

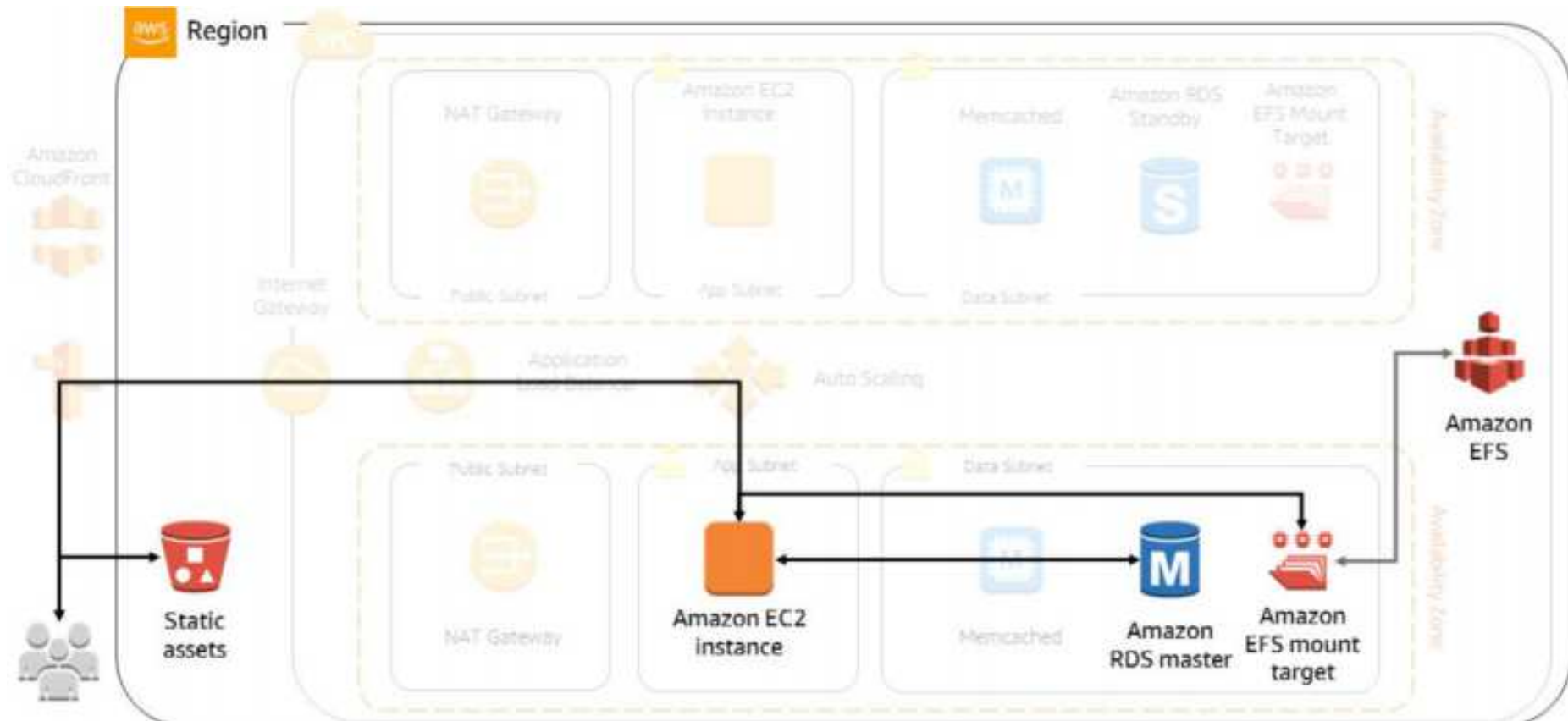
2.4

Capa de base de datos RDS

2.4 Capa de base de datos RDS

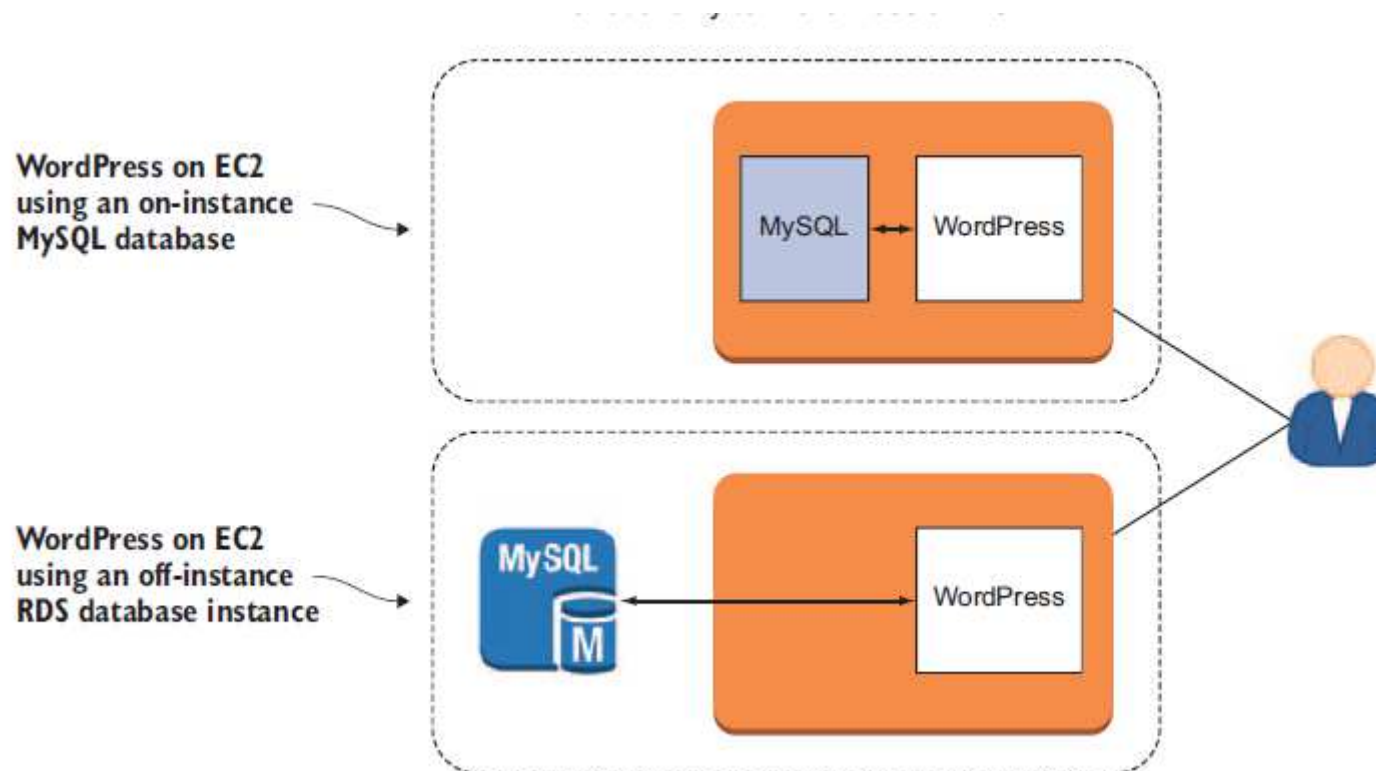
- AWS RDS ofrece un servicio para la gestión de bases de datos integrable con los servicios EC2
- AWS RDS se puede considerar SaaS
- Amazon se encarga de todo el hardware y competencias administrativas , como actualizaciones, ofreciendo una dirección IP (endpoint) mediante el cual acceder a la base de datos.
- MySQL, Oracle, Aurora, ...
- Servicio de replicación, disponibilidad

2.4 Capa de base de datos RDS



2.4 Capa de base de datos RDS

- AWS RDS Costo
- <http://calculator.s3.amazonaws.com/index.html>
- Un servicio db.t2.small un mes 24 horas aproximadamente costara 25\$



2.4 Capa de base de datos RDS

- Servicio AWS RDS gestionado vs base de datos alojado en un servidor virtual

	Amazon RDS	Self-hosted on virtual servers
Cost for AWS services	Higher because RDS costs more than virtual servers (EC2)	Lower because virtual servers (EC2) are cheaper than RDS
Total cost of ownership	Lower because operating costs are split among many customers	Much higher because you need your own manpower to manage your database
Quality	AWS professionals are responsible for the managed service.	You'll need to build a team of professionals and implement quality control yourself.
Flexibility	High, because you can choose a relational database system and most of the configuration parameters	Higher, because you can control every part of the relational database system you installed on virtual servers

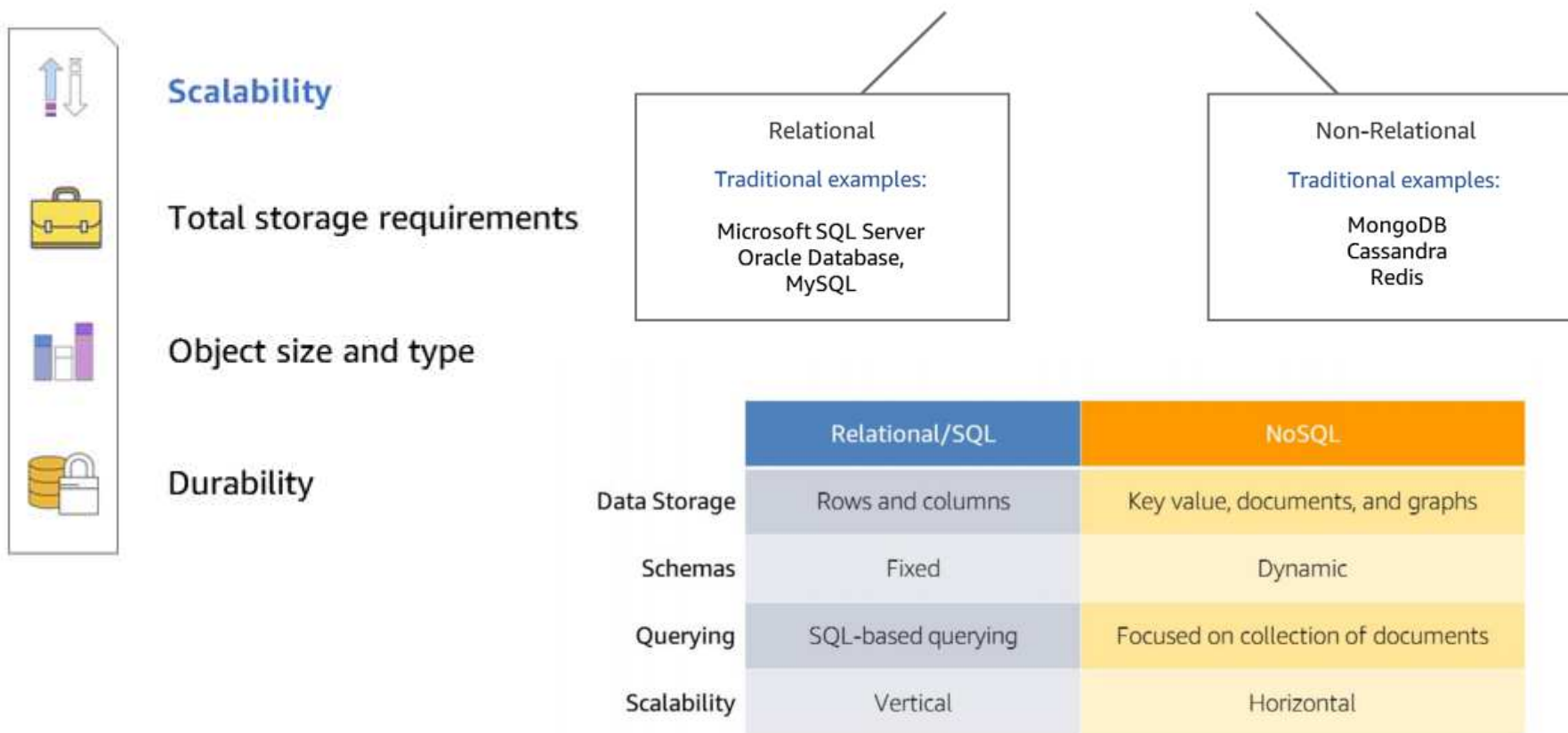
2.4 Capa de base de datos RDS

- Servicio AWS RDS gestionado vs base de datos alojado en un servidor virtual



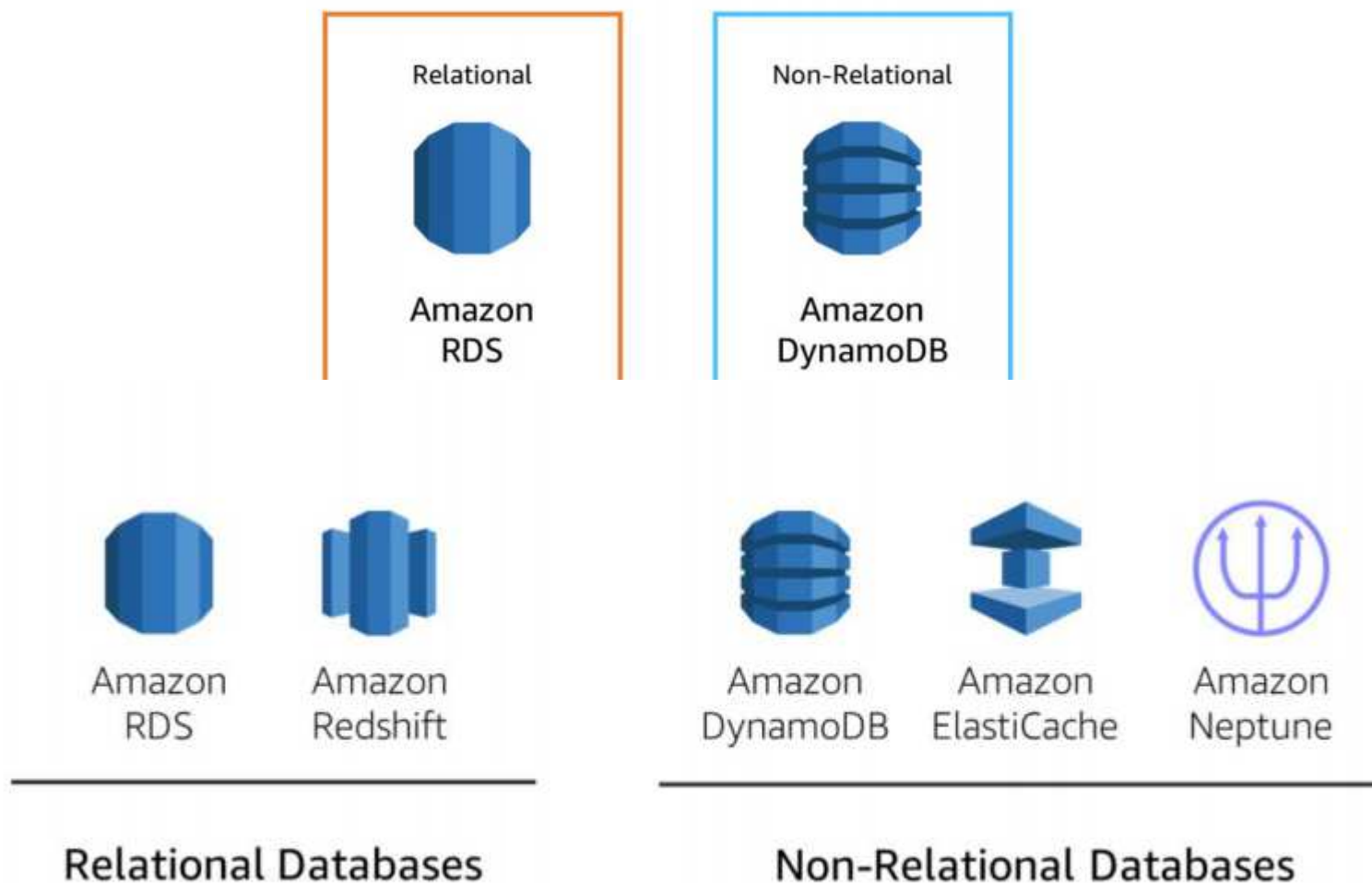
2.4 Capa de base de datos RDS

- Consideraciones para la selección del tipo de servicio de base de datos



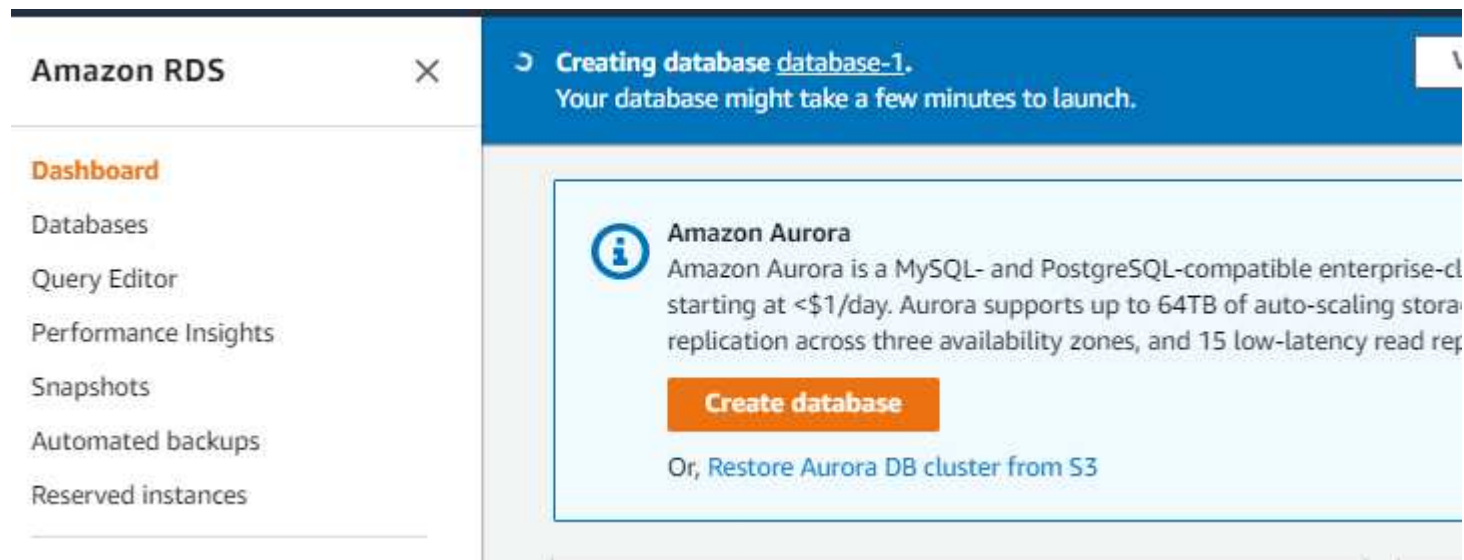
2.4 Capa de base de datos RDS

- Servicios de bases de datos AWS



2.4 Capa de base de datos RDS

- Creación de bases de datos RDS



2.4 Capa de base de datos RDS

- Importando datos a las bases de datos
- Creando dump

```
$mysqldump -u $UserName -p $DatabaseName > dump.sql
```

- Localizar endpoint y volcar información

```
$aws rds describe-db-instances --query DBInstances[0].Endpoint.Address  
$export DBHostname=$(aws rds describe-db-instances --query  
$DBInstances[0].Endpoint.Address)  
$DBHostname=`echo $DBHostname | sed -e 's/"//g`  
$mysql --host $DBHostname --user admin -p < dump.sql
```

2.4 Capa de base de datos RDS

- Servicios de migración

Source Database	Target Database
Microsoft SQL Server	Amazon Aurora, MySQL, PostgreSQL
MySQL	PostgreSQL
Oracle	Amazon Aurora, MySQL, PostgreSQL
Oracle Data Warehouse	Amazon Redshift
PostgreSQL	Amazon Aurora, MySQL
Teradata	Amazon Redshift

2.4 Capa de base de datos RDS

- Backup y recuperación de datos

Dashboard

Databases

Query Editor

Performance Insights

Snapshots

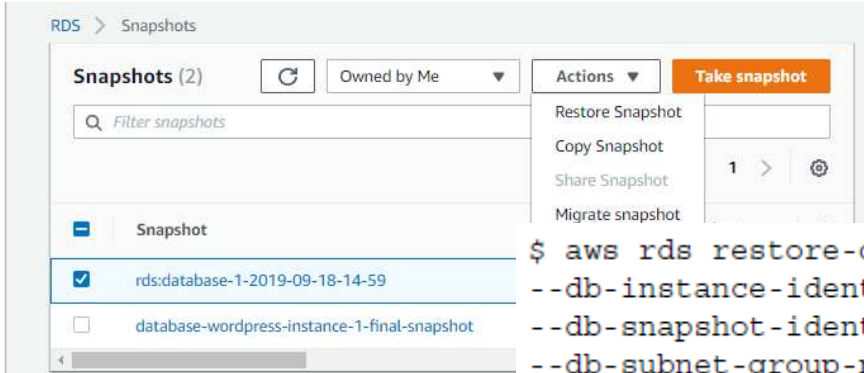
Automated backups

Reserved instances

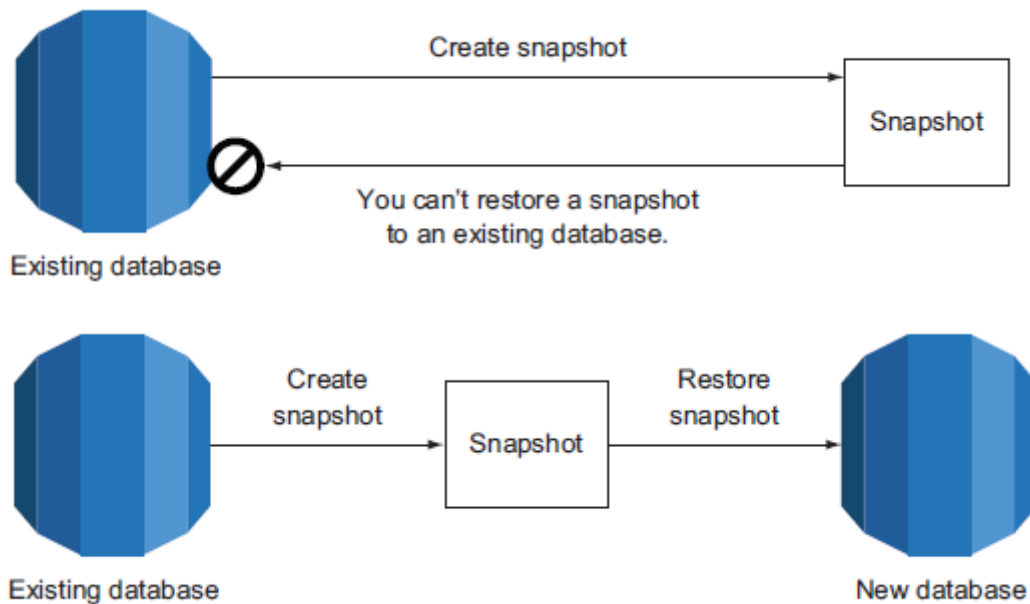
Subnet groups

Parameter groups

Option groups



```
$ aws rds restore-db-instance-from-db-snapshot \
--db-instance-identifier awsination-db-restore \
--db-snapshot-identifier wordpress-manual-snapshot \
--db-subnet-group-name $SubnetGroup
```



2.4 Capa de base de datos RDS

- Copiando un snapshot de una región a otra

```
$ aws rds copy-db-snapshot --source-db-snapshot-identifier \  
arn:aws:rds:us-east-1:$AccountId:snapshot:\  
wordpress-manual-snapshot --target-db-snapshot-identifier \  
wordpress-manual-snapshot --region eu-west-1
```

```
$ aws iam get-user --query "User.Arn" --output text  
arn:aws:iam::878533158213:user/mycli
```

← Account ID has 12 digits (878533158213)

2.4 Capa de base de datos RDS

- Borrado de bases de datos

The diagram illustrates the deletion of RDS database instances and snapshots. It consists of a list of AWS CLI commands on the left and four descriptive annotations on the right, connected by arrows.

```
$ aws rds delete-db-instance --db-instance-identifier \
awsinaction-db-restore --skip-final-snapshot
$ aws rds delete-db-instance --db-instance-identifier \
awsinaction-db-restore-time --skip-final-snapshot
$ aws rds delete-db-snapshot --db-snapshot-identifier \
wordpress-manual-snapshot
$ aws rds delete-db-snapshot --db-snapshot-identifier \
wordpress-copy-snapshot
$ aws --region eu-west-1 rds delete-db-snapshot --db-snapshot-identifier \
wordpress-manual-snapshot
```

Deletes the database with data from the snapshot restore (points to the first command)

Deletes the database with data from the point-in-time restore (points to the second command)

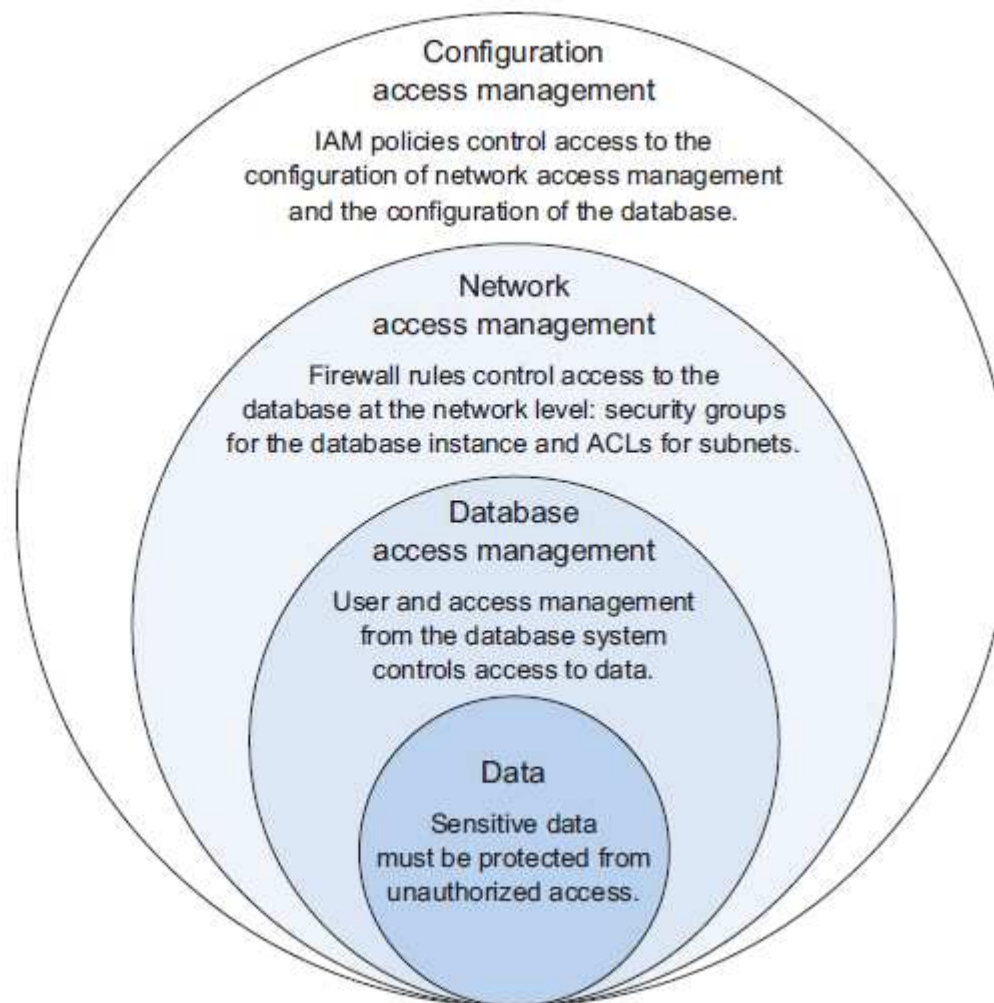
Deletes the manual snapshot (points to the third command)

Deletes the copied snapshot (points to the fourth command)

Deletes the snapshot copied to another region (points to the fifth command)

2.4 Capa de base de datos RDS

- Control de acceso



2.4 Capa de base de datos RDS

- Control de acceso : Gestión RDS : IAM Policy

```
{  
  "Version": "2012-10-17",  
  "Statement": [{  
    "Sid": "Stmt1433661637000",  
    "Effect": "Allow",  
    "Action": ["rds:*"],  
    "Resource": "*" } ]  
}
```

The IAM policy allows the specified actions on the specified resources.

All possible actions on the RDS service are specified (for example, changes to the database configuration).

All RDS databases are specified.

2.4 Capa de base de datos RDS

- Control de acceso : Acceso de red: Security Group

```
{
  [...]
  "Resources": {
    [...]
    "DatabaseSecurityGroup": {
      "Type": "AWS::EC2::SecurityGroup",
      "Properties": {
        "GroupDescription": "awsinaction-db-sg",
        "VpcId": {"Ref": "VPC"},
        "SecurityGroupIngress": [{
          "IpProtocol": "tcp",
          "FromPort": "3306",
          "ToPort": "3306",
          "SourceSecurityGroupId": {"Ref": "WebServerSecurityGroup"}
        }]
      }
    },
    [...]
  },
  [...]
}
```

Security group for the database instance, allowing incoming traffic on the MySQL default port for web servers

The default MySQL port is 3306.

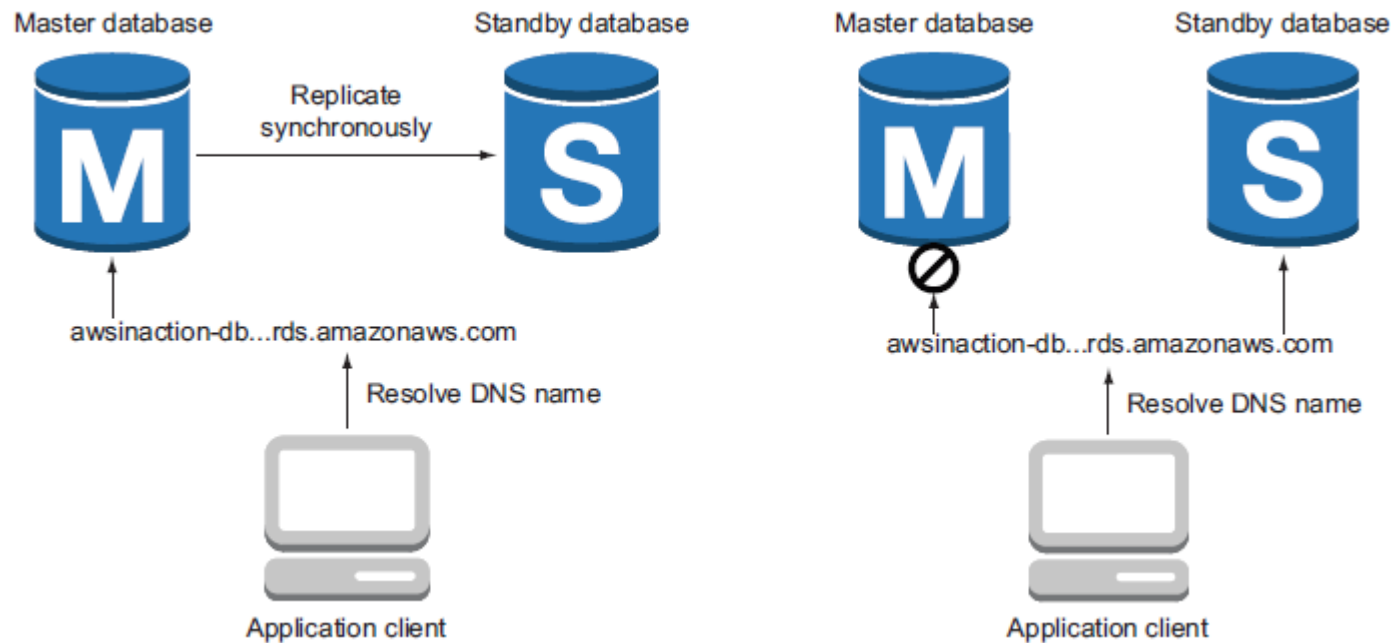
References the security group for web servers

2.4 Capa de base de datos RDS

- Control de acceso : Datos
 - Depende de cada gestor de base de datos
 - Mysql -> Mediante MsqIWorkBench

2.4 Capa de base de datos RDS

- Alta disponibilidad : Cluster : Replicas



2.4 Capa de base de datos RDS

- Alta disponibilidad : Cluster : Replicas

```
[...]
"Database": {
  "Type": "AWS::RDS::DBInstance",
  "Properties": {
    "AllocatedStorage": "5",
    "DBInstanceClass": "db.t2.micro",
    "DBInstanceIdentifier": "awsinaction-db",
    "DBName": "wordpress",
    "Engine": "MySQL",
    "MasterUsername": "wordpress",
    "MasterUserPassword": "wordpress",
    "VPCSecurityGroups": [
      { "Fn::GetAtt": ["DatabaseSecurityGroup", "GroupId"] }
    ],
    "DBSubnetGroupName": { "Ref": "DBSubnetGroup" },
    "MultiAZ": true
  }
}
[...]
```

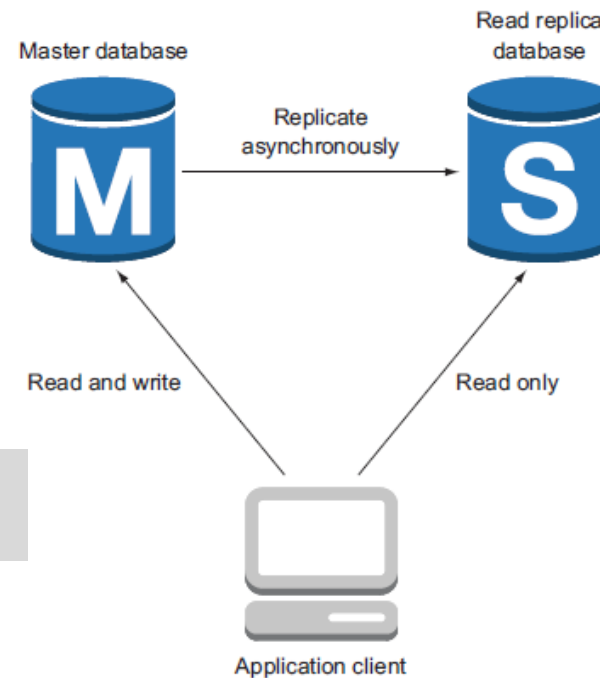
← Enables high-availability
deployment for the RDS
database

2.4 Capa de base de datos RDS

- Mejorando el rendimiento
 - Cambiar tipo de instancia
 - Cambiar tipo de almacenamiento
 - Usando la replicación para mejorar el rendimiento

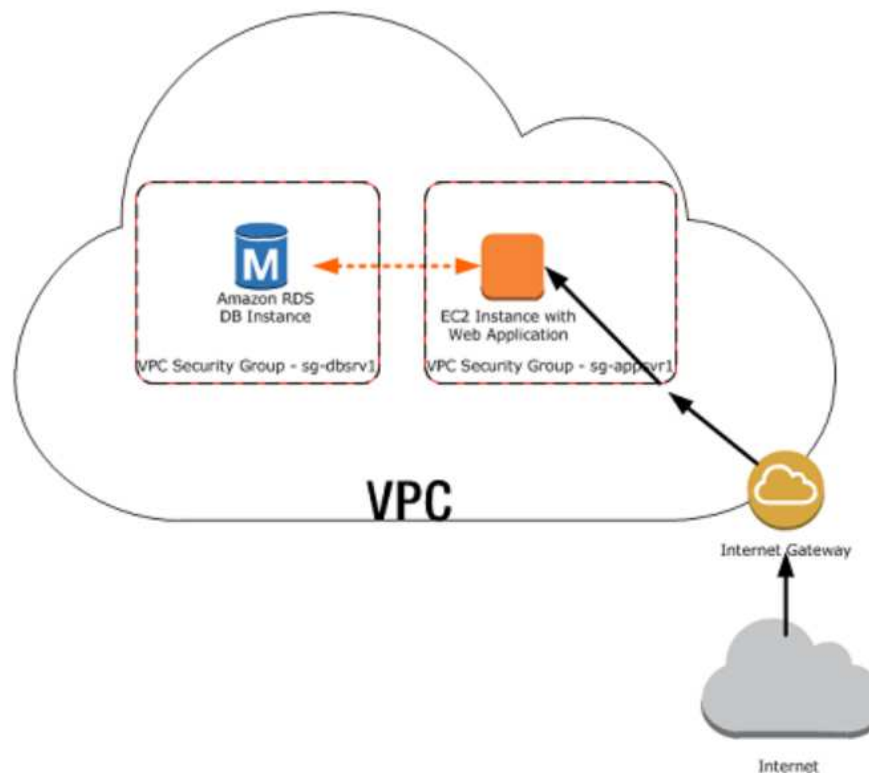
```
$ aws rds create-db-instance-read-replica \  
--db-instance-identifier awsinaction-db-read \  
--source-db-instance-identifier awsinaction-db
```

```
$ aws rds delete-db-instance --db-instance-identifier \  
awsinaction-db-read --skip-final-snapshot
```



2.4 Capa de base de datos RDS

- Practica 3 :
 - https://docs.aws.amazon.com/es_es/AmazonRDS/latest/UserGuide/CHAP_Tutorials.WebServerDB.CreateDBInstance.html



2.4 Capa de base de datos RDS

- Practica 3 : Crear grupos de seguridad para las dos instancias que se crearan
- Security Group : HTTP-security
 - VPC por defecto
 - Agregar regla de entrada para SSH y HTTP
- Security Group : DB-security
 - VPC por defecto
 - Agregar regla de entrada para MYSQL/Aurora
 - Aplicable a al security group HTTP-SECURITY

Type ⓘ	Protocol ⓘ	Port Range ⓘ	Source ⓘ
MYSQL/Aurora	TCP	3306	sg-0aed03a59421f8d18

2.4 Capa de base de datos RDS

- Practica 3 : Crear una base de datos AWS RDS

Create database


Choose a database creation method [Info](#)


☒ Standard Create
You set all of the configuration options, including ones for availability, security, backups, and maintenance.


☐ Easy Create
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.


Engine options


Engine type [Info](#)


☒ Amazon Aurora


☐ MySQL


☐ MariaDB


☐ PostgreSQL


☐ Oracle


☐ Microsoft SQL Server


Edition

☒ Amazon Aurora with MySQL compatibility
☐ Amazon Aurora with PostgreSQL compatibility

Version [Info](#)

Aurora (MySQL)-5.6.10a ▼

2.4 Capa de base de datos RDS

- Practica 3 : Configurar el servicio RDS

DB instance size

DB instance class [Info](#)
Choose a DB instance class that meets your processing power and memory requirements. The DB instance class options below are limited to those supported by the engine you selected above.

☐ Memory Optimized classes (includes r and x classes)

☒ Burstable classes (includes t classes)

db.t2.small

1 vCPUs 2 GiB RAM Not EBS Optimized

☐ Include previous generation classes

Availability & durability

Multi-AZ deployment [Info](#)

☐ Create an Aurora Replica/Reader node in a different AZ (recommended for scaled availability)
Creates an Aurora replica for fast failover and high availability.

☒ Don't create an Aurora Replica

2.4 Capa de base de datos RDS

- Practica 3 : Configurar el servicio RDS

Master username [Info](#)
Type a login ID for the master user of your DB instance.

admin

1 to 16 alphanumeric characters. First character must be a letter

☐ Auto generate a password
Amazon RDS can generate a password for you, or you can spe

Master password [Info](#)

.....

Constraints: At least 8 printable ASCII characters. Can't contain any

Confirm password [Info](#)

.....

2.4 Capa de base de datos RDS

- Practica 3 : Configurar el servicio RDS

Publicly accessible [Info](#)

☐ Yes

Amazon EC2 instances and devices outside the VPC can connect to your database. Choose one or more VPC security groups that specify which EC2 instances and devices inside the VPC can connect to the database.

☒ No

RDS will not assign a public IP address to the database. Only Amazon EC2 instances and devices inside the VPC can connect to your database.

VPC security group

Choose one or more RDS security groups to allow access to your database. Ensure that the security group rules allow incoming traffic from EC2 instances and devices outside your VPC. (Security groups are required for publicly accessible databases.)

☒

Choose existing

Choose existing VPC security groups

☐

Create new

Create new VPC security group

Existing VPC security groups

Choose VPC security groups ▼

DB-SECURITY X

Database port [Info](#)

TCP/IP port the database will use for application connections.

3306

2.4 Capa de base de datos RDS

- Practica 3 : Configurar nombre de base de datos

▼ Additional configuration

Database options, encryption enabled, failover, backup enabled, backtrack disabled, Enhanced Monitoring enabled, maintenance, CloudWatch Logs, delete protection enabled

Database options

DB instance identifier [Info](#)

master-practica-instance-1

If you do not provide one, a default identifier based on the cluster identifier will be used.

Initial database name [Info](#)

inventory

If you do not specify a database name, Amazon RDS does not create a database.

DB cluster parameter group [Info](#)

default.aurora5.6 ▼

DB parameter group [Info](#)

default.aurora5.6 ▼

2.4 Capa de base de datos RDS

- Practica 3 : Una vez creado comprobar el numero de instancias

database-1

Related

Q Filter databases

<input type="checkbox"/>	DB identifier	Role	Engine	Region & AZ	Size	Status
<input checked="" type="radio"/>	database-1	Regional	Aurora MySQL	us-east-1	2 instances	✓ Available
<input type="radio"/>	database-1-instance-1	Writer	Aurora MySQL	us-east-1c	db.t2.small	⌚ Creating
<input type="radio"/>	database-1-instance-1-us-east-1d	Reader	Aurora MySQL	us-east-1d	db.t2.small	⌚ Creating

2.4 Capa de base de datos RDS

- Practica 3 : Explorar la configuración clickando en modificar configuración

2.4 Capa de base de datos RDS

- Practica 3 : Crear instancia EC2 para albergar la página WEB
- Crear una maquina con el siguiente USER_DATA o instalarlo manualmente
 - Instala php, librerias mysql, httpd

```
#!/bin/bash
# Install Apache Web Server and PHP
yum install -y httpd mysql
amazon-linux-extras install -y php7.2
# Download Lab files
wget https://us-west-2-tcprod.s3.amazonaws.com/courses/ILT-TF-100-ARCHIT/v6.3.6/lab-2-
webapp/scripts/inventory-app.zip
unzip inventory-app.zip -d /var/www/html/
# Download and install the AWS SDK for PHP
wget https://github.com/aws/aws-sdk-php/releases/download/3.62.3/aws.zip
unzip aws -d /var/www/html
# Turn on web server
chkconfig httpd on
service httpd start
```

2.4 Capa de base de datos RDS

- Practica 3 : Crear instancia EC2 para albergar la página WEB
- Configurar acceso carpetas del servidor web

```
[ec2-user ~]$ sudo groupadd www
```

```
[ec2-user ~]$ sudo usermod -a -G www ec2-  
user
```

```
[ec2-user ~]$ exit
```

```
[ec2-user ~]$ groups  
ec2-user wheel www
```

```
[ec2-user ~]$ sudo chown -R root:www /var/www
```

```
[ec2-user ~]$ sudo chmod 2775 /var/www
```

```
[ec2-user ~]$ find /var/www -type d -exec sudo chmod 2775 {} +
```

```
[ec2-user ~]$ find /var/www -type f -exec sudo chmod 0664 {} +
```

2.4 Capa de base de datos RDS

- Practica 3 : Crear instancia EC2 para albergar la página WEB
- Crear aplicación WEB ejemplo y configurar acceso BBDD

```
[ec2-user ~]$ cd /var/www
[ec2-user ~]$ mkdir inc
[ec2-user ~]$ cd inc
[ec2-user ~]$ >dbinfo.inc
[ec2-user ~]$ nano dbinfo.inc
```

```
<?php
```

```
define('DB_SERVER', 'db_instance_endpoint');
define('DB_USERNAME', 'admin');
define('DB_PASSWORD', 'password');
define('DB_DATABASE', 'sample');
```

```
?>
```

2.4 Capa de base de datos RDS

- Practica 3 : Crear instancia EC2 para albergar la página WEB
- Crear aplicación WEB ejemplo

```
[ec2-user ~]$ cd /var/www/html
```

```
[ec2-user ~]$ >SamplePage.php
```

```
[ec2-user ~]$ nano SamplePage.php
```

```
<?php include "../inc/dbinfo.inc"; ?>
<html>
<body>
<h1>Sample page</h1>
<?php

    /* Connect to MySQL and select the database. */
    $connection = mysqli_connect(DB_SERVER, DB_USERNAME, DB_PASSWORD);

    if (mysqli_connect_errno()) echo "Failed to connect to MySQL: " .

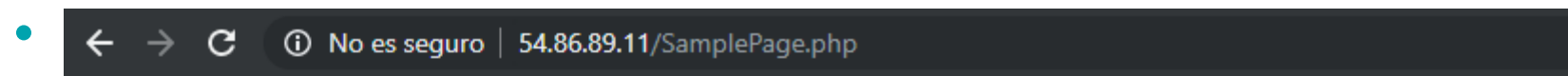
    $database = mysqli_select_db($connection, DB_DATABASE);

    /* Ensure that the EMPLOYEES table exists. */
    VerifyEmployeesTable($connection, DB_DATABASE);

    /* If input fields are populated, add a row to the EMPLOYEES table
    $employee_name = htmlentities($_POST['NAME']);
    $employee_address = htmlentities($_POST['ADDRESS']);
```

2.4 Capa de base de datos RDS

- Practica 3 : Crear instancia EC2 para albergar la página WEB



Sample page

NAME	ADDRESS	
<input type="text"/>	<input type="text"/>	<input type="button" value="Add Data"/>

ID	NAME	ADDRESS
1	joseba	matxinestarta
2	froga2	froga2

2.4 Capa de base de datos RDS

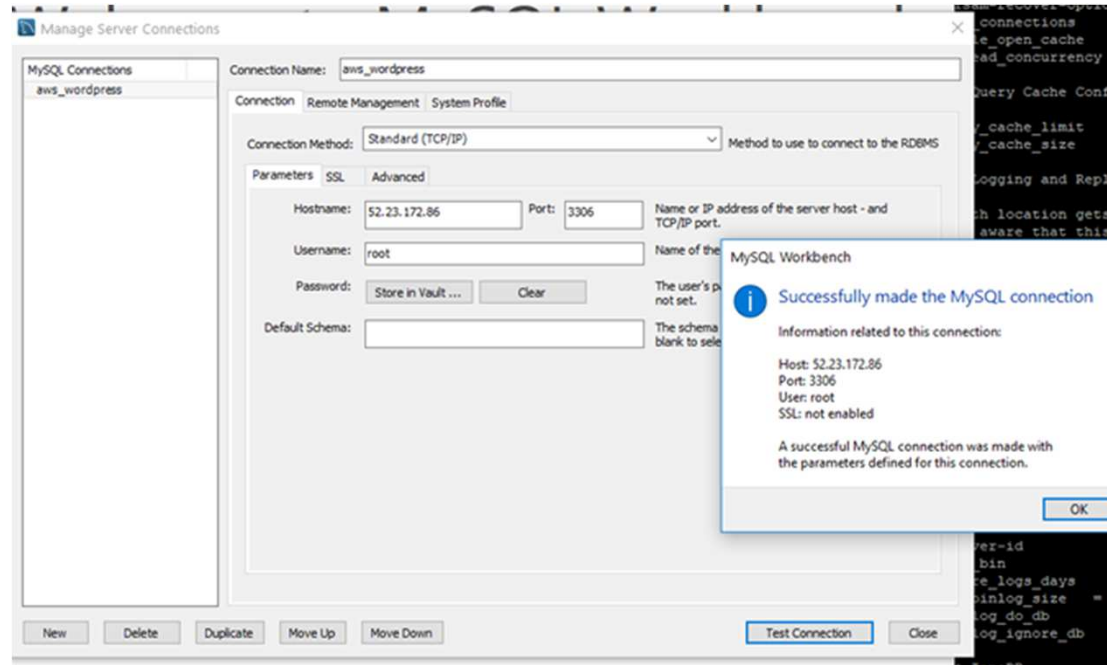
- Practica 4: Migración de la base de datos de wordpress a RDS
 - Crear una copia de la base de datos actual
 - Crear una instancia en Amazon RDS
 - Configurar los grupos de seguridad
 - Rellenar/actualizar la nueva base de datos
 - Configurar wordpress con la nueva base de datos

2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Conectarse a la base de datos mediante una herramienta gestora de base de datos, como phpMyAdmin , MySQL Workbench, cPanel
 - Confiurar para que un usuario se pueda conectar remotamente (*hacerlo con root es peligroso , sobre todo si no esta activado el acceso ssl*)
 - `$GRANT ALL PRIVILEGES ON *.* TO 'root'@'%' IDENTIFIED BY 'password';`
 - Modificar el bind address de la configuracion de mysql
 - `/etc/mysql/mysql.conf.d/mysql.cnf` (comentar el `bind_address`)
 - Reiniciar el servicio
 - `sudo service mysql restart`

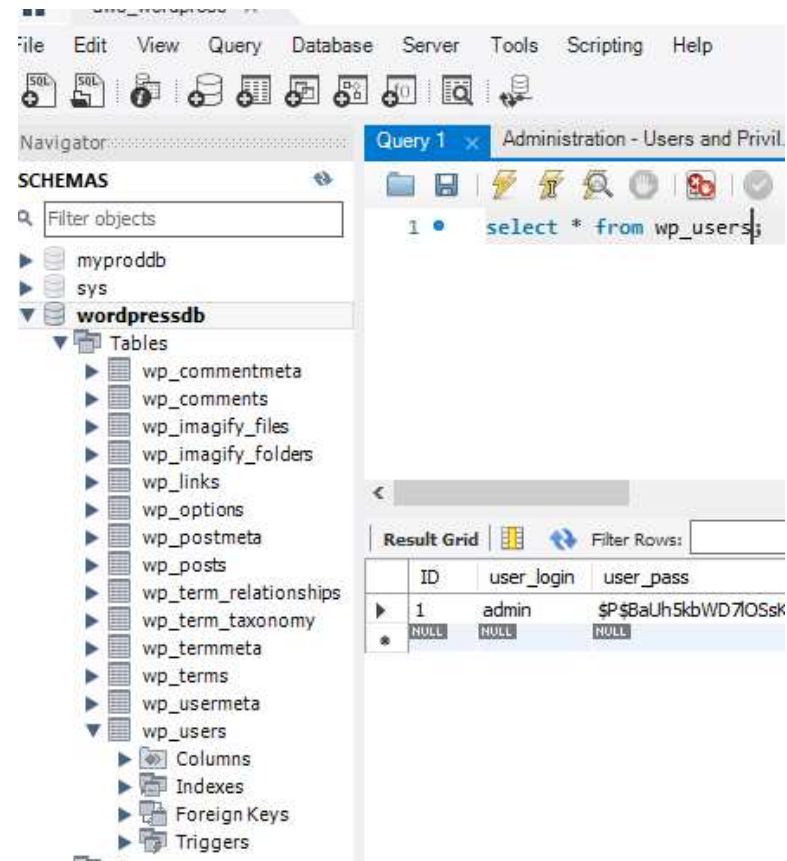
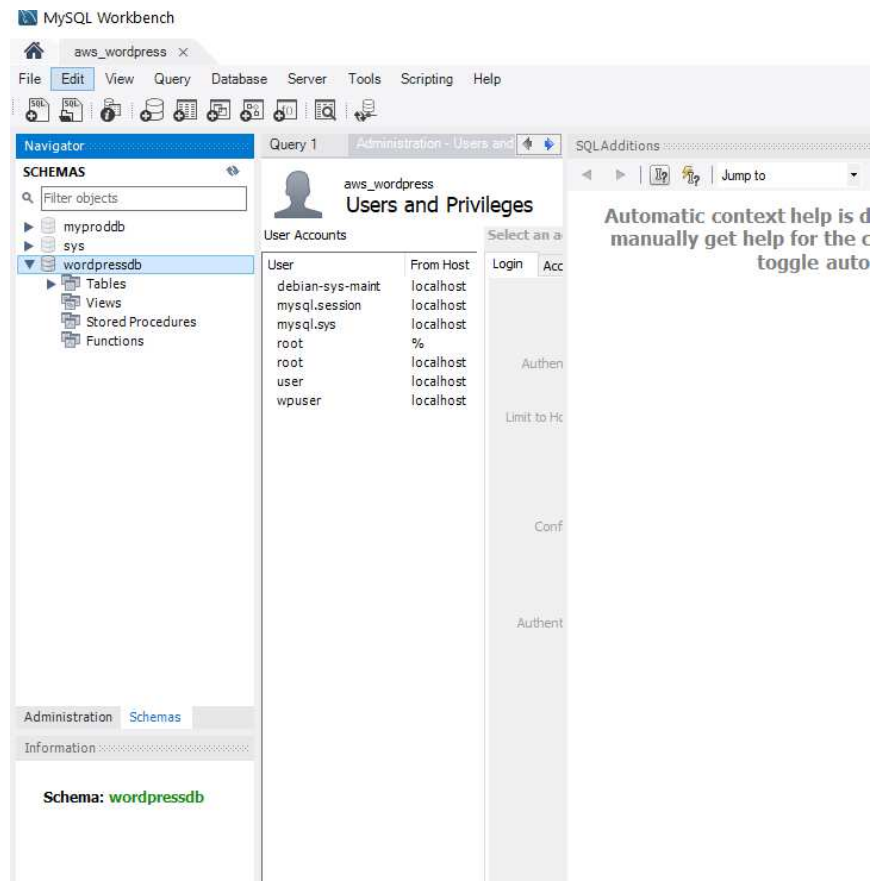
2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Conectarse a la base de datos mediante una herramienta gestora de base de datos, como phpMyAdmin , MySQL Workbench, cPanel



2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Conectarse a la base de datos



2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Crear una copia de la base de datos actual
`$mysqldump -u root -p --all-databases > dump.sql`

2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Crear una instancia en Amazon RDS



The screenshot shows the Amazon RDS console interface. At the top, there are navigation icons. Below them is a table with columns: DB identifier, Role, and Engine. The table contains two entries. The first entry, 'database-wordpress', is selected and highlighted in light blue. It has a 'Regional' role and 'Aurora MySQL' engine. The second entry, 'database-wordpress-instance-1', is listed below it with a 'Writer' role and 'Aurora MySQL' engine. A line connects the 'database-wordpress' entry to 'database-wordpress-instance-1', indicating it is the primary instance for the database.

DB identifier	Role	Engine
database-wordpress	Regional	Aurora MySQL
database-wordpress-instance-1	Writer	Aurora MySQL

2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Crear un usuario para la base de datos 'wordpressdb'
 - Crear el usuario con permisos ALL_PRIVILEGES
 - Update, insert, delete , seletc

```
ubuntu@ip-172-31-28-67:~$ mysql -u root -p --host database-1.c7fy4dzdqxep.us-east-1.rds.amazonaws.com
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 243
Server version: 5.7.22-log Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE USER 'wpuser'@'%' IDENTIFIED BY 'mypassword';
Query OK, 0 rows affected (0.01 sec)

mysql> GRANT SELECT ON wordpressdb.* TO 'jeffrey'@'%' ;
Query OK, 0 rows affected, 1 warning (0.01 sec)

mysql> flush privileges;
Query OK, 0 rows affected (0.00 sec)
```

2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Configurar los grupos de seguridad
 - Poner como publico si se quiere navegar en la base de datos
 - Permitir acceder a la base de datos al servidor WEB

2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Rellenar/actualizar la nueva base de datos
 - Obtener Endpoint

```
$export DBHostname=$(aws rds describe-db-instances --query  
DBInstances[0].Endpoint.Address)
```

```
$mysql -u root -p -h endpoint < dump.sql
```


2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - Modificar wordpress para que se conecte a la nueva base de datos

```
/** The name of the database for WordPress */
define( 'DB_NAME', 'wordpressdb' );

/** MySQL database username */
define( 'DB_USER', 'wpuser' );

/** MySQL database password */
define( 'DB_PASSWORD', 'mypassword' );

/** MySQL hostname */
define( 'DB_HOST', 'database-1.c7fy4dzdqpex.us-east-1-rds.amazonaws.com' );

/** Database Charset to use in creating database tables. */
define( 'DB_CHARSET', 'utf8' );

/** The Database Collate type. Don't change this if in doubt. */
define( 'DB_COLLATE', '' );

/**#@+
 * Authentication Unique Keys and Salts.
 */
```

2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS
 - En la base de datos esta el host/dominio antiguo
 - Modificar mediante el script de la primera práctica

← → × ⓘ 3.91.58.22/wp-login.php?redirect_to=http%3A%2F%2F52.23.172.86%2Fwp-admin%2F...



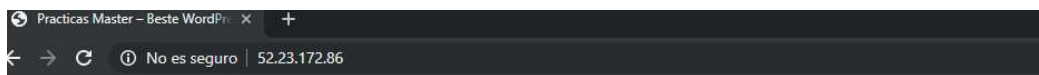
No se puede acceder a este sitio web

3.91.58.22 ha tardado demasiado tiempo en responder.

```
ubuntu@ip-172-31-28-67:~$ mysql -h database-1.c7fy4dzdqp.xp.us-east-1.rds.amazonaws.com -uroot -p --execute "SET @url='52.23.172.86' ; source word
press_domain.sql;";
Enter password:
+-----+-----+-----+-----+
| option_id | option_name | option_value | autoload |
+-----+-----+-----+-----+
| 2 | home | http://52.23.172.86 | yes |
| 1 | siteurl | http://52.23.172.86 | yes |
+-----+-----+-----+-----+
```

2.4 Capa de base de datos RDS

- Practica 4: Migración de la base de datos de wordpress a RDS



Practicas Master — Beste WordPress gune bat besterik ez

Kaixo mundua!1

Ongi etorri WordPressera. Hau zure lehen bidalketa da idazten!

