

RDS (Amazon Relational Database Service)



Amazon RDS



Aquesta obra sols es pot compartir per usos educatius per alumnes i professors d'instituts públics o concertats

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□Xavier Cardona Peris 2019

xcardona@xtec.cat

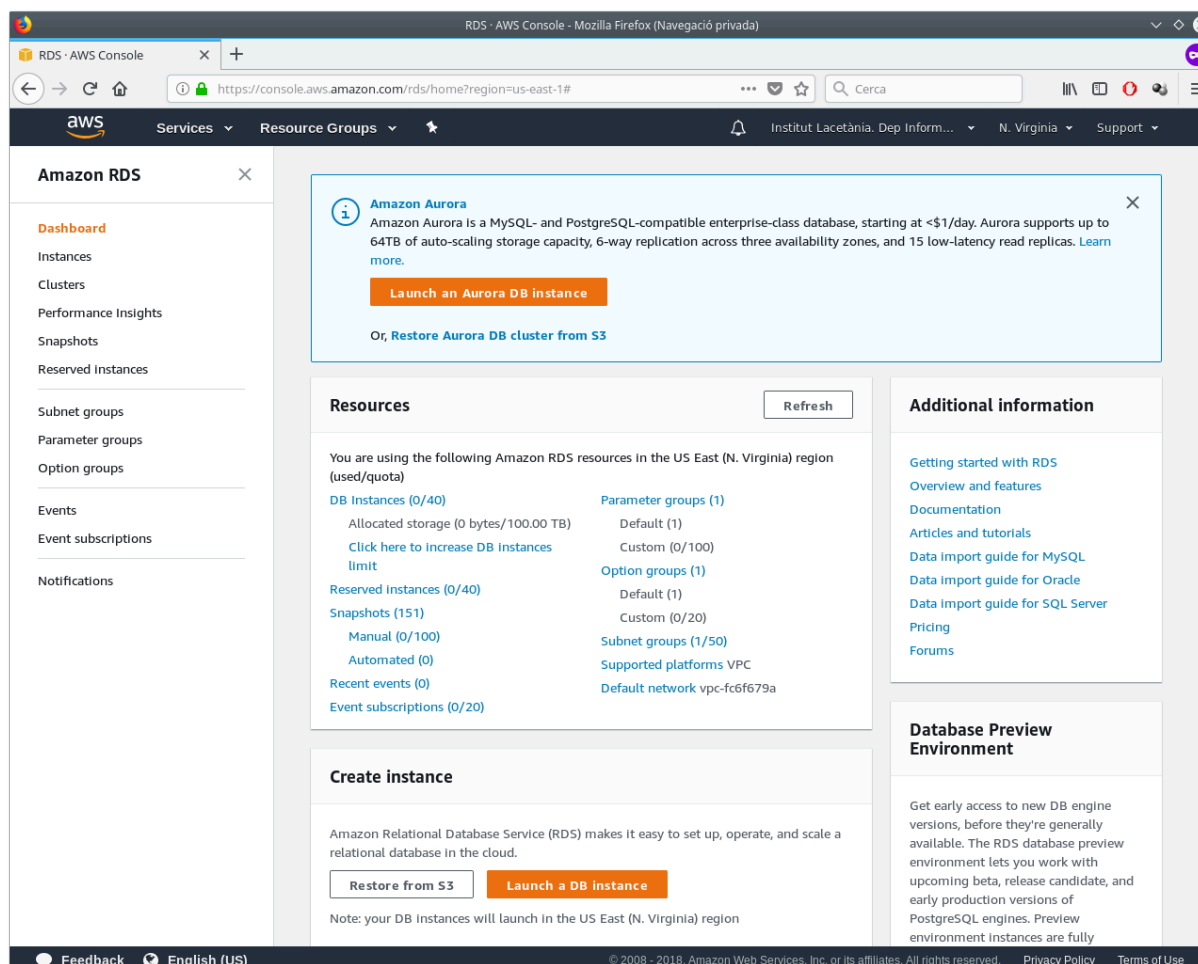
Introducció	3
Mysql	3
Connexió a Mysql desde EC2	11
Còpies de seguretat en RDS	14
Crear un Snapshot	14
Restaura un Snapshot	15
Restaura un Snapshot en un dia, hora i segon determinat	16
Multi AZ (Availability Zone)	17
Read replicas	18
Creant una read replica	18

Introducció

RDS permet crear bases de dades relacionals al núvol, que poden escalar segons les necessitats. RDS admet les següents bases de dades: [Amazon Aurora](#), [PostgreSQL](#), [MySQL](#), [MariaDB](#), [Oracle](#) i [Microsoft SQL Server](#). També ens dona un servei per migrar entre les diferents bases de dades.

Mysql

Utilitzarem MySQL ja que és la base de dades més popular.
Obriu la consola d'Amazon i trieu RDS.



Aneu al menú esquerra Databases->

Create database

Next

Trieu MySQL i, a sota,

The screenshot shows the 'Select engine' step of the AWS RDS 'Create database' wizard. On the left, a sidebar lists four steps: Step 1 (Select engine), Step 2 (Choose use case), Step 3 (Specify DB details), and Step 4 (Configure advanced settings). The main area is titled 'Select engine' and contains a section 'Engine options' with six database engine choices, each with a radio button and a logo: Amazon Aurora, MySQL (selected), MariaDB, PostgreSQL, Oracle, and Microsoft SQL Server.

Trieu Dev/Test perquè és gratuïta durant un any:

The screenshot shows the 'Choose use case' step of the AWS RDS 'Launch DB Instance' wizard. The sidebar on the left shows Step 1 (Select engine) and Step 2 (Choose use case) as active. The main area is titled 'Choose use case' and contains a 'Use case' section with the question 'Do you plan to use this database for production purposes?'. There are three radio button options: 'Production - Amazon Aurora' (marked 'Recommended'), 'Production - MySQL', and 'Dev/Test - MySQL' (selected). Below these options, a note states 'Billing is based on RDS pricing.' At the bottom right, there are 'Cancel', 'Previous', and 'Next' buttons.

Com la base de dades que triem és la gratuïta, marquem “Only enable options eligible for RDS Free Usage Tier”



Free tier

The Amazon RDS Free Tier provides a single db.t2.micro instance as well as up to 20 GiB of storage, allowing new AWS customers to gain hands-on experience with Amazon RDS. Learn more about the RDS Free Tier and the instance restrictions [here](#).

☒ Only enable options eligible for RDS Free Usage Tier [Info](#)

Especifiqueu en DB instance class la més petita de totes (db.t2.micro), en Multi-AZ deployment trieu “No” i en DBInstance identifier tieu “mysql1instance”, en Master username “mysql1user” i en password un de difícil, com *l2234aSSdk349sdl*

RDS · AWS Console - Mozilla Firefox (Navegació privada)

RDS · AWS Console

https://console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance:ct=db

aws Services Resource Groups

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Step 1 Select engine

Step 2 Choose use case

Step 3 Specify DB details

Step 4 Configure advanced settings

Specify DB details

Instance specifications

Estimate your monthly costs for the DB Instance using the [AWS Simple Monthly Calculator](#).

DB engine
MySQL Community Edition

License model [Info](#)
general-public-license

DB engine version [Info](#)
mysql 5.6.39

[Known Issues/Limitations](#)
Review the [Known Issues/Limitations](#) to learn about potential compatibility issues with specific database versions.

[Free tier](#)
The Amazon RDS Free Tier provides a single db.t2.micro Instance as well as up to 20 GiB of storage, allowing new AWS customers to gain hands-on experience with Amazon RDS. Learn more about the RDS Free Tier and the Instance restrictions [here](#).

☒ Only enable options eligible for RDS Free Usage Tier [Info](#)

DB Instance class [Info](#)
db.t2.micro — 1 vCPU, 1 GiB RAM

Multi-AZ deployment [Info](#)
☐ Create replica in different zone
Creates a replica in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency

Feedback English (US)

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RDS · AWS Console - Mozilla Firefox (Navegació privada)

https://console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance:ct=db

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Estimated monthly costs

DB Instance	12.41 USD
Storage	2.30 USD
Total	14.71 USD

Billing estimate is based on on-demand usage as described in [Amazon RDS Pricing](#). Estimate does not include costs for backup storage, I/Os (if applicable), or data transfer.

Estimate your monthly costs for the DB Instance using the [AWS Simple Monthly Calculator](#).

Settings

DB Instance Identifier [Info](#)
Specify a name that is unique for all DB Instances owned by your AWS account in the current region.

DB instance identifier is case insensitive, but stored as all lower-case, as in "mydbinstance". Must contain from 1 to 63 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Cannot end with a hyphen or contain two consecutive hyphens.

Master username [Info](#)
Specify an alphanumeric string that defines the login ID for the master user.

Master Username must start with a letter. Must contain 1 to 16 alphanumeric characters.

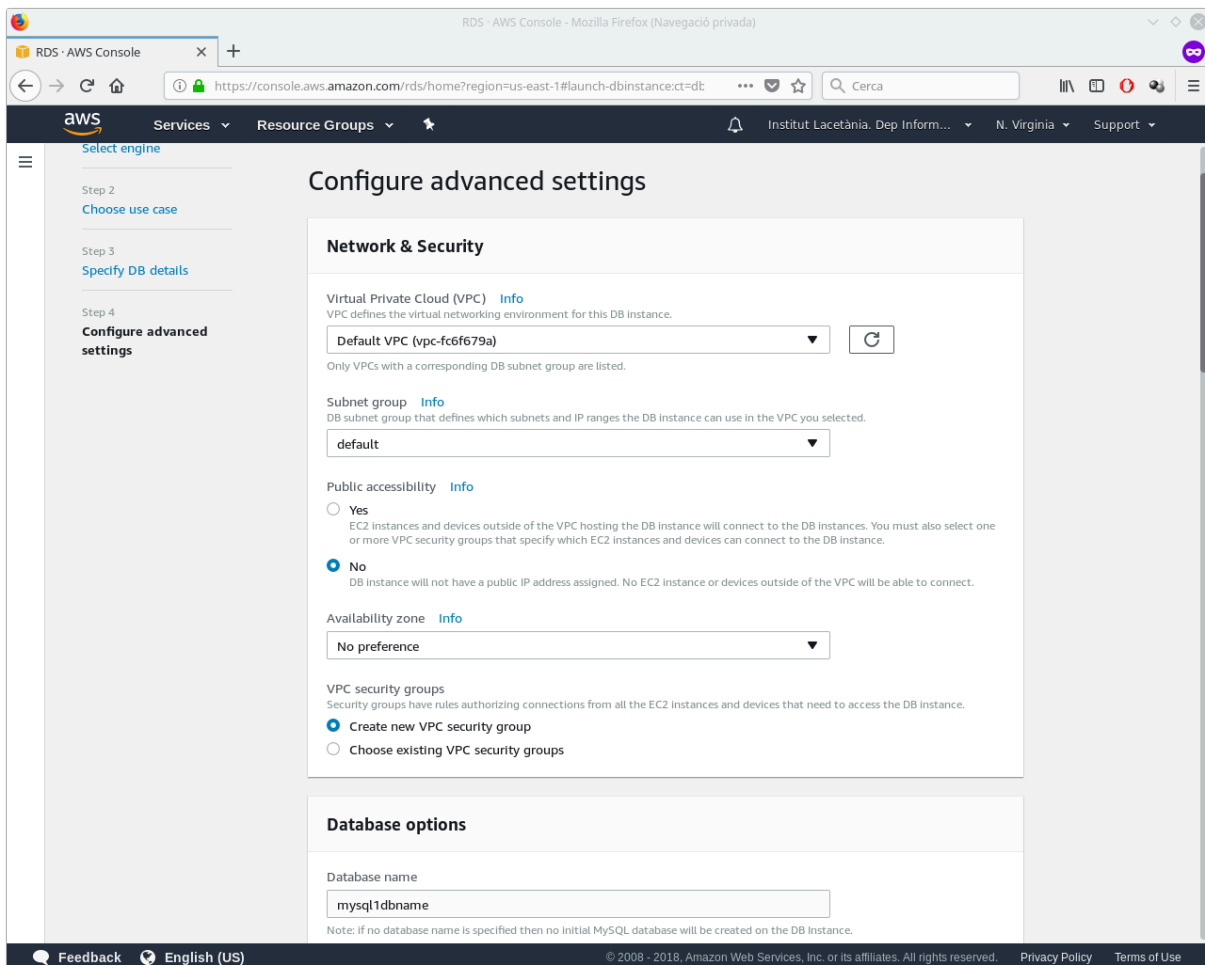
Master password [Info](#) **Confirm password** [Info](#)

Master Password must be at least eight characters long, as in "mypassword". Can be any printable ASCII character except "/", "", or "@".

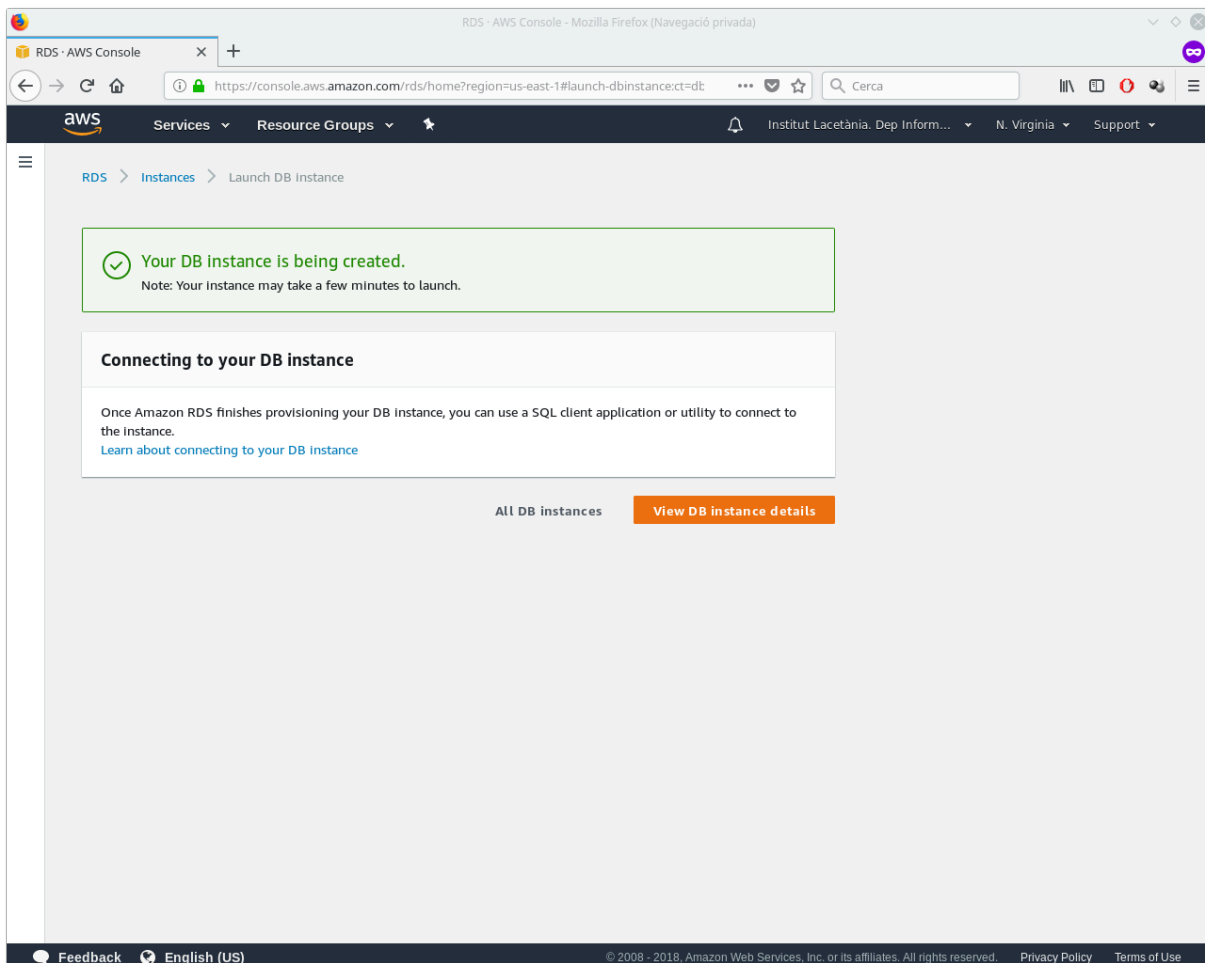
Cancel Previous **Next**

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A la següent finestra, trieu a Public accessibility "No" i a Database Name "mysql1dbname"



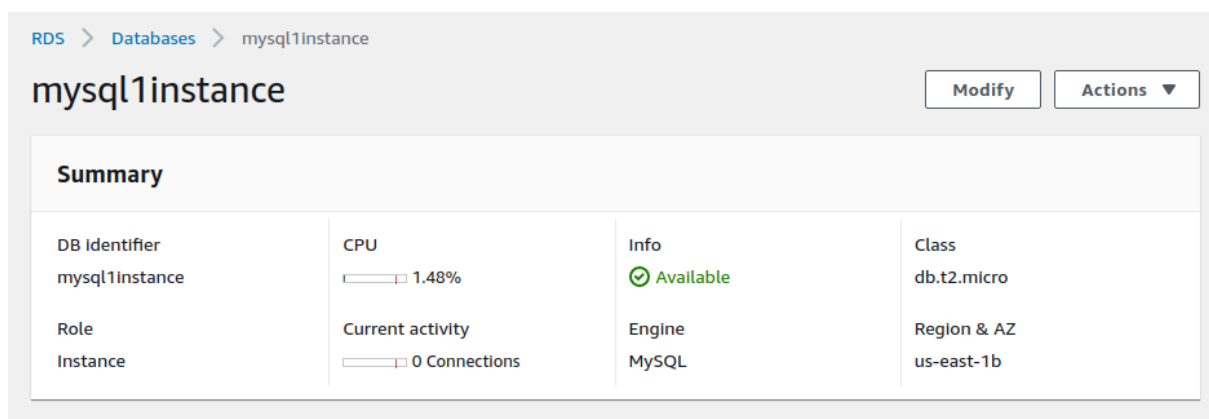
I ja la podeu engegar



Info

Espereu uns minuts a que s'engegue i aparega

Available

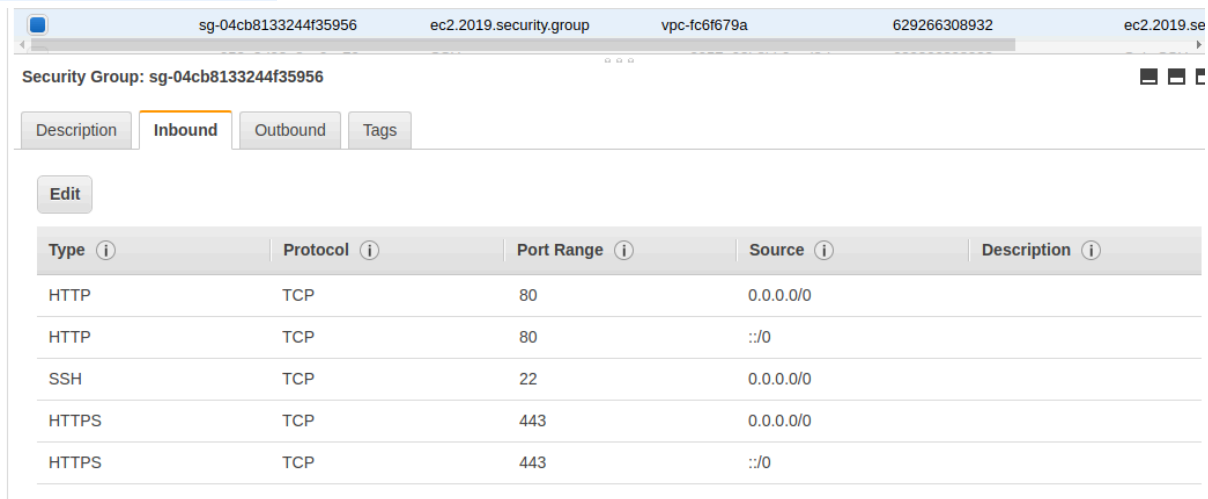


Farem una connexió entre EC2 i RDS.

Aneu a EC2 i al menú esquerre trieu NETWORK&SECURITY-> Security groups

Localitzeu el grup que ja hem definit anteriorment, amb accés a HTTP, HTTPS i SSH, primer hem de veure el codi del grup.

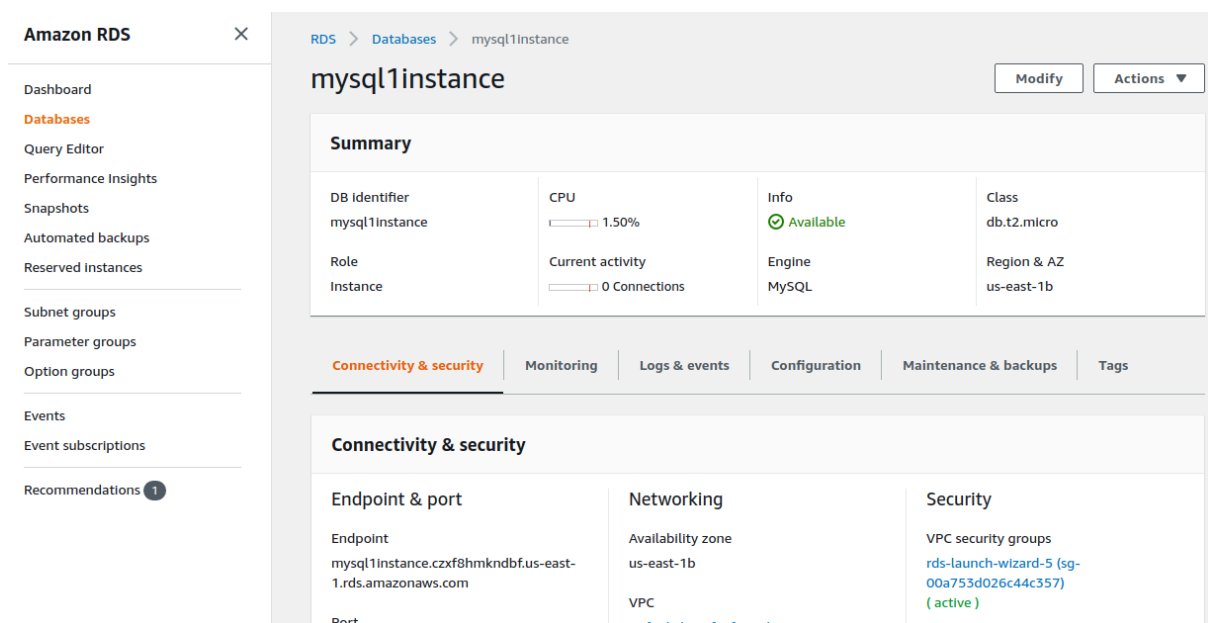
En el meu cas, el grup s'anomena `ec2.2019.security.group` i el Group ID és `sg-04cb8133244f35956`



Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	
HTTP	TCP	80	::/0	
SSH	TCP	22	0.0.0.0/0	
HTTPS	TCP	443	0.0.0.0/0	
HTTPS	TCP	443	::/0	

Caldrà modificar el Security Grup de la instància Mysql per afegir-li accés del Security Group `ec2.2019.security.group`

Aneu a RDS, trieu la base de dades i el Security Group de la base de dades.



Summary

DB Identifier mysql1instance	CPU 1.50%	Info Available	Class db.t2.micro
Role Instance	Current activity 0 Connections	Engine MySQL	Region & AZ us-east-1b

Connectivity & security

Endpoint & port Endpoint mysql1instance.czx8hmkndbf.us-east-1.rds.amazonaws.com Port	Networking Availability zone us-east-1b VPC Default (vpc-fc6f679a)	Security VPC security groups rds-launch-wizard-5 (sg-00a753d026c44c357) (active)
--	---	---

Security

VPC security groups

`rds-launch-wizard-5 (sg-00a753d026c44c357)`
(active)

Agegiu el grup al Inbound

Edit inbound rules

Type ⓘ

Protocol ⓘ

Port Range ⓘ

Source ⓘ

Description ⓘ

MYSQL/Aurora

TCP

3306

Custom

sg-04cb8133244f35956

e.g. SSH for Admin Desktop

Add Rule

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel

Save

Connexió a Mysql desde EC2

Per poder connectar EC2 amb MySQL, ho farem amb PHP.

```
$ sudo su
# yum update
# yum install httpd php php-mysql
# chkconfig httpd on
# service httpd restart
```

Creeu el fitxer /var/www/html/info.php:

```
<?php
    phpinfo();
```

Obriu amb el navegador el DNS de la vostra EC2 amb el fitxer creat info.php.

En el meu cas:

phpinfo() - Mozilla Firefox (Navegació privada) <2>

phpinfo()

ec2-52-201-223-236.compute-1.amazonaws.com/info.php

Cerca

PHP Version 5.3.29



System	Linux ip-172-31-76-74 4.14.47-56.37.amzn1.x86_64 #1 SMP Wed Jun 6 18:49:01 UTC 2018 x86_64
Build Date	May 12 2015 22:42:47
Configure Command	'./configure' '--build=x86_64-redhat-linux-gnu' '--host=x86_64-redhat-linux-gnu' '--target=x86_64-amazon-linux-gnu' '--program-prefix=' '--prefix=/usr' '--exec-prefix=/usr' '--bindir=/usr/bin' '--sbindir=/usr/sbin' '--sysconfdir=/etc' '--datadir=/usr/share' '--includedir=/usr/include' '--libdir=/usr/lib64' '--libexecdir=/usr/libexec' '--localstatedir=/var' '--sharedstatedir=/var/lib' '--mandir=/usr/share/man' '--infodir=/usr/share/info' '--cache-file=../config.cache' '--with-libdir=lib64' '--with-config-file-path=/etc' '--with-config-file-scan-dir=/etc/php.d' '--disable-debug' '--with-pic' '--disable-rpath' '--without-pear' '--with-bz2' '--with-exec-dir=/usr/bin' '--with-freetype-dir=/usr' '--with-png-dir=/usr' '--with-xpm-dir=/usr' '--enable-gd-native-ttf' '--with-t1lib=/usr' '--without-gdgm' '--with-gettext' '--with-gmp' '--with-iconv' '--with-jpeg-dir=/usr' '--with-openssl' '--with-pcre-regex=/usr' '--with-zlib' '--with-layout=GNU' '--enable-exif' '--enable-ftp' '--enable-magic-quotes' '--enable-sockets' '--with-kerberos' '--enable-ucd-snmp-hack' '--enable-shmop' '--enable-calendar' '--without-sqlite' '--with-libxml-dir=/usr' '--enable-xml' '--with-system-tzdata' '--with-mhash' '--with-apxs2=/usr/sbin/apxs' '--libdir=/usr/lib64/php' '--enable-pdo=shared' '--with-mysql=shared,/usr' '--with-mysqli=shared,/usr/lib64/mysql/mysql_config' '--with-pdo-mysql=shared,/usr/lib64/mysql/mysql_config' '--with-pdo-sqlite=shared,/usr' '--without-gd' '--disable-dom' '--disable-dba' '--without-unixODBC' '--disable-xmlreader' '--disable-xmlwriter' '--without-sqlite3' '--disable-phar' '--disable-fileinfo' '--disable-json' '--without-pspell' '--disable-wddx' '--without-curl' '--disable-posix' '--disable-sysmsg' '--disable-sysvshm' '--disable-sysvsem'
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc
Loaded Configuration File	/etc/php.ini
Scan this dir for additional .ini files	/etc/php.d
Additional .ini files parsed	/etc/php.d/curl.ini, /etc/php.d/fileinfo.ini, /etc/php.d/json.ini, /etc/php.d/mysqli.ini, /etc/php.d/mysqli.ini, /etc/php.d/pdo.ini, /etc/php.d/pdo_mysql.ini, /etc/php.d/pdo_sqlite.ini, /etc/php.d/phar.ini, /etc/php.d/sqlite3.ini, /etc/php.d/zip.ini
PHP API	20090626
PHP Extension	20090626
Zend Extension	220090626
Zend Extension Build	API220090626.NTS
PHP	API20090626.NTS

Creeu el fitxer /var/www/html/db.php. Caldrà que modifiqueu la línia \$hostname pel vostre DNS de la màquina MYSQL (anomenat endpoint) i també el \$dbname:

Amazon RDS

×

Dashboard
Databases
Query Editor
Performance Insights
Snapshots
Automated backups
Reserved Instances
Subnet groups
Parameter groups
Option groups
Events
Event subscriptions
Recommendations 1

Summary

DB Identifier

mysql1instance

CPU

Role

Instance

Current

Connectivity & security

Monitoring

Connectivity & security

Endpoint & port

Endpoint

mysql1instance.czxf8hmknadb.us-east-1.rds.amazonaws.com

Port

3306

```

<?php
$username = "mysql1user";
$password = "l2234aSSdk349sdl";
$hostname = "mysql1instance.czxf8hmknadb.us-east-1.rds.amazonaws.com";

$dbname = "mysql1dbname";

//connection to the database
$dbhandle = mysql_connect($hostname, $username, $password) or die("Unable to connect to MySQL");
echo "Connected to MySQL using username - $username, password - $password, host - $hostname<br>";
$selected = mysql_select_db("$dbname",$dbhandle) or die("Unable to connect to MySQL DB - check the database name and try again.");
?>

```

Obriu amb el navegador aquest fitxer. En el meu cas:

ec2-52-201-223-236.compute-1.amazonaws.com/db.php

Connected to MySQL using username - mysql1user, password - l2234\$aSSdk349sdl, host - mysql1instance.czx8hmkndbf.us-east-1.rds.amazonaws.com

Finalment, esborreu el RDS creat

The screenshot shows the AWS Management Console for the 'mysql1instance' RDS instance. The left sidebar lists navigation options: Dashboard, Instances (highlighted), Clusters, Performance Insights, Snapshots, Reserved Instances, Subnet groups, Parameter groups, Option groups, Events, and Event subscriptions. The main content area shows the instance details under the 'Summary' tab. A table lists the following information:

Summary		
Engine	DB Instance class	DB Instance status
MySQL 5.6.39	db.t2.micro	available

Below the summary, there is a 'CloudWatch (58)' section with a legend for 'mysql1instance' and a search bar. To the right, the 'Instance actions' dropdown menu is open, showing options: Modify, Stop, Reboot, Delete (highlighted), Create read replica, Create Aurora read replica, Promote read replica, Take snapshot, Restore to point in time, and Migrate snapshot.

Com no hem creat cap informació, ho esborrem tot

Delete mysql1instance instance?



Are you sure you want to Delete the **mysql1instance** DB Instance?

Create final snapshot?

Determines whether a final DB Snapshot is created before the DB instance is deleted.

No

- ☒ I acknowledge that upon instance deletion, automated backups, including system snapshots and point-in-time recovery, will no longer be available.

Enter the phrase **delete me** into the field below to confirm deletion

delete me



We strongly recommend taking a final snapshot before instance deletion since after your instance is deleted, automated backups will no longer be available.

Cancel

Delete

Elimineu també la màquina virtual EC2

Còpies de seguretat en RDS

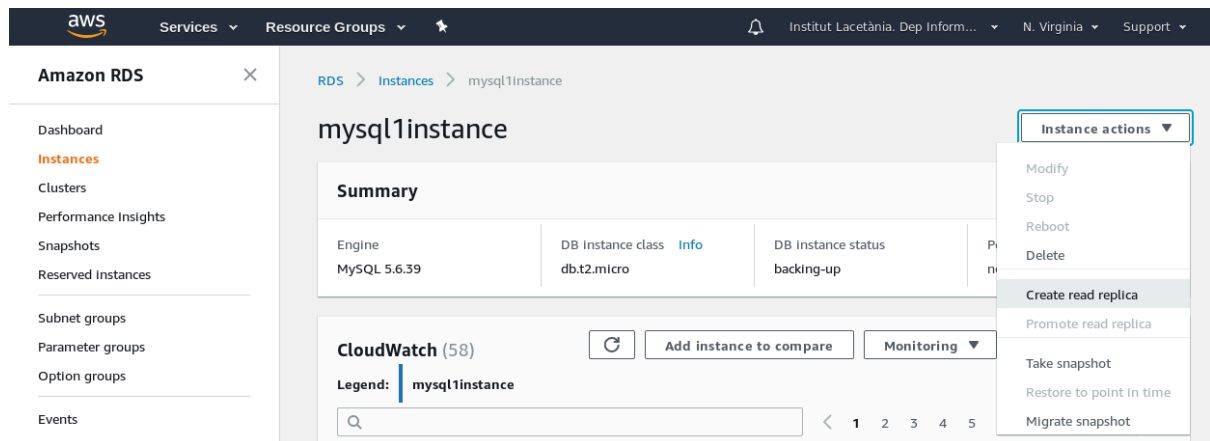
Hi ha dos tipus de còpies de seguretat en RDS:

- Automated Backups: Es desa la base de dades entre 1 i 35 dies i, a més, els transaction logs de la base de dades, de manera que es pot reconstruir la base de dades en un moment amb una precisió d'un segon. Es desen a S3. Durant la còpia de seguretat, la base de dades es queda en suspensió. Quan s'esborra la base de dades, també s'esborren.
- DB snapshots: Es fan manualment. No s'esborren quan s'esborra la base de dades

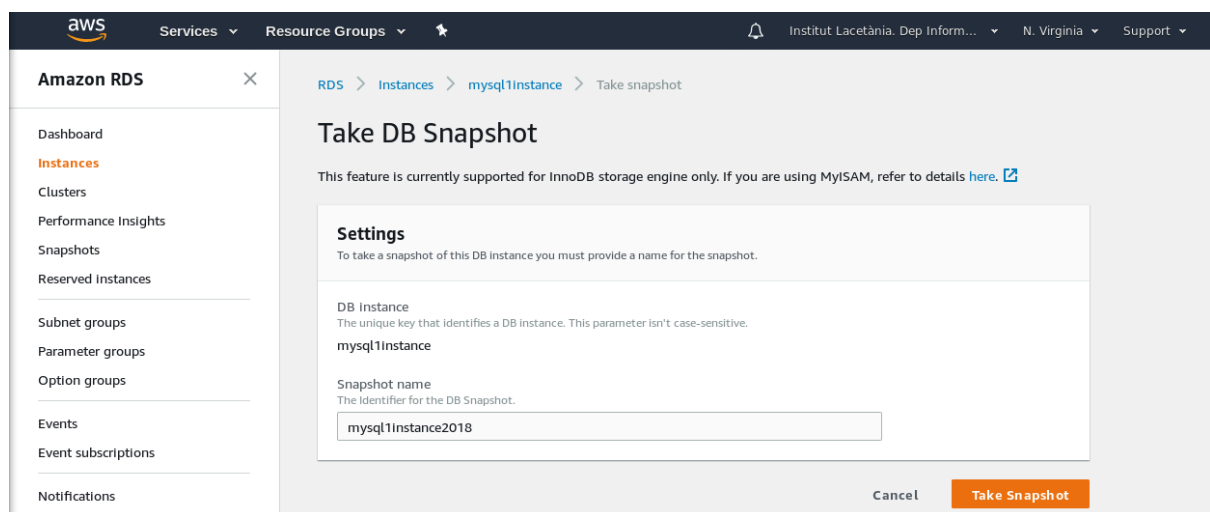
Quan es restaura qualsevol de les dues anteriors, es crea una nova instància RDS.

Crear un Snapshot

Per crear un Snapshot, entreu a la consola d'Amazon ->[RDS](#)->Actions->Take snapshot



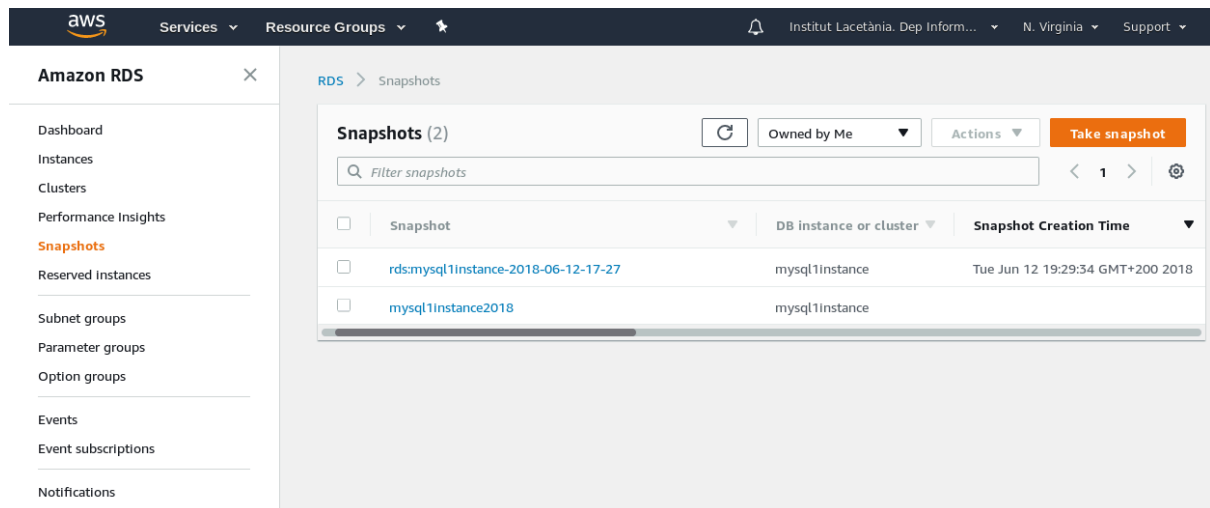
Doneu-li un nom a l'snapshot



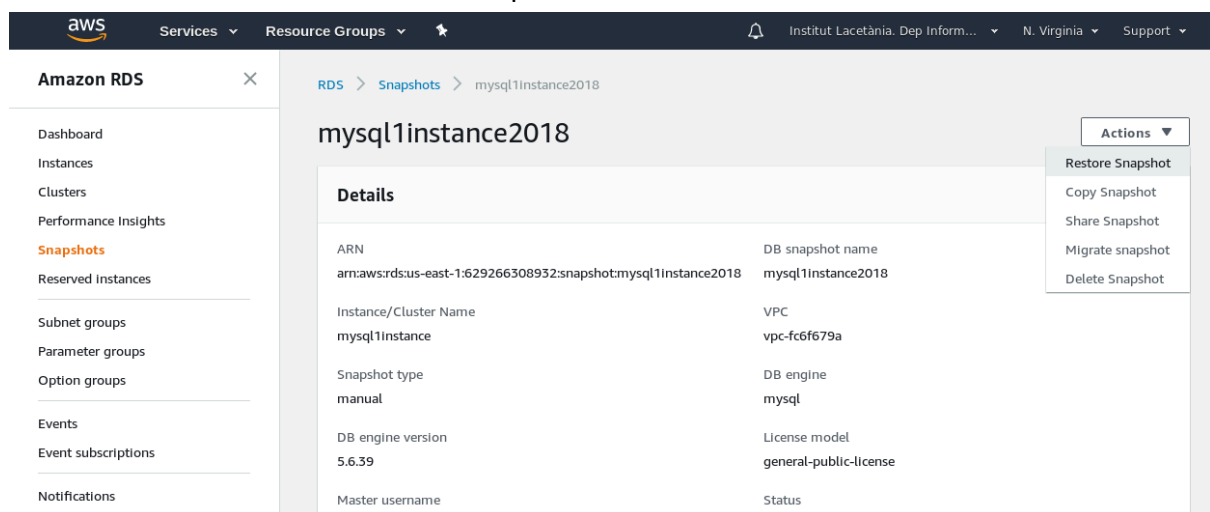
Espereu uns minuts fins que acabe.

Restaura un Snapshot

Trieu en el menú esquerre Snapshots i feu click en el Snapshot que voleu restaurar. En el meu cas, el [mysql1instance2018](#) (vigileu que ja estiga la còpia finalitzada).



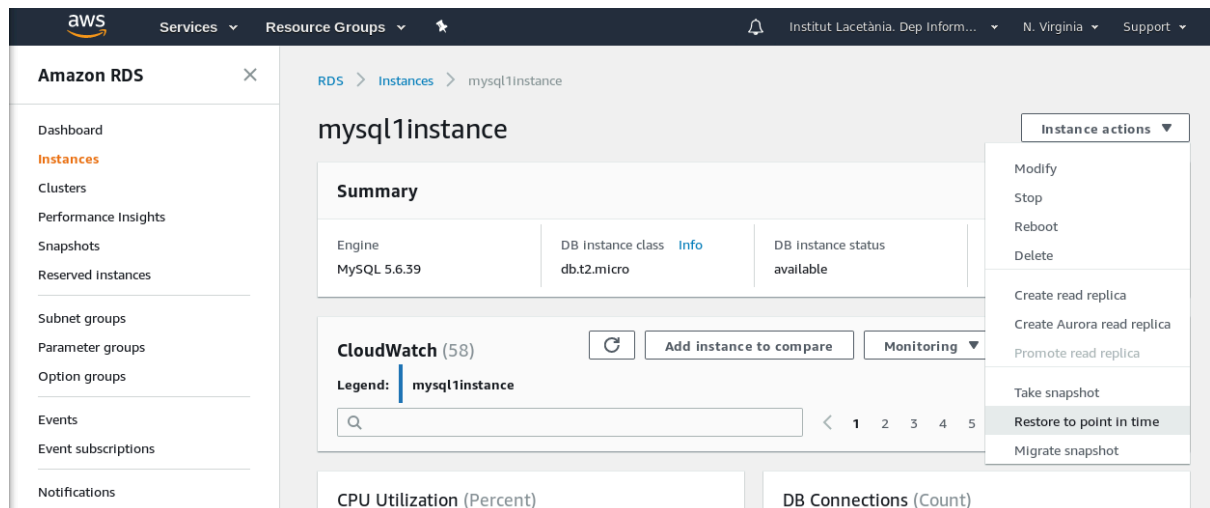
Trieu al menú de la dreta “Restore Snapshot”



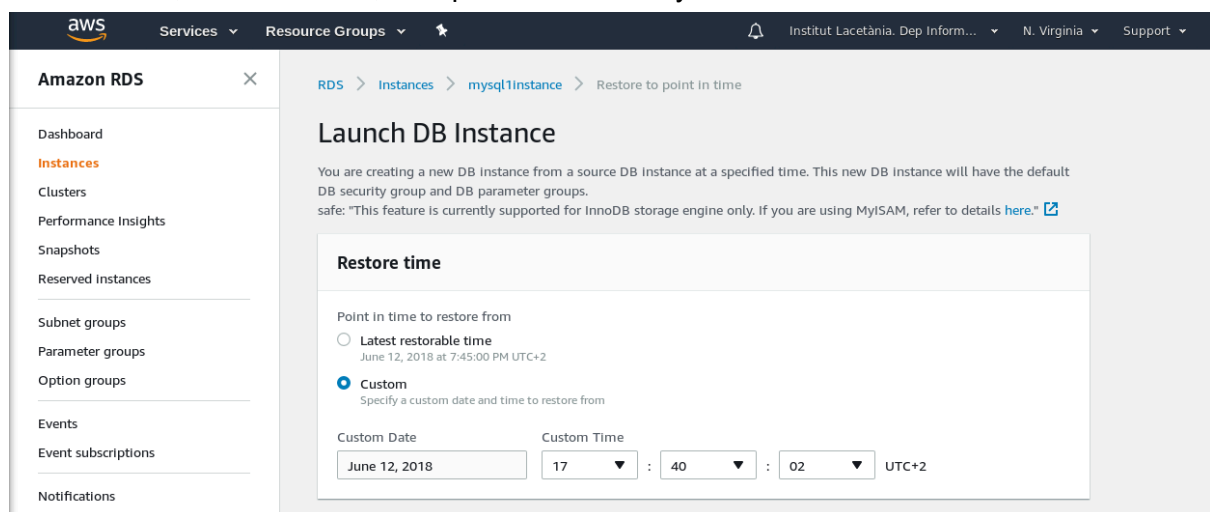
Seguiu els passos indicats anteriorment per restaurar el snapshot.

Restaura un Snapshot en un dia, hora i segon determinat

Entreu a RDS, feu click en una DB instance i trieü “Restore to point in time”



Restaurarem, en el meu cas, la còpia del 12 de Juny a les 17:40:02

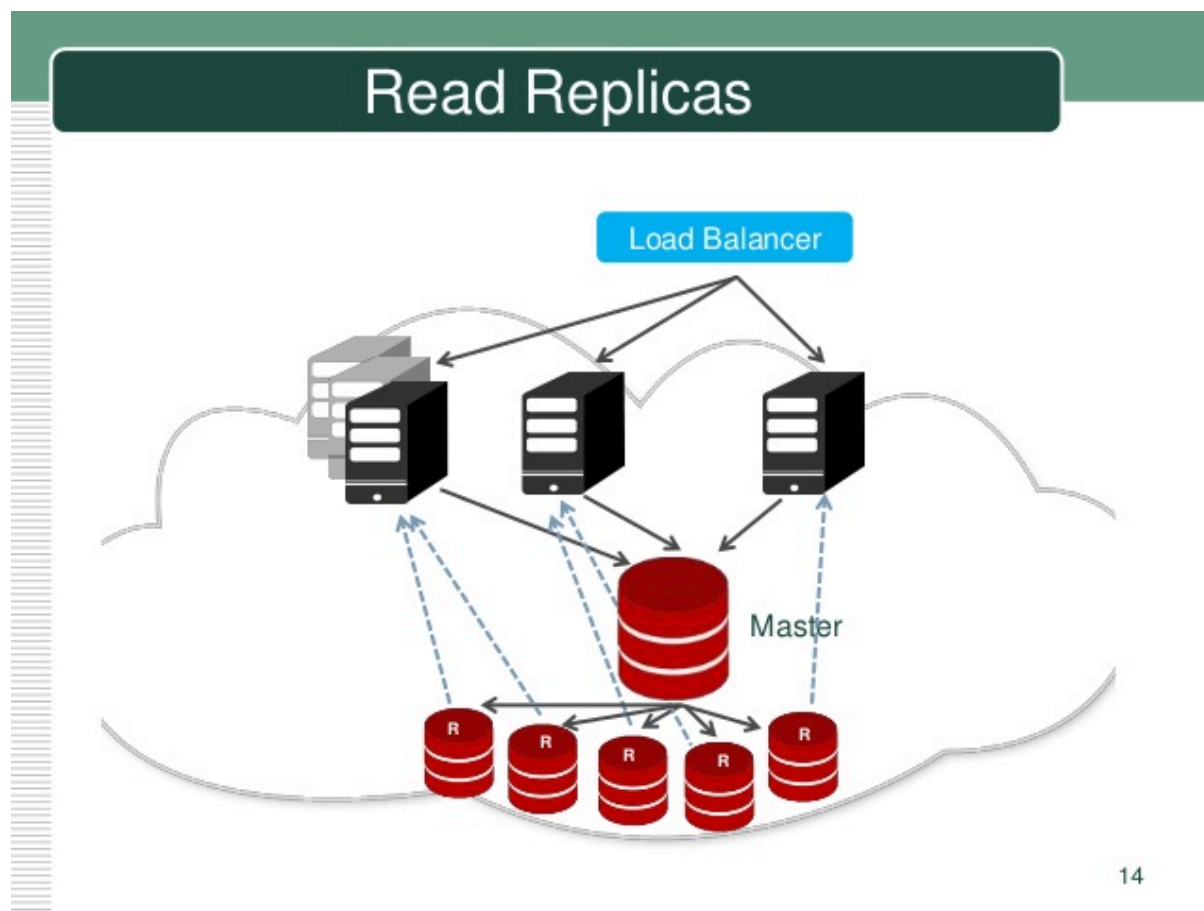


Multi AZ (Availability Zone)

RDS permet tenir **sols dues** Bases de Dades sincronitzades sincronament en diferent zones, una de les bases de dades s'anomena Master i l'altra Replica.

Crearem un esquema com el següent amb un balancejador de càrrega. Diverses instàncies EC2, una còpia Master de la Base de dades i altra rèplica de la base de dades.

Read replicas



14

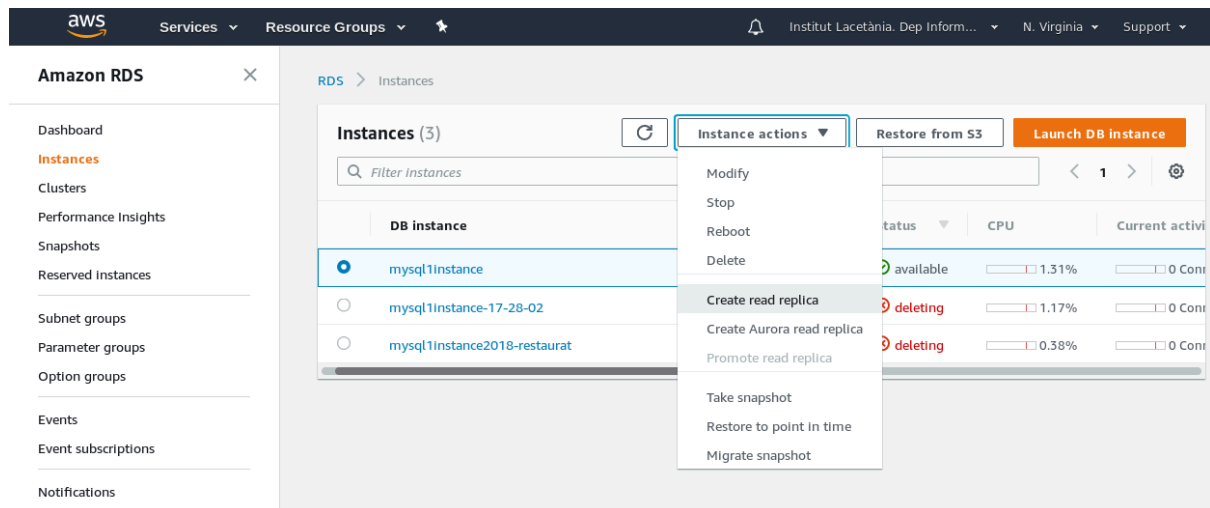
Es creen fins a 5 còpies asíncrones de sols lectura de la base de dades, cadascuna amb un DNS end point diferent. Millora en velocitat si cada instància llegeix d'una còpia diferent de la base de dades. Si es necessiten més de 5 còpies, es poden fer Read replicas d'una Read replica.



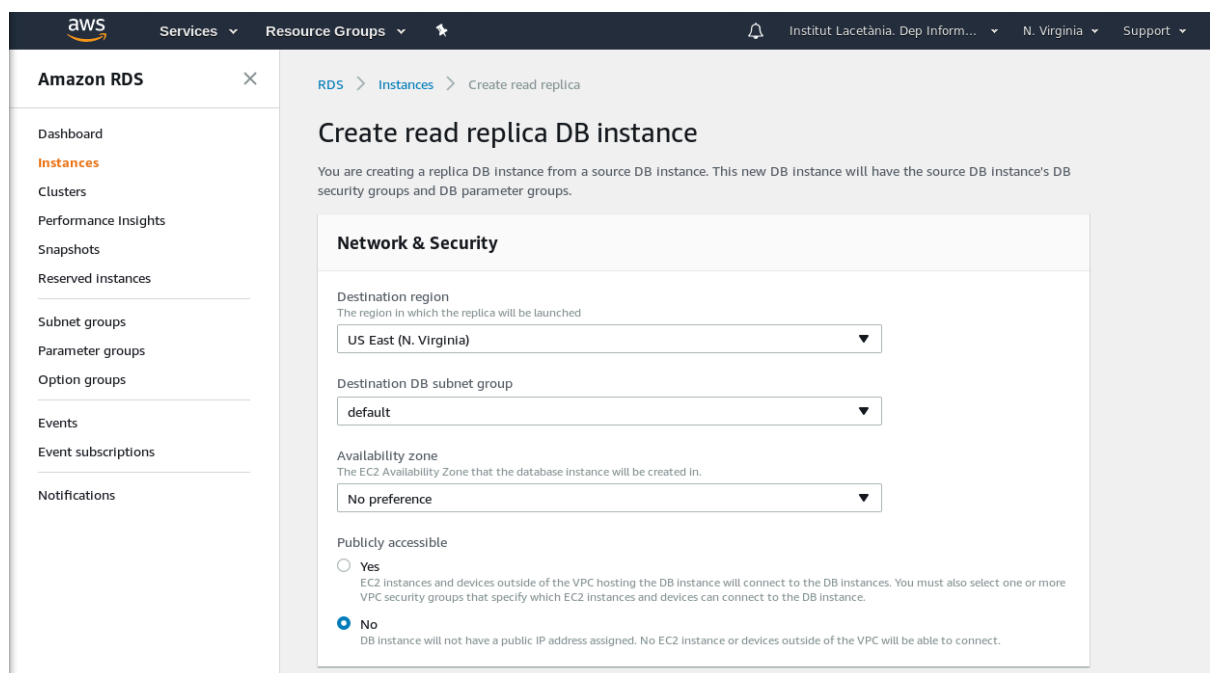
Exercici 1: Quin problema de latència podem tenir amb 25 Read replicas?

Creant una read replica

Entreu a la consola d'Amazon ->[RDS](#)->Actions->Create read replica



Doneu-li un nom a la rèplica, per exemple “mysql1instance-read-replica1”



Exercici 2: Instal·leu Wordpress o altres programari web per llegir d'una instància RDS. Envieu el fitxer de configuració i una captura de pantalla del programari executant-se. Pista: https://crunchify.com/setup-wordpress-amazon-aws-ec2/#disqus_thread



Exercici 3: Wordpress llegeix i escriu a la mateixa base de dades i no està preparat per distingir entre la base de dades mestra i “read replicas”, encara que podem

trobar plugins que sí ho fan. Quin problema ens podem trobar per escalar la base de dades de Wordpress? Es pot escalar horitzontalment? I verticalment?