

Starting an AWS Oracle Standard Edition RDS Instance

Overview: In this exercise, you use your AWS Educate Starter account to spin-up an Oracle Standard Edition RDS Instance on AWS.

Note: Take your time while setting up and entering the database parameters. One incorrect setting could lead to not being able to properly connect to the database.

There are two major steps needed to successfully start and connect to your database instance in the cloud.

- 1) Create a security group - This allows your desktop computer to connect the database over port 1521. This is critical as by default, no one (including you) can connect to the instance. We complete step 1 first so when you move on to step 2, you will point to the security group you already created.
- 2) Spin-up an Oracle Database instance – This step is where you actually start the Oracle database server. The AWS Cloud environment will provide you an endpoint (a URL) for you to connect with SQL Developer.

Create a Security Group for your Database

A security group allows you to connect to the database using Port 1521 (the default port for Oracle) and your specific IP address of your desktop machine. Note: you can add more IPs as needed (e.g. your home, or work desktop). It is best practice to restrict the number of IPs to limit possible security issues.

To set up a security group, navigate to the EC2 instance service in your AWS console and scroll down to the security group link. (See figure 1.)

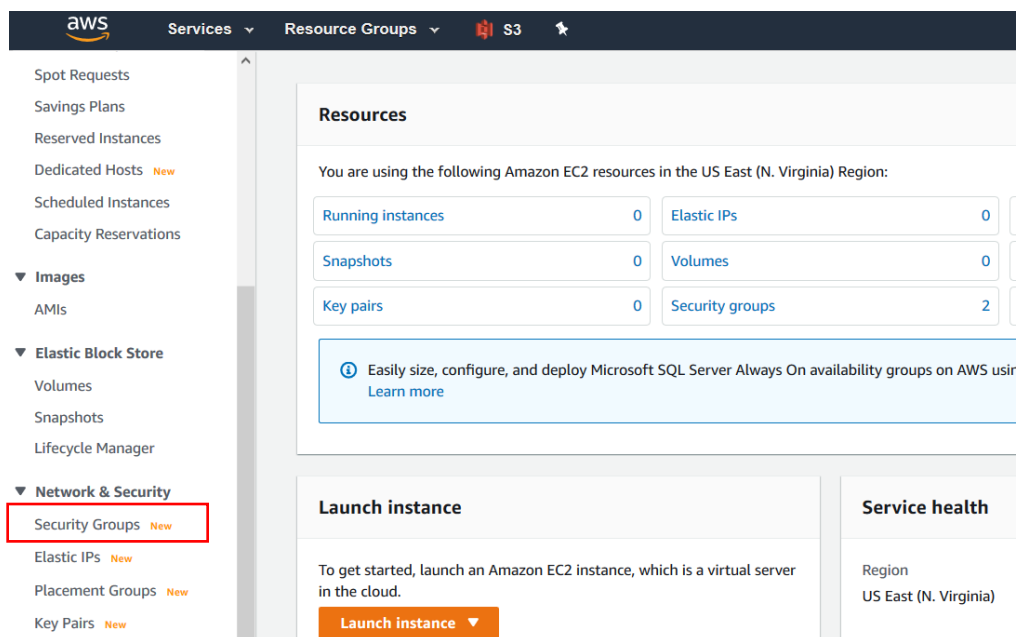


Figure 1 Navigate to Security Groups in the EC2 Services Dashboard

Select “Create Security Group”

Name the security MyDBSGroup (or similar) and add an inbound rule for Oracle-RDS for your custom IP address. Note when you select the Custom IP, the system will automatically place your desktop in the field. Feel free to add a description. This open up port 1521 for your desktop machine. See figure 2. Save and remember the name as you will select this option in the Database security group when you spin-up your database.

Create security group [Info](#)

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name [Info](#)
MyDBSGroup
Name cannot be edited after creation.

Description [Info](#)
My DBS Security Group for Oracle

VPC [Info](#)
vpc-e8b24f95

Inbound rules [Info](#)

Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
Oracle-RDS	TCP	1521	My IP	Robertson Home Desktop

100.16.60.194/32 X

Add rule

Delete

Figure 2 Create the Security Group

Spinning-up and Oracle RDS Instance on AWS:

After logging into your AWS Educate Starter account and entering your SDEV350 Database Security classroom following the process found in the “EnteringYourAWSClassroom.pdf” document, click on the AWS Console link.

As shown in figure 3, search for RDS in the Services dashboard.

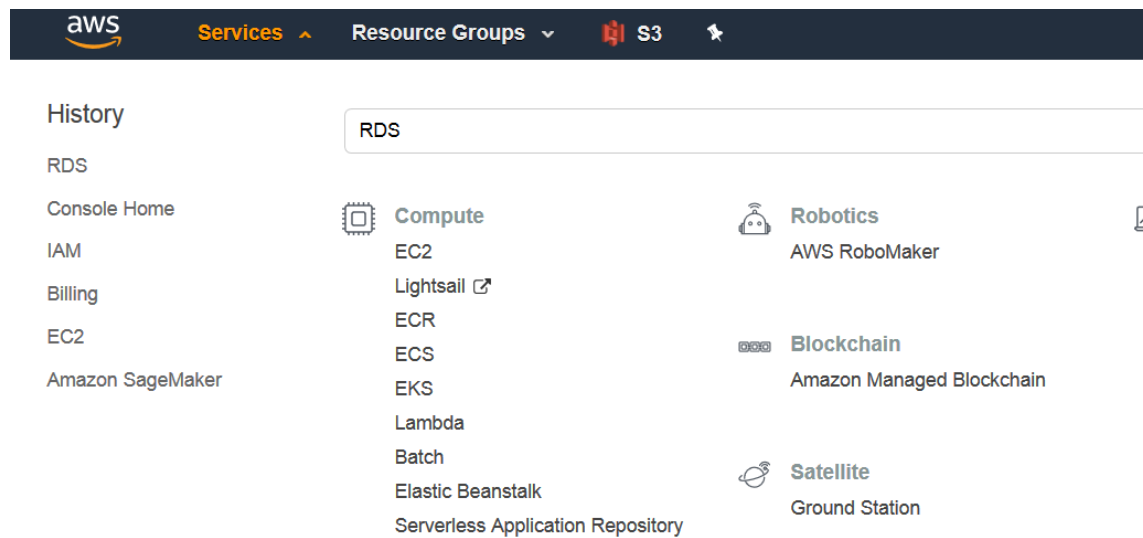


Figure 3 Search for the RDS Service in AWS Services

To create a database, click on the “Create Database” link as shown in figure 4.

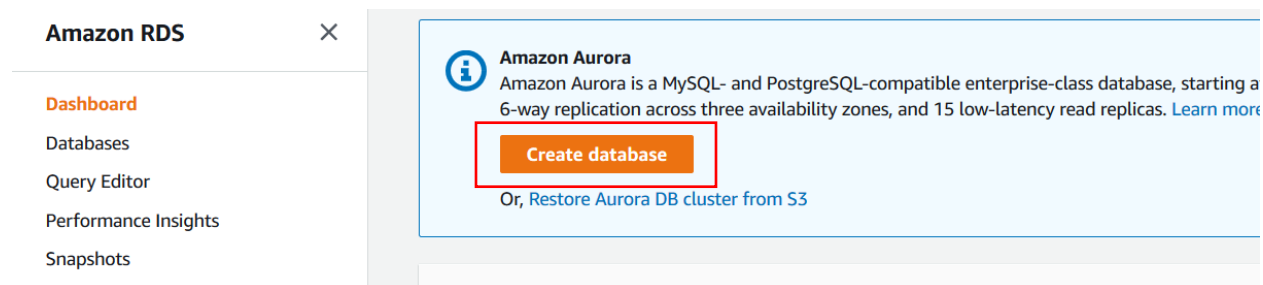


Figure 4 Select Create Database

When prompted, select the “Standard Create” and select the Oracle Engine as shown in figure 5.


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


Figure 5 Selecting the Oracle Database Engine

Continue to scroll down to select additional options. These options include:

- Oracle Standard Edition Two
- Version: 19.0.[0.0.X] (where 0.0.X is the highest, or most recent edition number)
- License: Bring your own License.
- Dev/Test template

See figure 6.

Edition

- ☐ **Oracle Enterprise Edition**
Efficient, reliable, and secure database management system that delivers comprehensive high-end capabilities for mission-critical applications and demanding database workloads.
- ☐ **Oracle Standard Edition**
Affordable and full-featured database management system supporting up to 32 vCPUs.
- ☐ **Oracle Standard Edition One**
Affordable and full-featured database management system supporting up to 16 vCPUs.
- ☒ **Oracle Standard Edition Two**
Affordable and full-featured database management system supporting up to 16 vCPUs.
Oracle Database Standard Edition Two is a replacement for Standard Edition and Standard Edition One.

Version [Info](#)

Oracle 19.0.0.0.ru-2020-04.rur-2020-04.r1 ▼

License

bring-your-own-license ▼

Templates

Choose a sample template to meet your use case.

☐ **Production**
Use defaults for high availability and fast, consistent performance.

☒ **Dev/Test**
This instance is intended for development use outside of a production environment.

Figure 6 Additional Oracle Options

Continue to scroll down to enter a database identifier, master username and master password. The default database identifier and master username will suffice. Be sure enter a password you won't forget but is also secure. See figure 7.

DB instance identifier [Info](#)
Type a name for your DB instance. The name must be unique cross all DB instances owned by your AWS account in the current AWS Region.

database-1

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

▼ Credentials Settings

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 specify your own password

Master password [Info](#)

••••••••

Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), "(double quote) and @ (at sign).

Confirm password [Info](#)

••••••••

Figure 7 Additional Instance Settings

Critically important! Be sure to select the Burstable Class (includes t classes for the DB instance size. All other options are very expensive and you will run out of your allotted AWS class rooms in about week. Be sure you select the smallest instance size which is typically the first one and db.t3.micro. See Figure 8.

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.

☐ Standard classes (includes m classes)

☐ Memory Optimized classes (includes r and x classes)

☒ Burstable classes (includes t classes)

db.t3.micro
2 vCPUs 1 GiB RAM EBS: 1500 Mbps ▼

☐ Include previous generation classes

Figure 8 Selecting db.t3.micro


Continue to scroll down to the Storage. As shown in figure 9, select the General Purpose (SSD) with allocated storage of 20 GB. Be sure to **uncheck** the "Enable Autoscaling" option.

Storage

Storage type [Info](#)


General Purpose (SSD) ▼

Allocated storage

20 

 GiB

(Minimum: 20 GiB, Maximum: 32768 GiB) Higher allocated storage **may improve** IOPS performance.

 Provisioning less than 100 GiB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance. [external link for more details.](#)

Storage autoscaling [Info](#)

Provides dynamic scaling support for your database's storage based on your application's needs.

☐ Enable storage autoscaling

Enabling this feature will allow the storage to increase once the specified threshold is exceeded.

Figure 9 Storage Settings

For the Availability settings take the default settings of “Do not create a standby instance” as shown in figure 10.

Availability & durability

Multi-AZ deployment [Info](#)

☒ Do not create a standby instance

☐ Create a standby instance (recommended for production usage)

Creates a standby in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.

Figure 10 Availability & durability settings

Critically Important! For the Connectivity settings be sure to expand Additional Connectivity configuration. Then scroll down to select Yes for Publicly Accessible. If you don't do this, you will not be able to connect to your instance. (Note, this is for this class, for production environments, you will most likely have this set to No for security reasons.)

Also, be sure you select the security group you previously created. The security group you created provides access to your IP address for the Oracle RDS port (1521) In this example, MyDBSGroup was selected. See figure 11.

▼ Additional connectivity configuration

Subnet group [Info](#)

DB subnet group that defines which subnets and IP ranges the DB instance can use in the VPC you selected.

default-vpc-e8b24f95 ▼

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.

Existing VPC security groups

Choose VPC security groups

The security group
you created.

MyDBSGroup ✕

Availability Zone [Info](#)

No preference ▼

Database port [Info](#)

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

1521

Figure 11 Connectivity Configuration Settings.

As shown in figure 12, accept the default password authentication option for database authentication.

Database authentication

Database authentication options [Info](#)

- ☒ **Password authentication**
Authenticates using database passwords.
- ☐ **Password and Kerberos authentication**
Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos Authentication.

Figure 12 Database Authentication

Continue scrolling and view the additional configuration parameters to enter a database name. All of the other default settings will be okay. **But create a database with a name “ORCL”. This is critical for future projects in the class.** (see figure 13.)

▼ Additional configuration
Database options, encryption enabled, backup disabled, backtrack disabled, Performance Insights enabled, Enhanced Monitoring enabled, maintenance, CloudWatch Logs, delete protection disabled

Database options

Initial database name [Info](#)
ORCL
If you do not specify a database name, Amazon RDS does not create a database.

DB parameter group [Info](#)
default.oracle-se2-19 ▼

Option group [Info](#)
default:oracle-se2-19 ▼

Character set
AL32UTF8 ▼

Figure 13 Naming the Database

Disable Automatic Back-ups, Enable the encryption using the default master key as shown in figure 14.

Backup
Creates a point in time snapshot of your database

☐ **Enable automatic backups**
Enabling backups will automatically create backups of your database during a certain time window.

Encryption

☒ **Enable Encryption**
Choose to encrypt the given instance. Master key ids and aliases appear in the list after they have been created using the Key Management Service(KMS) console. [Info](#)

Master key [Info](#)
(default) aws/rds ▼

Figure 14 Back-up and Encryption options

For monitoring, Uncheck the Enable Performance Insights, Disable enhanced monitoring, but add the Alert and Audit Logs exports as shown in figure 15.

Performance Insights [Info](#)

☐ Enable Performance Insights

Monitoring

☐ Enable Enhanced monitoring

Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU

Log exports

Select the log types to publish to Amazon CloudWatch Logs

☒ Alert log

☒ Audit log

☐ Listener log

☐ Trace log

IAM role

Figure 15 Log Export and Maintenance Options

For the maintenance, do not check Enable auto minor version, No preference for maintenance window and do not check the Enable deletion protection as shown in figure 16.

Maintenance

Auto minor version upgrade [Info](#)

☐ Enable auto minor version upgrade

Enabling auto minor version upgrade will automatically upgrade to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the database.

Maintenance window [Info](#)

Select the period you want pending modifications or maintenance applied to the database by Amazon RDS.

☐ Select window

☒ No preference

Deletion protection

☐ Enable deletion protection

Protects the database from being deleted accidentally. While this option is enabled, you can't delete the database.

Figure 16 Deletion Protection Options

Finally, double check your cost estimates. If you have done this correctly, you will have a very modest monthly cost (which AWS is covering for you) of less than \$30 a month. (See figure 17) This will allow you to run the database 24x7 for the 2 months of the course without issue. However, you should start and stop the instance to minimize the charges. This will allow your credits to last much longer and is a Cloud best practice. If you see a larger number, you may have probably entered the wrong instance type. Go back and start again and ask your professor for assistance if needed.

Estimated monthly costs	
DB instance	24.82 USD
Storage	2.30 USD
Total	27.12 USD

Figure 17 Checking your Monthly Cost

Select “Create Database” to continue.

As shown in figure 18, upon success, the DB instance will begin creation.

<div> <div>tabases</div> <div> <input checked="" type="checkbox"/> Group resources <div> <div></div> <div>Modify</div> </div> <div> <div>Actions</div> <div>▼</div> </div> <div>Restore from S3</div> <div>Create database</div> </div> </div>						
<div> <div>Filter databases</div> <div>< 1 > {</div> </div>						
DB identifier	▲	Role ▼	Engine ▼	Region & AZ ▼	Size ▼	Status ▼
database-1		Instance	Oracle Standard Edition Two	us-east-1a	db.t3.micro	🕒 Creating

Figure 18 Creating the Database

Creation time varies from **10-30 minutes**. You can use the databases links in the RDS dashboard to monitor the status. Once the status changes to available, you will be able to connect to and start using your instance. (See figure 19).

DB identifier	▲	Role ▼	Engine ▼	Region & AZ ▼	Size ▼	Status ▼
database-1		Instance	Oracle Standard Edition Two	us-east-1a	db.t3.micro	✅ Available

Figure 19 DB is now available

Additional documents, available in the LEO classroom, provide step-by-step details on how to connect to your Oracle RDS instance using SQL Developer.

Once the database is launched, it will remain running until it is either terminated or stopped. Additional details on how to stop or terminate an instance will be provided in LEO classroom documentation. It is highly recommended to stop the database while not in use. This is best practice for the Cloud model which saves operational costs. You can restart the instance at any time when you need to use it again.