

## Use SQL Server Express on AWS RDS for better security

### Advantage:

- 1) Replaces a local version therefore user doesn't need to download and install SQL Server Express
- 2) S3, AWS credentials are being protected remotely
- 3) The application related database "olink" and the tables will be automatically created in AWS RDS

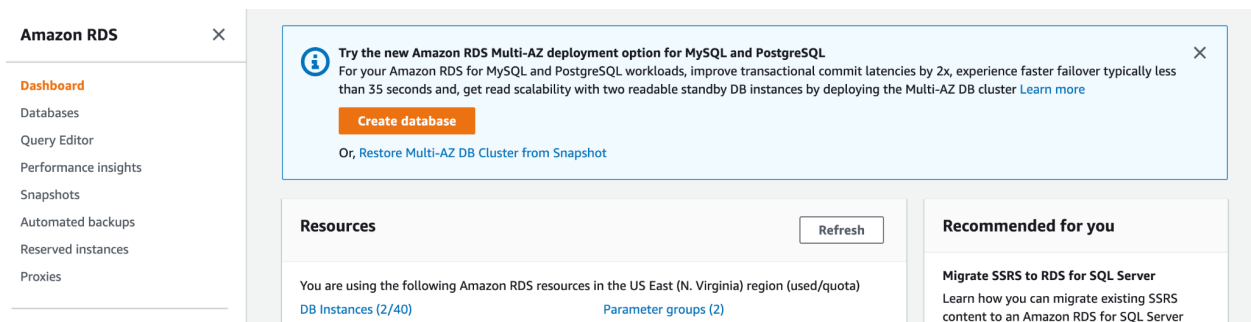
For Root User (administrator of AWS account) to create S3 & RDS:

Create a user (e.g "user1").

Create a database server after the user name attaching a suffix ("-RDS", default on the form).

Create a S3 bucket after the user name attaching a suffix ("-S3", default on the form).

### How to Create Database Server (naming rule: [username] + "-RDS")



The screenshot shows the Amazon RDS console dashboard. On the left is a navigation menu with links: Dashboard, Databases, Query Editor, Performance insights, Snapshots, Automated backups, Reserved instances, and Proxies. The main content area features a top banner with an information icon and text: "Try the new Amazon RDS Multi-AZ deployment option for MySQL and PostgreSQL. For your Amazon RDS for MySQL and PostgreSQL workloads, improve transactional commit latencies by 2x, experience faster failover typically less than 35 seconds and, get read scalability with two readable standby DB instances by deploying the Multi-AZ DB cluster. Learn more". Below this banner is a "Create database" button and a link "Or, Restore Multi-AZ DB Cluster from Snapshot". The "Resources" section shows "You are using the following Amazon RDS resources in the US East (N. Virginia) region (used/quota)" with links for "DB Instances (2/40)" and "Parameter groups (2)". A "Refresh" button is next to the resources list. The "Recommended for you" section includes a link "Migrate SSRS to RDS for SQL Server" and a description: "Learn how you can migrate existing SSRS content to an Amazon RDS for SQL Server".

Select “Easy Create” in “Choose a database creation method”. In Configuration, choose “MS SQL Server”.

## 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.


**Configuration**


**Engine type** [Info](#)


☐ Amazon Aurora  


☐ MySQL  


☐ MariaDB  


☐ PostgreSQL  


☐ Oracle  


☒ Microsoft SQL Server  


Select “Free Tier” in “DB instance size”. Select “DB instance identifier”. Name it “olinkuser1-rds”, S3 user name plus suffix “-rds”. Choose a Master password as you like or let AWS auto-generate it for you, by checking “Auto generate a password”. Click “Create Database” button to save.

#### DB instance size

☐ Production

db.r5.xlarge  
4 vCPUs  
32 GiB RAM  
500 GiB  
3.198 USD/hour

☐ Dev/Test

db.m5.large  
2 vCPUs  
8 GiB RAM  
100 GiB  
0.993 USD/hour

☒ Free tier

db.t2.micro  
1 vCPUs  
1 GiB RAM  
20 GiB  
0.025 USD/hour

#### DB instance identifier

Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

olinkuser1-rds

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

#### Master username [Info](#)

Type a login ID for the master user of your DB instance.

olinkuser1

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), ' (single quote), " (double quote) and @ (at sign).

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

Here is a snapshot of the “Easy Create” configuration of the newly created RDS instance.

### ▼ View default settings for Easy create

Easy create sets the following configurations to their default values, some of which can be changed later. If you want to change any of these settings now, use [Standard Create](#).

Configuration ▼	Value	Editable after database is created ▲
Encryption	Enabled	No
VPC	Default VPC (vpc-034b1b55434824a9c)	No
Option Group	default:sqlserver-ex-14-00	Yes
Subnet Group	default-vpc-034b1b55434824a9c	Yes
Automatic Backups	Enabled	Yes
VPC Security Group	sg-0c071b8db21605a3a	Yes
Publically Accessible	No	Yes
Database Port	1433	Yes
DB Instance Identifier	olinkuser1-rds	Yes
DB Engine Version	14.00.3421.10.v1	Yes
DB Parameter Group	default.sqlserver-ex-14.0	Yes
Performance Insights	Enabled	Yes
Monitoring	Enabled	Yes
Maintenance	Auto Minor Version Upgrade Enabled	Yes
Delete Protection	Not Enabled	Yes

Here is a YT video reference, if the steps are not clear.

[https://www.youtube.com/watch?v=vp\\_uulb5phM](https://www.youtube.com/watch?v=vp_uulb5phM)

Wait until this message is gone: “Your database might take a few minutes to launch” message is gone. If you have chosen to let AWS generate password for you, Click “Credential Details” for password and username.

[View credential details](#)

Please note a VPC security group is created for you (e.g. “sg-xxxxxa3a” in the above screenshot). Go to EC2 (from Search, ShortCut, or Consol Home)

[Console Home](#) [RDS](#) [IAM](#) [S3](#) [Lambda](#) [API Gateway](#) [EC2](#)

On the left scrollable menu, under “Network & Security” select “Security Groups”. Select the default security group created for the RDS instance and select “Edit inbound rules” under “Actions” dropdown list.

**Security Groups (1/8)** [Info](#)

	Name	Security group ID	Security group name	VPC ID
<input type="checkbox"/>	-	sg-0278f1e32c31dbe5a	olinkdbsecgrp	vpc-034b1b55434824a9c
<input type="checkbox"/>	-	sg-08abcea7d2eb4b5b3	default	vpc-04d58ec432f1ca690
<input checked="" type="checkbox"/>	-	sg-0c071b8db21605a3a	default	vpc-034b1b55434824a9c
<input type="checkbox"/>	-	sg-0840ed2509826b67c	default	vpc-05c341c364ef371b4

**Actions**

- View details
- Edit inbound rules
- Edit outbound rules
- Manage tags
- Manage stale rules
- Copy to new security group
- Delete security groups

**Export security groups to CSV**

[Create security group](#)

	Owner	Int
	327767585884	1 P
up	327767585884	1 P
up	327767585884	1 P
up	327767585884	1 P

Delete the default rule.

**Edit inbound rules** [Info](#)

Inbound rules control the incoming traffic that's allowed to reach the instance.

**Inbound rules** [Info](#)

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sg-06bae638c7e3d6e5c	All traffic	All	All	Custom	

[Add rule](#)

Click “Add rule” button at the left bottom. Choose MSSQL in the Type list and Select “My IP” in the Source list. The click “Save rules”.

**Edit inbound rules** [Info](#)

Inbound rules control the incoming traffic that's allowed to reach the instance.

**Inbound rules** [Info](#)

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
-	MSSQL	TCP	1433	My IP	

[Add rule](#)

[Cancel](#) [Preview changes](#) [Save rules](#)

Back in the Amazon RDS console, Choose Databases from the navigation pane, and then select the DB instance.

Choose Modify. Under Connectivity, extend the Additional configuration section, and then choose Publicly accessible.

Choose Continue. Choose Modify DB Instance.

Select "Publically Accessible". Click "Continue" and select "Apply Immediately" and "Modify DB instance"

## Connectivity



### DB Subnet group

default-vpc-034b1b55434824a9c

### Security group

List of DB security groups to associate with this DB instance.

Choose security groups

default X

### Certificate authority

rds-ca-2019

### ▼ Additional configuration

#### Public access

☒ Publicly accessible

RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.

☐ Not publicly accessible

No IP address is assigned to the DB instance. EC2 instances and devices outside the VPC can't connect.

#### Database port

Specify the TCP/IP port that the DB instance will use for application connections. The application connection string must specify the port number. The DB security group and your firewall must allow connections to the port. [Learn more](#)

1433

## Modify DB instance: olinkuser1-rds

### Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
Public accessibility	No	Yes

### Scheduling of modifications

#### When to apply modifications

☐ Apply during the next scheduled maintenance window

Current maintenance window: September 08, 2022 03:20 - 03:50 UTC-7

☒ Apply immediately

The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

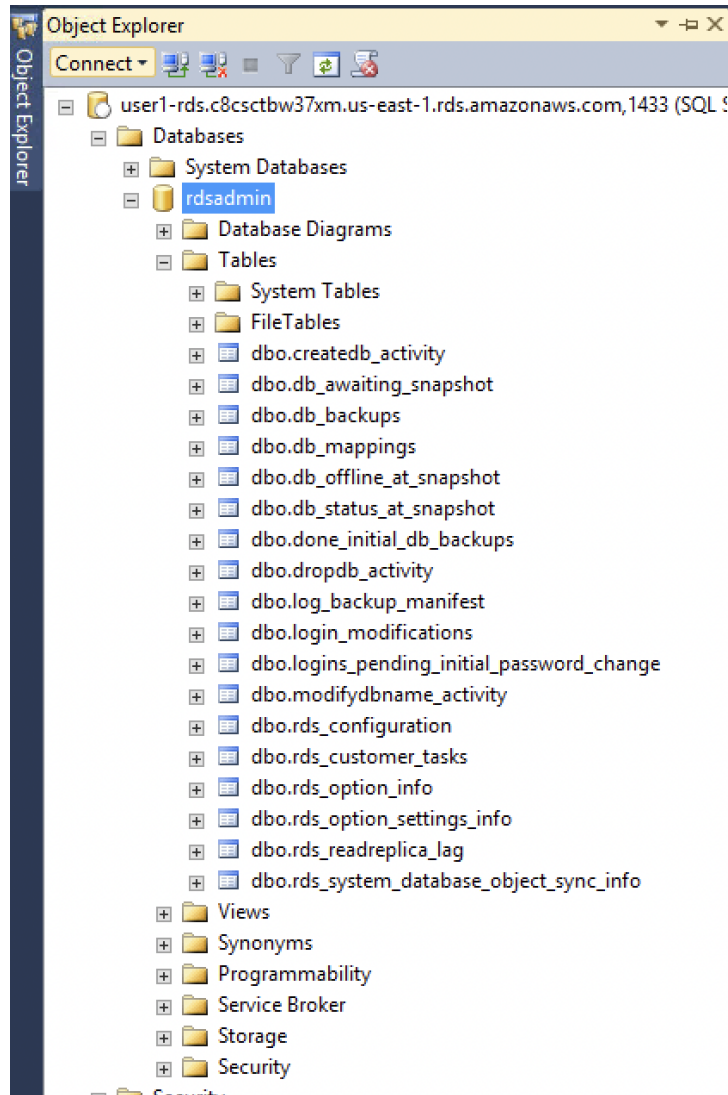
Cancel

Back

Modify DB instance



At this point, you should be able to access the DB Instance in SSMS. There is a pre-existing database “rdsadmin”. See the screenshot below.





If you wish to customize your security group, please follow the steps below. It'd better to understand the AWS networks before doing it.

The screenshot shows the AWS Management Console interface for a security group. The top navigation bar includes links to Console Home, RDS, IAM, S3, Lambda, API Gateway, and EC2. The main content area is divided into two sections: 'Basic details' and 'Inbound rules'.

**Basic details**

- Security group name:** olink\_public\_rds\_access\_by\_mysql (with an 'Info' link and a note: 'Name cannot be edited after creation.')
- Description:** allow public SSMS access to olink database server (with an 'Info' link)
- VPC:** vpc-034b1b55434824a9c (with an 'Info' link and a search icon)

**Inbound rules**

Type	Protocol	Port range	Source	Description - optional	
MSSQL	TCP	1433	Anywh... 0.0.0.0/0		Delete

Buttons: Add rule, Delete

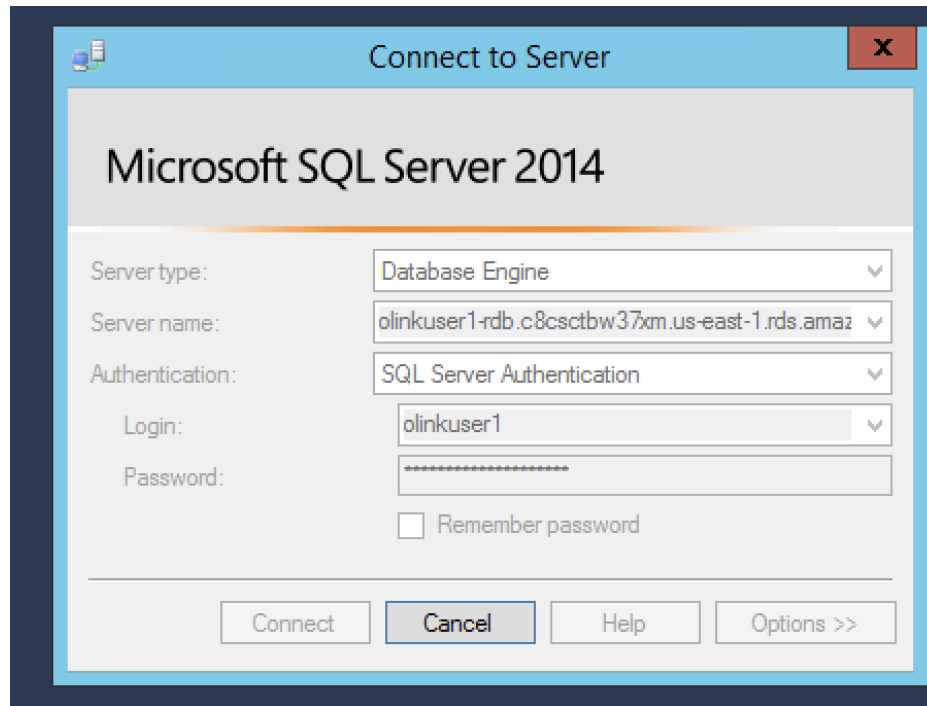
In RDS console, select the DB Instance you want to edit and click “Modify” button. Choose the security group just added (e.g. olink\_public\_rds\_access\_by\_mysql).

The screenshot shows the Amazon RDS console interface. The left sidebar contains a navigation menu with links to Dashboard, Databases (highlighted), Query Editor, Performance insights, Snapshots, Automated backups, Reserved instances, Proxies, Subnet groups, and Parameter groups.

**Connectivity**

- DB Subnet group:** default-vpc-034b1b55434824a9c
- Security group:** List of DB security groups to associate with this DB instance. Choose security groups: olink\_public\_rds\_access\_by\_mysql
- Certificate authority:** rds-ca-2019
- Additional configuration:** (expandable section)

Edit the “Inbound Rule” of a Security Group and set the ip to the user computer. No more MSSQL server access from other machines.



Application automatically creates the "olink" database and its tables if doesn't exist. Message will appear to confirm the existence.

```
[2022-09-07 07:06:58] Remote database server login done.  
[2022-09-07 07:06:58] Default database to function has been found.  
[2022-09-07 07:06:58] Default database tables to function have been found.
```

Running