



BLACKBUCKS INTERNSHIP REPORT

An Architect of Security and Compliance using AWS Resources

SUBMITTED BY

**BORUSU LEELA SRI (20B91A0542)
CHALLAPUDI SANTHI ROJA (20B91A0547)**

UNDER THE GUIDANCE OF MR. AASHU DEV

**Blackbuck Engineers Pvt. Ltd
Road No 36, Jubilee Hills, Hyderabad**

BLACKBUCK INTERNSHIP WORK

Team Members:

- BORUSU LEELA SRI (20B91A0542)
- CHALLAPUDI SANTHI ROJA (20B91A0547)

Title:

An Architect of Security and Compliance using AWS Resources.

Abstract:

The project deals with two ideologies

1. Autoscaling the servers in public and private subnets (which can be accessed through the bastion host) and send SNS whenever an instance is created through autoscaling under the monitoring of cloud watch, an alarm will be triggered when more than 5 SNS's are sent.
2. An RDS is attached to the public subnet located in Mumbai which is Replicated in Private subnet with read write access and also in another region North Virginia with only Read access , and is connected to amazon s3 using glue by providing access through IAM role

INTRODUCTION

CLOUD COMPUTING

Cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale. You typically pay only for cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change.

Benefits of Cloud Computing

Cloud computing is a big shift from the traditional way businesses think about IT resources. Here are seven common reasons organizations are turning to cloud computing services:

Cost

- Moving to the cloud helps companies optimize [IT costs](#). This is because cloud computing eliminates the capital expense of buying hardware and software and setting up and running onsite data centres—the racks of servers, the round-the-clock electricity for power and cooling, and the IT experts for managing the infrastructure. It adds up fast.

Speed

- Most cloud computing services are provided self-service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity planning.

Performance

- The biggest cloud computing services run on a worldwide network of secure datacentres, which are regularly upgraded to the latest generation of fast and efficient computing hardware. This offers several benefits over a single corporate datacentre, including reduced network latency for applications and greater economies of scale.

Reliability

- Cloud computing makes data backup, [disaster recovery](#), and business continuity easier and less expensive because data can be mirrored at multiple redundant sites on the cloud provider’s network.

Security

- Many cloud providers offer a broad set of policies, technologies, and controls that strengthen your security posture overall, helping protect your data, apps, and infrastructure from potential threats.

CLOUD COMPUTING SERVICES

- IaaS (Infrastructure-as-a-Service)
- PaaS (Platform-as-a-Service)
- SaaS (Software-as-a-service)

IaaS (Infrastructure-as-a-Service)

IaaS provides on-demand access to fundamental computing resources—physical and virtual servers, networking, and storage—over the internet on a pay-as-you-go basis. IaaS enables end users to scale and shrink resources on an as-needed basis, reducing the need for high, up-front capital expenditures or unnecessary on-premises or ‘owned’ infrastructure and for overbuying resources to accommodate periodic spikes in usage.

In contrast to SaaS and PaaS (and even newer PaaS computing models such as containers and serverless), IaaS provides the users with the lowest-level control of computing resources in the cloud.

IaaS was the most popular cloud computing model when it emerged in the early 2010s. While it remains the cloud model for many types of workloads, use of SaaS and PaaS is growing at a much faster rate.

PaaS (Platform-as-a-service)

PaaS provides software developers with on-demand platform—hardware, complete software stack, infrastructure, and even development tools—for running, developing, and managing applications without the cost, complexity, and inflexibility of maintaining that platform on-premises.

With PaaS, the cloud provider hosts everything—servers, networks, storage, operating system software, middleware, databases—at their datacentre. Developers simply pick from a menu to ‘spin up’ servers and environments they need to run, build, test, deploy, maintain, update, and scale applications.

Today, PaaS is often built around *containers*, a virtualized compute model one step removed from virtual servers. Containers virtualize the operating system, enabling developers to package the application with only the operating system services it needs to run on any platform, without modification and without need for middleware.

SaaS (Software-as-a-Service)

SaaS—also known as cloud-based software or cloud applications—is application software that’s hosted in the cloud, and that user’s access via a web browser, a dedicated desktop client, or an API that integrates with a desktop or mobile operating system. In most

cases, SaaS users pay a monthly or annual subscription fee; some may offer ‘pay-as-you-go’ pricing based on your actual usage.

In addition to the cost savings, time-to-value, and scalability benefits of cloud, SaaS offers the following:

- **Automatic upgrades:** With SaaS, users take advantage of new features as soon as the provider adds them, without having to orchestrate an on-premises upgrade.
- **Protection from data loss:** Because SaaS stores application data in the cloud with the application, users don’t lose data if their device crashes or breaks.

SaaS is the primary delivery model for most commercial software today—there are hundreds of thousands of SaaS solutions available, from the most focused industry and departmental applications to powerful enterprise software database and AI (artificial intelligence) software.

AWS (AMAZON WEB SERVICES)

The AWS service is provided by the Amazon that uses distributed IT infrastructure to provide different IT resources available on demand. It provides different services such as infrastructure as a service (IaaS), platform as a service (PaaS) and packaged software as a service (SaaS).

Amazon launched AWS, a cloud computing platform to allow the different organizations to take advantage of reliable IT infrastructure.

Advantages of AWS

Flexibility

- We can get more time for core business tasks due to the instant availability of new features and services in AWS.
- It provides effortless hosting of legacy applications. AWS does not require learning new technologies and migration of applications to the AWS provides the advanced computing and efficient storage.
- AWS also offers a choice that whether we want to run the applications and services together or not. We can also choose to run a part of the IT infrastructure in AWS and the remaining part in data centres.

Cost-effectiveness

AWS requires no upfront investment, long-term commitment, and minimum expense when compared to traditional IT infrastructure that requires a huge investment.

Scalability

Through AWS, autoscaling and elastic load balancing techniques are automatically scaled up or down, when demand increases or decreases respectively. AWS techniques are ideal for handling unpredictable or very high loads. Due to this reason, organizations enjoy the benefits of reduced cost and increased user satisfaction.

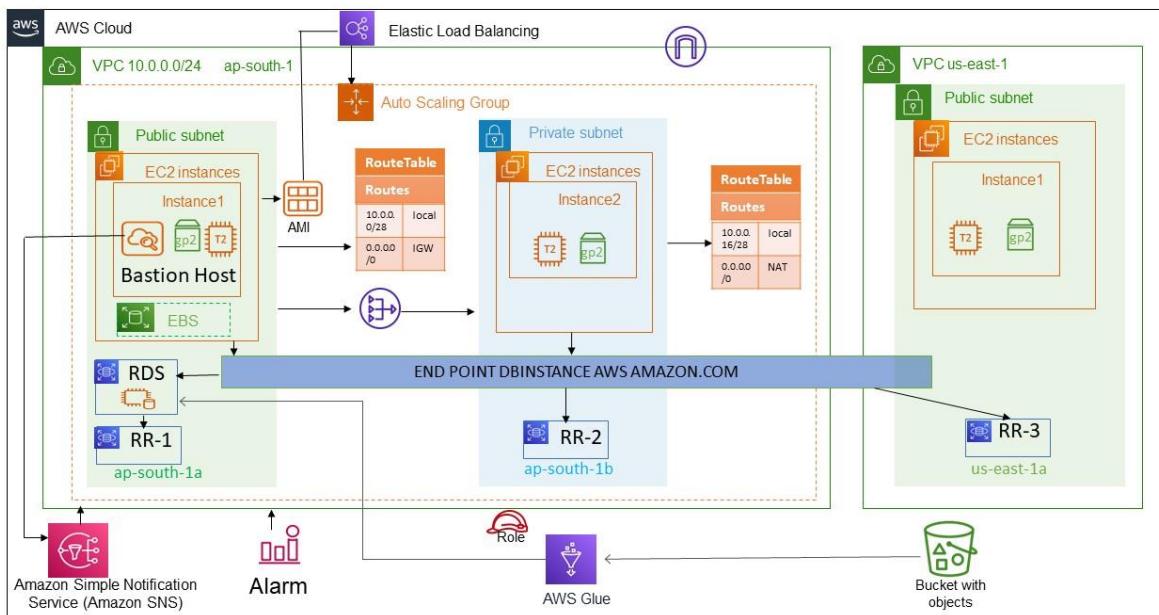
Security

- AWS has a virtual infrastructure that offers optimum availability while managing full privacy and isolation of their operations.
- AWS provides end-to-end security and privacy to customers.
- Customers can expect high-level of physical security because of Amazon's several years of experience in designing, developing and maintaining large-scale IT operation centers.
- AWS ensures the three aspects of security, i.e., Confidentiality, integrity, and availability of user's data.

AWS Services used in this project

- Amazon EC2 (Elastic Compute Cloud)
- Amazon RDS (Relational Database Services)
- Amazon S3 (Simple Storage Service)
- Amazon SNS (Simple Notification Service)
- Amazon VPC (Virtual Private Cloud)
- Amazon CloudWatch
- Amazon IAM (Identity and Access Management)
- Elastic Load Balancer
- Elastic Beanstalk
- Amazon Glue

ARCHITECTURE



IMPLEMENTATION

Let's Begin by Creating a VPC

A virtual private cloud (VPC) is a virtual network allocated to your AWS Architecture account. It is logically removed from other virtual networks in the AWS Cloud. You can launch your **AWS connect resources**, like Amazon EC2 instances, into your VPC.

- Open the VPC section of the AWS services, and click on the **Create VPC** button.

The screenshot shows the AWS VPC dashboard. On the left, there's a sidebar with options like 'Virtual private cloud' (Your VPCs, Subnets, Route tables, Internet gateways, Egress-only Internet gateways, DHCP option sets, Elastic IPs, Managed prefix lists, Endpoints, Endpoint services, NAT gateways, Peering connections) and 'Security'. In the main area, there's a 'Create VPC' button and a note: 'Note: Your Instances will launch in the Asia Pacific region.' Below this is a 'Resources by Region' section with cards for VPCs (1), Subnets (3), Route Tables (1), Internet Gateways (1), Egress-only Internet Gateways (0), and DHCP option sets (1). To the right, there are sections for 'Service Health', 'Settings' (Zones, Console Experiments), 'Additional Information' (VPC Documentation, All VPC Resources, Forums, Report an Issue), and 'AWS Network Manager' (Get started with Network Manager). The top navigation bar includes 'Services', 'Search', and 'Mumbai | San Francisco'.

- Name your VPC and give it a CIDR block of 10.0.0.0/24.
- Click on **Create VPC**.

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create [Info](#)
Create only the VPC resource or the VPC and other networking resources.

VPC only VPC and more

Name tag - *optional*
Creates a tag with a key of 'Name' and a value that you specify.
vpc1

IPv4 CIDR block [Info](#)
 IPv4 CIDR manual input
 IPAM-allocated IPv4 CIDR block

IPv4 CIDR
10.0.0.0/24

IPv6 CIDR block [Info](#)
 No IPv6 CIDR block
 IPAM-allocated IPv6 CIDR block
 Amazon-provided IPv6 CIDR block
 IPv6 CIDR owned by me

Tenancy [Info](#)
Default

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

| Key | Value - <i>optional</i> |
|---------------------------|--------------------------|
| <input type="text"/> Name | <input type="text"/> vpc |

[Add new tag](#)
You can add 49 more tags.

[Cancel](#) [Create VPC](#)

- Now ,go to Route Table ,edit the name of the Route table.

The screenshot shows the AWS VPC dashboard with the 'Route tables' section selected. A modal window is open for creating a new route table, with the 'Edit Name' field set to 'vpcrt1'. Below the modal, the main table lists two existing route tables: 'rtb-0ed64aa174defc4e7' and 'rtb-0494c142e4ad73d2'. The table includes columns for Name, Route table ID, Explicit subnet associations, Edge associations, Main, VPC, and Owner ID.

| Name | Route table ID | Explicit subnet associations | Edge associations | Main | VPC | Owner ID |
|-----------------------|-------------------|------------------------------|-------------------|------|------------------------------|--------------|
| rtb-0ed64aa174defc4e7 | 0ed64aa174defc4e7 | - | - | Yes | vpc-0831241d2693c390d vpc1 | 216236839455 |
| rtb-0494c142e4ad73d2 | 0494c142e4ad73d2 | - | - | Yes | vpc-0b05ebcd2a267da7 vpc1 | 216236839455 |

Create the Required Subnets

AWS subnets is the splitting up of an IP network by IP address. You must link each subnet to a routing table that lays out the eligible routes for outbound traffic leaving the subnet. Furthermore, every subnet you create is automatically linked with the primary route table and default network ACL of the VPC.

- Go to the **Subnets** page and click on **Create Subnet**.
- Locate the correct VPC from the VPC ID drop-down.

Create subnet Info

VPC

VPC ID

Create subnets in this VPC.

▼**Associated VPC CIDRs**

IPv4 CIDRs

10.0.0.0/24

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1**Subnet name**

Create a tag with a key of 'Name' and a value that you specify.

The name can be up to 256 characters long.

Availability Zone Info

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

▼**IPv4 CIDR block** Info X**▼ Tags - optional**

Key

 X

Value - optional

 X**Remove****Add new tag**

You can add 49 more tags.

Remove**Add new subnet****Cancel****Create subnet**

AWS Services Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch

▼ Tags - optional

| | |
|------|------------------|
| Key | Value - optional |
| Name | sub1pub |

Add new tag Remove You can add 49 more tags.

Subnet 2 of 2

Subnet name Create a tag with a key of 'Name' and a value that you specify.

| |
|---------|
| sub2prv |
|---------|

The name can be up to 256 characters long.

Availability Zone Info Choose the zone in which your subnet will reside, or let Amazon choose one for you.

| |
|-------------------------------------|
| Asia Pacific (Mumbai) / ap-south-1b |
|-------------------------------------|

IPv4 CIDR block Info

| |
|--------------|
| 10.0.0.16/28 |
|--------------|

▼ Tags - optional

| | |
|------|------------------|
| Key | Value - optional |
| Name | sub2prv |

Add new tag Remove You can add 49 more tags.

Add new subnet

Cancel Create subnet

Here ,we will be making 2 subnets. Every subnet needs a CIDR block and also each of these will fall into one of the two availability zones.

The division of the subnets is as follows:

public-subnet1: 10.0.0.0/28 (ap-south-1a)

private-subnet2: 10.0.0.16/28 (ap-south-1b)

Select **Create** once you have configured all the subnets.

Setup an Internet Gateway

An Internet Gateway is a highly available, horizontally scaled, yet redundant VPC component. It enables communication between the instances in your VPC and the internet using VPC route tables for internet-routable traffic. It supports IPv4 and IPv6 traffic and does not cause bandwidth limitations or availability risks to your network traffic.

You can attach only one internet gateway per VPC. You are not charged additionally for the internet gateway in your account.

Go to the left-hand drop-down menu and select **Internet Gateway**. Choose to **Create internet gateway**, give it a name, and finish by clicking **Create internet gateway**.

The screenshot shows the AWS Management Console with the following details:

- Header:** AWS logo, Services navigation bar, Search bar, and keyboard shortcut [Alt+S]. Below the navigation bar are links for EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, and CloudWatch.
- Breadcrumbs:** VPC > Internet gateways > Create internet gateway
- Title:** Create internet gateway Info
- Description:** An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.
- Internet gateway settings:**
 - Name tag:** Creates a tag with a key of 'Name' and a value that you specify. The input field contains "igw".
- Tags - optional:** A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.
 - Key:** Name (input field) | **Value - optional:** igw (input field) | Remove button
 - Add new tag button
 - You can add 49 more tags.
- Buttons:** Cancel and Create internet gateway (highlighted in orange).

Select **Actions** inside your internet gateway and **Attach to VPC**.

The screenshot shows the AWS VPC service interface. In the left sidebar, under 'Virtual private cloud', 'Internet gateways' is selected. The main pane displays a table of internet gateways with columns: Name, Internet gateway ID, State, VPC ID, and Owner. One row is selected, labeled 'igw'. A modal window titled 'igw-03d2d3a13999da6ff / igw' is open, showing the 'Details' tab with information: Internet gateway ID (igw-03d2d3a13999da6ff), State (Detached), VPC ID (-), and Owner (216236839455).

Next, choose your VPC and then click on **Attach internet gateway**.

The screenshot shows the 'Attach to VPC' dialog box. At the top, there is a search bar containing the VPC ID 'vpc-0831241d2693c390d'. Below the search bar is a link labeled '▶ AWS Command Line Interface command'. At the bottom right, there are 'Cancel' and 'Attach internet gateway' buttons.

Create the Route Tables and Associate them with the Relevant Subnets

Next, we will go to the **Route Tables** page. A route table carries a set of rules, called routes, that you use to ascertain the network traffic's direction from your gateway or subnet.

Although your subnets should be linked to the main route table by default, you have to ensure each tier has its routing table.

For the Subnets of Application and Database Tiers, you will create two Private Route Tables for each Subnet. Once you are done creating them, you will have to make a public route table for your two Presentation (Web) Subnets.

You can start this by selecting **Create route table**, naming it, then finding your VPC and choosing **Create route table**.

The screenshot shows the AWS VPC dashboard with the 'Route tables' section selected. It displays two route tables: vpcrt1 and vpcrt2. The table includes columns for Name, Route table ID, Explicit subnet associations, Edge associations, Main, VPC, and Own... . Below the table, there is a section titled 'Subnets without explicit associations' listing subnets sub2prv and sub1pub.

| Name | Route table ID | Explicit subnet associat... | Edge associations | Main | VPC | Own... |
|--------|-----------------------|-----------------------------|-------------------|------|------------------------------|-----------|
| vpcrt1 | rtb-0ed64aa174defc4e7 | - | - | Yes | vpc-0831241d2693c390d vpc1 | 216236... |
| | rtb-04944c142e4ad73d2 | - | - | Yes | vpc-0b05ebcd2d267daf7 | 216236... |

The screenshot shows the 'Create route table' wizard. Step 1: Route table settings. It asks for a name (vpcrt2), selects a VPC (vpc-0831241d2693c390d (vpc1)), and adds a tag (Name: vpcrt2). The 'Tags' section allows adding up to 49 more tags.

Route table settings

Name - optional
Create a tag with a key of 'Name' and a value that you specify.

VPC
The VPC to use for this route table.

Tags
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

| Key | Value - optional |
|-----------------------------------|-------------------------------------|
| <input type="text" value="Name"/> | <input type="text" value="vpcrt2"/> |

Add new tag
You can add 49 more tags.

Cancel

Create route table

| Name | Route table ID | Explicit subnet associat... | Main | VPC |
|--------|-----------------------|-----------------------------|------|------------------------------|
| vpctr1 | rtb-0ed64aa174defc4e7 | subnet-020801529a032e... | Yes | vpc-0831241d2693c390d vpc1 |
| vpctr2 | rtb-0a61a2b45ca36b57b | subnet-02f703317af35e... | No | vpc-0831241d2693c390d vpc1 |
| | rtb-04944c142e4ad73d2 | - | Yes | vpc-0b05ebcd2d267daf7 |

| Destination | Target | Status | Propagated |
|-------------|--------|--------|------------|
| 10.0.0.0/24 | local | Active | No |

Select **Subnet associations** and then **Edit Subnet associations** inside your new route table. For each table, you can associate the different subnets. Click on **Save association** at the end of each configuration.

| Name | Subnet ID | IPv4 CIDR | IPv6 CIDR | Route table ID |
|---|--------------------------|--------------|-----------|---------------------------------------|
| sub2prv | subnet-02f703317af35ed66 | 10.0.0.16/28 | - | Main (rtb-0ed64aa174defc4e7 / vpctr1) |
| <input checked="" type="checkbox"/> sub1pub | subnet-020801529a032e272 | 10.0.0.0/28 | - | Main (rtb-0ed64aa174defc4e7 / vpctr1) |

Now, we need to associate our public route table with the internet gateway that we created earlier under the **Edit routes** section. Then click on **Save changes**.

The screenshot shows the AWS VPC Route Tables interface. The top navigation bar includes 'Services' and 'Search' with a keyboard shortcut '[Alt+S]'. Below the navigation are icons for various AWS services: EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, and CloudWatch. The main content area is titled 'Edit routes' under 'Route tables > rtb-0ed64aa174defc4e7 > Edit routes'. A table lists routes: one for '10.0.0.0/24' with 'Target' 'local' and 'Status' 'Active'; another for '0.0.0.0/0' with 'Target' 'igw-03d2d5a13999da6ff' and 'Status' '-' (Pending). Buttons for 'Add route', 'Remove', 'Cancel', 'Preview', and 'Save changes' are visible.

Create an instance 1 for public subnet

The screenshot shows the AWS EC2 Instances interface. The top navigation bar includes 'Services' and 'Search' with a keyboard shortcut '[Alt+S]'. Below the navigation are icons for various AWS services: EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, and CloudWatch. The left sidebar has sections for 'New EC2 Experience', 'EC2 Dashboard', 'EC2 Global View', 'Events', 'Limits', and 'Instances' (which is expanded to show 'Instances', 'Instance Types', 'Launch Templates', 'Spot Requests', and 'Savings Plans'). The main content area is titled 'Instances' and shows a table with no matching instances found. Buttons for 'Connect', 'Actions', and 'Launch instances' are visible.

AWS Services Search [Alt+S]

EC2 RDS VPC IAM S3 EPS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch

Name: vm1 Add additional tags

Application and OS Images (Amazon Machine Image) An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

Search our full catalog including 7000s of application and OS images

Quick Start

Amazon Linux macOS Ubuntu Windows Red Hat

Amazon Machine Image (AMI)

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type
ami-012b9156f755804f5 (64-bit (x86)) / ami-0ef1f76016cbdaaf9 (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs

Free tier eligible

Browse more AMIs Including AMIs from AWS, Marketplace and the Community

Description: Amazon Linux 2 Kernel 5.10 AMI 2.0.20230612.0 x86_64 HVM gp2

Architecture: 64-bit (x86) AMI ID: ami-012b9156f755804f5 Verified provider

Instance type

t2.micro 1 vCPU 1 GiB Memory Current generation: true Free tier eligible
On-Demand Linux pricing: 0.0124 USD per Hour
On-Demand Windows pricing: 0.017 USD per Hour
On-Demand RHEL pricing: 0.0724 USD per Hour
On-Demand SUSE pricing: 0.0124 USD per Hour

All generations Compare instance types

Key pair (login) You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required: santhi Create new key pair

Summary

Number of instances: 1

Software Image (AMI): Amazon Linux 2 Kernel 5.10 AMI...read more ami-012b9156f755804f5

Virtual server type (instance type): t2.micro

Firewall (security group): New security group

Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GiB of bandwidth to the internet.

Cancel Launch instance Review commands

Screenshot of the AWS EC2 instance creation wizard - Step 3: Configure Instance Details.

Network settings

- VPC - required**: vpc-0831241d2693c390d (vpc1) 10.0.0.0/24
- Subnet**: subnet-020801529a032e272 sub1pub
 - VPC: vpc-0831241d2693c390d Owner: 216236839455 Availability Zone: ap-south-1a IP addresses available: 11 CIDR: 10.0.0.0/28
 - [Create new subnet](#)
- Auto-assign public IP**: Enabled
- Firewall (security groups)**: A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
 - [Create security group](#)
 - [Select existing security group](#)
- Security group name - required**: launch-wizard-1
- Description - required**: launch-wizard-1 created 2023-06-26T04:32:42.036Z
- Inbound Security Group Rules**
 - Security group rule 1 (TCP, 22, 0.0.0.0/0)**

| Type | Protocol | Port range |
|------|----------|------------|
| ssh | TCP | 22 |

 - Source type**: Anywhere
 - Source Info**: Add CIDR, prefix list or security group
 - Description - optional**: e.g. SSH for admin desktop
 - Port range**: 0.0.0.0/0 - ::/0
 - Security group rule 2 (All, All, Multiple sources)**

Summary

- Number of instances**: 1
- Software Image (AMI)**: Amazon Linux 2 Kernel 5.10 AMI...read more ami-012b9156f755804f
- Virtual server type (instance type)**: t2.micro
- Firewall (security group)**: New security group
- Storage (volumes)**: 2 volume(s) - 18 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.

[Launch instance](#)

Screenshot of the AWS EC2 Instances page.

Instances (1/1) Info

| Name | Instance ID | Instance state | Instance type | Status check | Alarm status | Availability Zone | Public IPv4 DNS | Public IPv4 ... | Elastic IP |
|------|---------------------|----------------|---------------|--------------|--------------|-------------------|-----------------|-----------------|------------|
| vm1 | i-0a5fab83942dbb4c0 | Running | t2.micro | - | No alarms | ap-south-1a | - | 15.206.67.130 | - |

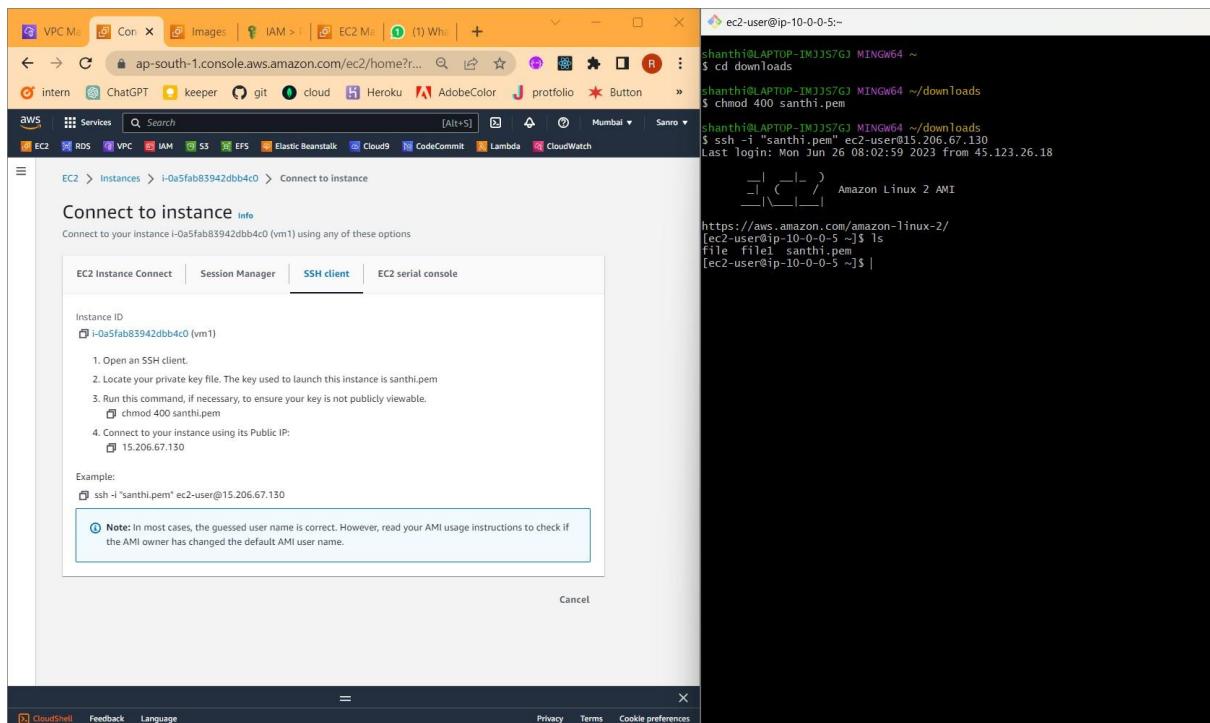
Instance: i-0a5fab83942dbb4c0 (vm1)

Details | Security | Networking | Storage | Status checks | Monitoring | Tags

Instance summary

| Instance ID | Public IPv4 address | Private IPv4 addresses |
|---------------------------|--|------------------------|
| i-0a5fab83942dbb4c0 (vm1) | 15.206.67.130 open address | 10.0.0.5 |
| IPv6 address | Instance state | Public IPv4 DNS |
| - | Running | - |
| Hostname type | Private IP DNS name (IPv4 only) | Public IPv4 ... |
| - | - | - |

Connect to instance1



 root@ip-10-0-0-5:/home/ec2-user

```
shanthi@LAPTOP-IMJJS7GJ MINGW64 ~
$ cd downloads

shanthi@LAPTOP-IMJJS7GJ MINGW64 ~/downloads
$ chmod 400 santhi.pem

shanthi@LAPTOP-IMJJS7GJ MINGW64 ~/downloads
$ ssh -i "santhi.pem" ec2-user@15.206.67.130
Last login: Mon Jun 26 04:52:54 2023 from 157.48.194.42

      _\   _|_ ) 
     _\ (   | /   Amazon Linux 2 AMI
     __| \__|_|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-0-0-5 ~]$ sudo su
[root@ip-10-0-0-5 ec2-user]# lsblk
NAME   MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
xvda    202:0    0  8G  0 disk
└─xvda1 202:1    0  8G  0 part /mnt/data
xvdb    202:16   0 10G  0 disk
[root@ip-10-0-0-5 ec2-user]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        468M   0  468M  0% /dev
tmpfs          477M   0  477M  0% /dev/shm
tmpfs          477M  488K  476M  1% /run
tmpfs          477M   0  477M  0% /sys/fs/cgroup
/dev/xvda1     8.0G  1.9G  6.1G  24% /
tmpfs          96M   0   96M  0% /run/user/0
tmpfs          96M   0   96M  0% /run/user/1000
[root@ip-10-0-0-5 ec2-user]# mkfs -t xfs /dev/xvdb
meta-data=/dev/xvdb              isize=512    agcount=4, agsize=655360 blks
                                =           sectsz=512   attr=2, projid32bit=1
                                =           crc=1       finobt=1, sparse=1, rmapbt=0
data             =           reflink=1   bigtime=0 inobtcount=0
data             =           bsize=4096   blocks=2621440, imaxpct=25
data             =           sunit=0     swidth=0 blks
naming           =version 2    bsize=4096   ascii-ci=0, ftype=1
log              =internal log bsize=4096   blocks=2560, version=2
log              =           sectsz=512   sunit=0 blks, lazy-count=1
realtime         =none        extsz=4096   blocks=0, rtextents=0
[root@ip-10-0-0-5 ec2-user]# file -s /dev/xvdb
/dev/xvdb: SGI XFS filesystem data (blksz 4096, inosz 512, v2 dirs)
[root@ip-10-0-0-5 ec2-user]# mkdir /mnt/data
mkdir: cannot create directory '/mnt/data': File exists
[root@ip-10-0-0-5 ec2-user]# mount /dev/xvdb /mnt/data
[root@ip-10-0-0-5 ec2-user]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        468M   0  468M  0% /dev
tmpfs          477M   0  477M  0% /dev/shm
tmpfs          477M  488K  476M  1% /run
tmpfs          477M   0  477M  0% /sys/fs/cgroup
/dev/xvda1     8.0G  1.9G  6.1G  24% /
/dev/xvdb      10G 104M  9.9G  2% /mnt/data
tmpfs          96M   0   96M  0% /run/user/0
tmpfs          96M   0   96M  0% /run/user/1000
[root@ip-10-0-0-5 ec2-user]#
```

```
[root@ip-10-0-0-5 ec2-user]# cd /mnt
[root@ip-10-0-0-5 mnt]# ls
data
[root@ip-10-0-0-5 mnt]# cd data
[root@ip-10-0-0-5 data]# ls
[root@ip-10-0-0-5 data]# cat > file1
this is inst1 mounted with volume 10G
^C
[root@ip-10-0-0-5 data]# cp file1 /mnt/data
cp: 'file1' and '/mnt/data/file1' are the same file
[root@ip-10-0-0-5 data]# cd ../../..
[root@ip-10-0-0-5 /]# cd homw/ec2-user
bash: cd: homw/ec2-user: No such file or directory
[root@ip-10-0-0-5 /]# cd home/ec2-user
[root@ip-10-0-0-5 ec2-user]# cat > file
this is inst1 mounted with 10G EBS
^C
[root@ip-10-0-0-5 ec2-user]#
[root@ip-10-0-0-5 ec2-user]# cp file /mnt/data
[root@ip-10-0-0-5 ec2-user]# cd /mnt/data
[root@ip-10-0-0-5 data]# ls
file file1
[root@ip-10-0-0-5 data]# |
```

Creating AMI for instance 1

The screenshot shows the AWS EC2 Instances page. There are two instances listed:

| Name | Instance ID | Instance state | Instance type | Status check | Alarm status | Availability Zone | Public IPv4 DNS |
|------|---------------------|----------------|---------------|-------------------|--------------|-------------------|-----------------|
| vm1 | i-05fab83942dbb4c0 | Running | t2.micro | 2/2 checks passed | No alarms | ap-south-1a | - |
| vm2 | i-0abf2a39a0bed2467 | Terminated | t2.micro | - | No alarms | ap-south-1b | - |

The Actions menu for instance vm1 is open, showing options like Connect, View details, Manage instance state, Instance settings, Networking, Security, Create image, Create template from instance, and Launch more like this.

Create an Amazon Machine Image (AMI)

Create image Info

An image (also referred to as an AMI) defines the programs and settings that are applied when you launch an EC2 instance. You can create an image from the configuration of an existing instance.

| Instance ID | i-0a5fab83942dbb4c0 (vm1) | | | | | | | |
|--|----------------------------------|---------------------------|------|---|------|------------|--|---------------------------------|
| Image name | <input type="text" value="AMI"/> | | | | | | | |
| Maximum 127 characters. Can't be modified after creation. | | | | | | | | |
| Image description - optional | | | | | | | | |
| <input type="text" value="AMI for privatesubnet vm "/> | | | | | | | | |
| Maximum 255 characters | | | | | | | | |
| No reboot | | | | | | | | |
| <input type="checkbox"/> Enable | | | | | | | | |
| Instance volumes | | | | | | | | |
| Storage type | Device | Snapshot | Size | Volume type | IOPS | Throughput | Delete on termination | Encrypted |
| EBS | /dev/... | Create new snapshot fr... | 8 | EBS General Purpose S... | 100 | | <input checked="" type="checkbox"/> Enable | <input type="checkbox"/> Enable |
| EBS | /dev/... | Create new snapshot fr... | 10 | EBS General Purpose S... | 100 | | <input type="checkbox"/> Enable | <input type="checkbox"/> Enable |
| Add volume | | | | | | | | |
| <p>During the image creation process, Amazon EC2 creates a snapshot of each of the above volumes.</p> | | | | | | | | |
| Tags - optional | | | | | | | | |
| A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs. | | | | | | | | |
| <input checked="" type="radio"/> Tag image and snapshots together <small>Tag the image and the snapshots with the same tag.</small> | | | | <input type="radio"/> Tag image and snapshots separately <small>Tag the image and the snapshots with different tags.</small> | | | | |
| No tags associated with the resource. | | | | | | | | |
| Add new tag | | | | | | | | |

The screenshot shows the AWS EC2 console with the 'AMIs' section selected. On the left, there's a navigation sidebar with options like 'New EC2 Experience', 'Instances', 'Images', 'EBS', and 'Network & Security'. The main area displays a table of AMIs:

| Name | AMI ID | AMI name | Source | Owner | Visibility | Status | Creation date |
|------|-----------------------|----------|------------------|--------------|------------|---------|----------------------|
| AMI | ami-0941be271c0b8dd95 | AMI | 216236839455/AMI | 216236839455 | Private | Pending | 2023/06/26 13:59 GMT |

Below the table, a detailed view of the selected AMI (ami-0941be271c0b8dd95) is shown:

AMI ID: ami-0941be271c0b8dd95 (AMI)

| Details | Permissions | Storage | Tags |
|---------------------------------------|----------------------------------|--|---------------------------------|
| AMI ID ami-0941be271c0b8dd95 (AMI) | Image type machine | Platform details Linux/UNIX | Root device type EBS |
| AMI name AMI | Owner account ID 216236839455 | Architecture x86_64 | Usage operation RunInstances |
| Root device name /dev/xvda | Status Pending | Source 216236839455/AMI | Virtualization type hvm |
| Boot mode - | State reason - | Creation date Mon Jun 26 2023 13:59:19 GMT+0530 (India Standard Time) | Kernel ID - |
| Block devices | Description | Product codes | RAM disk ID |

Create an instance 2 for private subnet

S

The screenshot shows the 'Launch an instance' wizard in the AWS EC2 console. The first step, 'Name and tags', is completed with the name 'Vm2'. The second step, 'Application and OS Images (Amazon Machine Image)', is currently selected. It displays a catalog search bar and tabs for 'AMI from catalog', 'Recents', 'My AMIs' (selected), and 'Quick Start'. Under 'My AMIs', there are two options: 'Owned by me' (selected) and 'Shared with me'. A tooltip for the 'Free tier' is shown, stating: 'In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.' The third step, 'Summary', is partially visible on the right.

The screenshot shows the 'Launch an instance' wizard in the AWS EC2 console. The second step, 'Key pair (login)', is selected. It requires a key pair name, which is set to 'santhi'. The third step, 'Network settings', is currently selected. It includes fields for VPC (set to 'vpc-0831241d2693c390d (vpc1)'), Subnet (set to 'subnet-02f703317af35ed66'), and Auto-assign public IP (set to 'Disable'). A tooltip for the 'Free tier' is shown, stating: 'In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.' The fourth step, 'Summary', is partially visible on the right.

Screenshot of the AWS EC2 instance creation wizard.

Inbound Security Group Rules:

- Security group rule 1 (TCP, 22, 0.0.0.0/0):

| | | | | | |
|--------------------|----------|----------|-----------------------------------|-------------|----------------------------|
| Type | ssh | Protocol | TCP | Port range | 22 |
| Source type | Anywhere | Source | Add CIDR, prefix list or security | Description | e.g. SSH for admin desktop |
| 0.0.0.0/0 X ::/0 X | | | | | |
- Security group rule 2 (All, All, Multiple sources):

| | | | | | |
|--------------------|-------------|----------|-----------------------------------|-------------|----------------------------|
| Type | All traffic | Protocol | All | Port range | All |
| Source type | Anywhere | Source | Add CIDR, prefix list or security | Description | e.g. SSH for admin desktop |
| 0.0.0.0/0 X ::/0 X | | | | | |

Summary:

- Number of instances: 1
- Software Image (AMI): AMI for private subnet vm ami-0941be271c0b8dd95
- Virtual server type (instance type): t2.micro
- Firewall (security group): New security group
- Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GB of bandwidth to the internet.

Buttons: Cancel, Launch instance, Review commands.

Screenshot of the AWS EC2 Instances page.

Instances (1/3) info:

| Details | Security | Networking | Storage | Status checks | Monitoring | Tags |
|--|---|---|---------|---------------|------------|------|
| Instance ID: i-0acfd2dbd05f78b3a (vmn) | Public IPv4 address: - | Private IP4 addresses: 10.0.0.28 | | | | |
| IPV6 address: - | Instance state: Running | Public IPv4 DNS: ip-10-0-0-28.ap-south-1.compute.internal | | | | |
| Hostname type: IP name: ip-10-0-0-28.ap-south-1.compute.internal | Private IP DNS name (IPv4 only): ip-10-0-0-28.ap-south-1.compute.internal | Elastic IP addresses: - | | | | |
| Any other resource DNS name: - | Instance type: - | Actions: Actions ▾ | | | | |

AWS CloudShell:

```

[santhi@ip-10-0-46-94 ~]$ ls
[santhi@ip-10-0-46-94 ~]$ cat .ssh/known_hosts
[santhi@ip-10-0-46-94 ~]$ ssh -i /home/ec2-user/.ssh/santhi.pem ec2-user@15.206.47.130
The authenticity of host '15.206.47.130 (15.206.47.130)' can't be established.
ECDSA key fingerprint is 9e:35:4c:42:e0:1g:7u:0u:rr:yg:ld:ur:n6:1b:6b:0p:vp.
This key is between 1024 and 2048 bits long. Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '15.206.47.130' (ECDSA) to the list of known hosts.
[santhi@ip-10-0-46-94 ~]$ ls
[santhi@ip-10-0-46-94 ~]$ chmod 400 santhi.pem
[santhi@ip-10-0-46-94 ~]$ ssh -i /home/ec2-user/.ssh/santhi.pem ec2-user@15.206.47.130
Permission denied.
[santhi@ip-10-0-46-94 ~]$ ssh -i /home/ec2-user/.ssh/santhi.pem ec2-user@15.206.47.130
Permission denied.
[santhi@ip-10-0-46-94 ~]$ Click inside the terminal window to reconnect and continue using your CloudShell session.
Connection to 15.206.47.130 closed.

```

Connect to instance2

```

shanthi@LAPTOP-TM3357G3: ~$ ssh -i "santhi.pem" ec2-user@10.0.0.28
Last Login: Mon Jun 26 08:02:59 2023 from 45.123.26.18
[ec2-user@ip-10-0-0-5 ~]$ ls
[ec2-user@ip-10-0-0-5 ~]$ file santhi.pem
The authenticity of host '10.0.0.28 (10.0.0.28)' can't be established.
ECDSA key fingerprint is MD5:2c:54:75:3b:72:ba:3c:ed:de:2b:a0:6b:9b:38:47:59.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.0.0.28' (EDSA) to the list of known hosts.
Last login: Mon Jun 26 08:02:59 2023 from 45.123.26.18
[ec2-user@ip-10-0-0-5 ~]$ ping google.com
PING google.com (142.250.182.238) 56(84) bytes of data.

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-0-0-5 ~]$ ls
[ec2-user@ip-10-0-0-5 ~]$ file santhi.pem
[ec2-user@ip-10-0-0-5 ~]$ ping google.com
PING google.com (142.250.182.238) 56(84) bytes of data.

```

Setup a NAT Gateway

A NAT gateway stands for Network Address Translation (NAT) service. You can employ a NAT gateway to enable the instances in a private subnet to connect to services outside the VPC. Still, external services cannot initiate a connection with those instances.

1. In the navigation panel, choose **NAT Gateways**.
2. Choose **Create NAT gateway** and do the following:
 1. Specify a name for the NAT gateway.
 2. Choose the subnet in which you want to create the NAT gateway.
 3. For the **Connectivity type**, select **Private** to create a private NAT gateway or **Public** (the default) to create a public NAT gateway.
 4. For **Elastic IP allocation ID**, select an Elastic IP address to associate with the NAT gateway.
 5. Choose **Create a NAT gateway**.

Create NAT gateway

A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet.

NAT gateway settings

Name - optional
Create a tag with a key of 'Name' and a value that you specify.

The name can be up to 256 characters long.

Subnet
Select a subnet in which to create the NAT gateway.

Connectivity type
Select a connectivity type for the NAT gateway.
 Public
 Private

Elastic IP allocation ID Info
Assign an Elastic IP address to the NAT gateway.

Additional settings Info

NAT gateway ID: nat-0b27a711090091a22

Connectivity type: Public

State: Pending

Primary public IPv4 address: -

Primary private IPv4 address: -

Primary network interface ID: -

Subnet: subnet-0a194b4fd247814f7 / web-pub-subnet2

Created: Sunday, June 25, 2023 at 18:43:50 GMT+5:30

Deleted: -

Update routes for private subnet

Route tables (1/3) Info

| Name | Route table ID | Explicit subnet associat... | Edge associations | Main | VPC | Owner ID |
|--------------|------------------------------|---------------------------------|-------------------|------|------------------------------|--------------|
| vpct1 | rtb-0ed64aa174defc4e7 | subnet-020801529a052e... | - | Yes | vpc-0831241d2693c390d vpc1 | 216236839455 |
| vpct2 | rtb-0a61a2b45ca36b57b | subnet-02f703317af35e... | - | No | vpc-0831241d2693c390d vpc1 | 216236839455 |
| - | rtb-04944c142e4ad73d2 | - | - | Yes | vpc-0b05ebcd2d267daef7 | 216236839455 |

Routes (1)

| Destination | Target | Status | Propagated |
|-------------|--------|--------|------------|
| 10.0.0.0/24 | local | Active | No |

Pinging through Private Subnet instance

```

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-0-0-5 ~]$ ls
[ec2-user@ip-10-0-0-5 ~]$ ssh -i "santhi.pem" ec2-user@10.0.0.28
The authenticity of host '10.0.0.28 (10.0.0.28)' can't be established.
ECDSA key fingerprint is SHA256:Lc6On9dTOfUdg2bfoc/ACDNCVWMX61ATNuFyRM4c.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.0.0.28' (ECDSA) to the list of known hosts.
Last login: Mon Jun 26 08:02:59 2023 from 45.123.26.18

```

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

AutoScaling

```

root@ip-10-0-0-5:/home/ec2-user/rose
$ cd downloads
$ chmod 400 santhi.pem
$ ssh -i "santhi.pem" ec2-user@15.206.67.130
Last Login: Mon Jun 26 08:50:31 2023 from 45.123.26.18

```

```

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-0-0-5 ~]$ sudo su
[root@ip-10-0-0-5 ~]# useradd roja
useradd: user 'roja' already exists
[root@ip-10-0-0-5 ~]# passwd
Change the password for user root.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[root@ip-10-0-0-5 ~]# /etc/init.d/nologin start
[root@ip-10-0-0-5 ~]# /etc/init.d/nologin
bin:x:1:bin:/bin:/sbin/nologin
daemon:x:2:daemon:/sbin:/nologin
adm:x:3:adm:/var/adm:/nologin
lp:x:4:lp:/var/spool/lpd:/nologin
sync:x:5:sync:/bin:/sync
shutdown:x:6:shutdown:/sbin:/shutdown
halt:x:7:halt:/sbin:/halt
mail:x:8:mail:/var/spool/mail:/sbin/nologin
operator:x:11:operator:/var/run:/sbin/nologin
games:x:12:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/var/nobody:/nologin
syslog:x:104:syslog:/var/run/syslog:/nologin
dbus:x:81:81:System message bus:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
libstoragemgt:x:999:997:libstoragemgt:/var/run/lsm:/sbin/nologin
sshd:x:74:74:OpenSSH Daemon:/var/run/sshd:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
rndx:x:998:996:Random Number Generator Daemon:/var/lib/rnd:/sbin/nologin
chrony:x:997:995:/var/lib/chrony:/sbin/nologin
[root@ip-10-0-0-5 ~]# curl http://169.254.169.254/latest/meta-data/instance-connect:/sbin/nologin
postfix:x:89:89:/var/spool/postfix:/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
ec2-user:x:1000:1000:EC2 Default User:/home/ec2-user:/bin/bash
[root@ip-10-0-0-5 ~]# rm /etc/nologin
[root@ip-10-0-0-5 ~]# mkdir rose
[root@ip-10-0-0-5 ~]# cd rose
[root@ip-10-0-0-5 rose]# nano file1
[root@ip-10-0-0-5 rose]# nano file1
[root@ip-10-0-0-5 rose]# ls
file1
[root@ip-10-0-0-5 rose]#

```

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Create a Launch Template for autoscaling

You can build a launch template that has the configuration details to launch an instance. You can use launch templates to store launch parameters so that you do not have to specify them every time you launch an instance. For example, a launch template can

contain the instance type, AMI ID, and network settings that you usually utilize to launch instances.

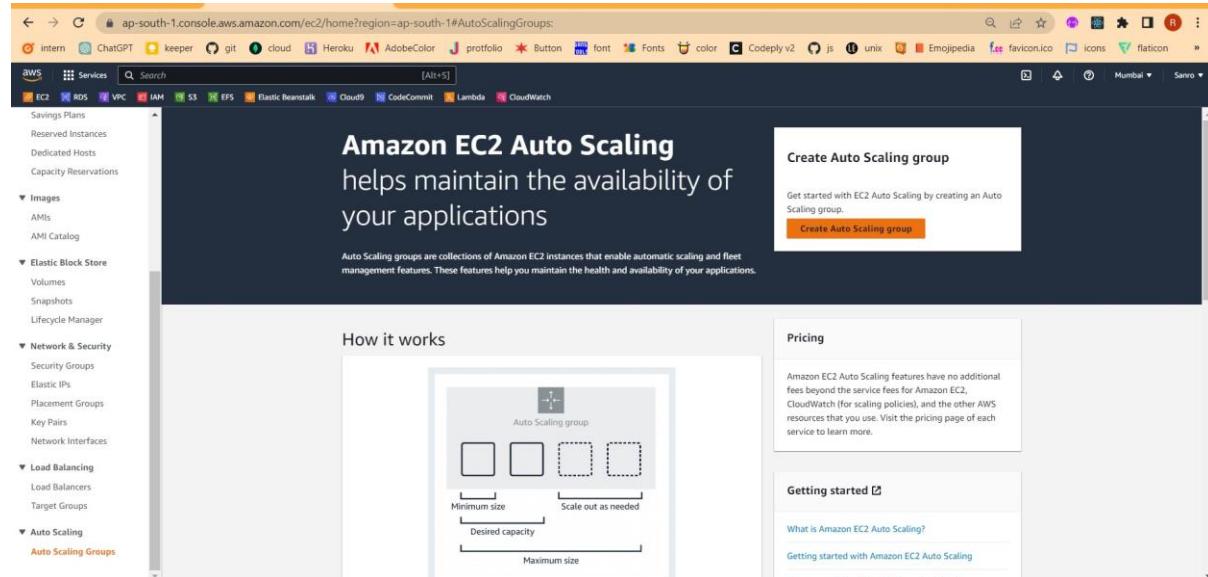
Select **Launch Templates** and **Create launch Templates** from the AWS EC2 Console. Click the Check the box for **Provide guidance to help me set up a template that I can use with EC2 Auto Scaling under Auto Scaling guidance.**

Select your preferred AMI under Launch template contents. Let's use Amazon Linux 2 AMI with free tier eligibility for this blog.

Select the relevant instance type and **Create new key pair**. Select the desired subnet from under the **Network settings**.

Create Auto Scaling Group

Let's start creating an **Auto Scaling Group** from the same Launch Template page by selecting any of the templates. Go to the **Actions** menu and select **Create Auto Scaling group**.



Screenshot of the AWS EC2 Auto Scaling Groups - Create Auto Scaling group wizard Step 1: Choose launch template.

Choose launch template Info

Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group.

Name

Auto Scaling group name
Enter a name to identify the group.
 [AS1]
Must be unique to this account in the current Region and no more than 255 characters.

Launch template Info

For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.

Launch template
Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.
 [tempale1]

Version

| Description | Launch template | Instance type |
|---------------|--|--|
| template | tempale1 <small>[tempale1]</small> lt-0927d67e130979dd7 | t2.micro |
| AMI ID | ami-0c14ab8f9deb91586 | Request Spot Instances No |
| Key pair name | santhi | Security group IDs sg-0fd5bf222f70c15eb <small>[sg-0fd5bf222f70c15eb]</small> |

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1 Choose launch template

Step 2 Choose instance launch options

Step 3 - optional Configure advanced options

Step 4 - optional Configure group size and scaling policies

Step 5 - optional Add notifications

Step 6 - optional Add tags

Step 7 Review

Choose instance launch options Info

Choose the VPC network environment that your instances are launched into, and customize the instance types and purchase options.

Network Info

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC
Choose the VPC that defines the virtual network for your Auto Scaling group.
 [vpc-0831241d2693c390d (vpc1)]

Availability Zones and subnets
Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.
 [Select Availability Zones and subnets]

| | |
|---|---|
| ap-south-1a subnet-020801529a032e272 (sub1pub) 10.0.0.0/28 | X |
| ap-south-1b subnet-02f703317af35ed66 (sub2prv) 10.0.0.16/28 | X |

Create a subnet [Create a subnet]

Screenshot of the AWS CloudFormation Create Stack wizard Step 6: Configure instance launch options.

Load balancing Info

Use the options below to attach your Auto Scaling group to an existing load balancer, or to a new load balancer that you define.

No load balancer
Traffic to your Auto Scaling group will not be fronted by a load balancer.

Attach to an existing load balancer
Choose from your existing load balancers.

Attach to a new load balancer
Quickly create a basic load balancer to attach to your Auto Scaling group.

Attach to a new load balancer

Define a new load balancer to create for attachment to this Auto Scaling group.

Load balancer type
Choose from the load balancer types offered below. Type selection cannot be changed after the load balancer is created. If you need a different type of load balancer than those offered here, visit the [Load Balancing console](#).

Application Load Balancer
HTTP, HTTPS

Network Load Balancer
TCP, UDP, TLS

Load balancer name
Name cannot be changed after the load balancer is created.
AS1-1

Load balancer scheme
Scheme cannot be changed after the load balancer is created.

Internal

Internet-facing

Network mapping
Your new load balancer will be created using the same VPC and Availability Zone selections as your Auto Scaling group. You can select

Screenshot of the AWS CloudFormation Create Stack wizard Step 6: Configure instance launch options.

Configure group size and scaling policies - optional Info

Set the desired, minimum, and maximum capacity of your Auto Scaling group. You can optionally add a scaling policy to dynamically scale the number of instances in the group.

Group size - optional Info

Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum capacity limits. Your desired capacity must be within the limit range.

Desired capacity
1

Minimum capacity
1

Maximum capacity
10

Scaling policies - optional

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. Info

Target tracking scaling policy
Choose a desired outcome and leave it to the scaling

None

Target tracking scaling policy
Choose a desired outcome and leave it to the scaling policy to add and remove capacity as needed to achieve that outcome.

None

Scaling policy name

Metric type
▼

Target value

Instances need
 seconds warm up before including in metric

Disable scale in to create only a scale-out policy

Instance scale-in protection - optional

Instance scale-in protection
If protect from scale in is enabled, newly launched instances will be protected from scale in by default.
 Enable instance scale-in protection

Cancel Skip to review Previous Next

≡ EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template

Step 2
Choose instance launch options

Step 3 - optional
Configure advanced options

Step 4 - optional
Configure group size and scaling policies

Step 5 - optional
Add notifications

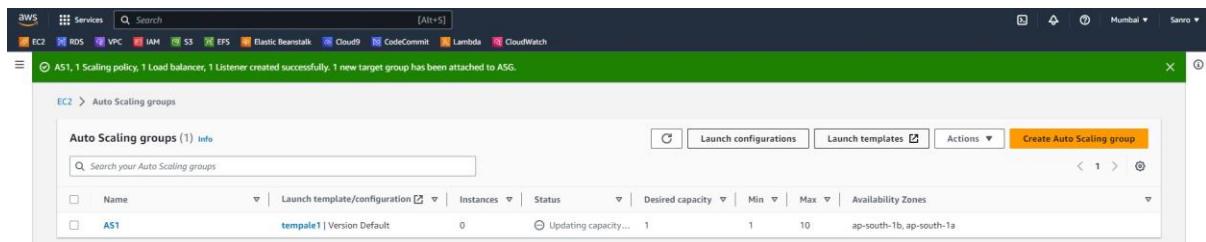
Step 6 - optional
Add tags

Step 7
Review

Add notifications - optional Info

Send notifications to SNS topics whenever Amazon EC2 Auto Scaling launches or terminates the EC2 instances in your Auto Scaling group.

Cancel Skip to review Previous Next



Name your **Auto Scaling Group**.

A screenshot of the AWS Auto Scaling wizard, Step 3 - optional. The left sidebar lists steps: Step 3 - optional (Configure advanced options), Step 4 - optional (Configure group size and scaling policies), Step 5 - optional (Add notifications), Step 6 - optional (Add tags), and Step 7 (Review). The main content area is titled 'Load balancing' and shows three options: 'No load balancer' (radio button unselected), 'Attach to an existing load balancer' (radio button unselected), and 'Attach to a new load balancer' (radio button selected). Below this, the 'Attach to a new load balancer' section is expanded, showing fields for 'Load balancer type' (Application Load Balancer or Network Load Balancer selected), 'Load balancer name' (AS1-1), 'Load balancer scheme' (Internal or Internet-facing selected), and 'Network mapping'.

The screenshot shows the AWS CloudFront console with the 'Create distribution' wizard open. The top navigation bar includes the AWS logo, a search bar, and a 'Services' dropdown. Below the navigation is a horizontal bar with icons for various AWS services: EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, and CloudWatch.

The main content area is titled 'Specify group details' under 'Step 1: Specify group details'. A sub-section titled 'Basic configuration' contains the instruction: 'Your load balancer routes requests to the targets in a target group and performs health checks on the targets.' Below this, a note states: 'Settings in this section can't be changed after the target group is created.'

The 'Choose a target type' section contains four options:

- Instances** (selected):
 - Supports load balancing to instances within a specific VPC.
 - Facilitates the use of Amazon EC2 Auto Scaling to manage and scale your EC2 capacity.
- IP addresses**:
 - Supports load balancing to VPC and on-premises resources.
 - Facilitates routing to multiple IP addresses and network interfaces on the same instance.
 - Offers flexibility with microservice based architectures, simplifying inter-application communication.
 - Supports IPv6 targets, enabling end-to-end IPv6 communication, and IPv4-to-IPv6 NAT.
- Lambda function**:
 - Facilitates routing to a single Lambda function.
 - Accessible to Application Load Balancers only.
- Application Load Balancer**:
 - Offers the flexibility for a Network Load Balancer to accept and route TCP requests within a specific VPC.
 - Facilitates using static IP addresses and PrivateLink with an Application Load Balancer.

Target group name

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

| Protocol | Port |
|----------|-----------------|
| TCP | : 80 1-65535 |

VPC

Select the VPC with the instances that you want to include in the target group.

| | |
|--|---|
| vpc1 vpc-0831241d2693c390d IPv4: 10.0.0.0/24 | ▼ |
|--|---|

Health checks

The associated load balancer periodically sends requests, per the settings below, to the registered targets to test their status.

Health check protocol

| | |
|------|---|
| HTTP | ▼ |
|------|---|

Health check path

Use the default path of "/" to ping the root, or specify a custom path if preferred.

Up to 1024 characters allowed.

► **Advanced health check settings**

Attributes

vpc-0831241d2693c390d [Edit](#) **vpc1**

Availability Zones and subnets
You must select a single subnet for each Availability Zone enabled. Only public subnets are available for selection to support DNS resolution.

| | | |
|---|--------------------------|---|
| <input checked="" type="checkbox"/> ap-south-1b | subnet-02f703317af35ed66 | ▼ |
| <input checked="" type="checkbox"/> ap-south-1a | subnet-020801529a032e272 | ▼ |

Listeners and routing
If you require secure listeners, or multiple listeners, you can configure them from the [Load Balancing console](#) after your load balancer is created.

| Protocol | Port | Default routing (forward to) |
|----------|------|------------------------------|
| TCP | 80 | grp2 TCP |

Tags - optional
Consider adding tags to your load balancer. Tags enable you to categorize your AWS resources so you can more easily manage them.

[Add tag](#)
50 remaining

Health checks

Health checks increase availability by replacing unhealthy instances. When you use multiple health checks, all are evaluated, and if at least one fails, instance replacement occurs.

EC2 health checks
[Always enabled](#)

Additional health check types - optional [Info](#)

Turn on [AWS Lambda health checks](#) [Recommended](#)

AWS Services Search [Alt+S] Mumbai Sanjo

EC2 RDS VPC IAM SNS EFS Elastic Beanstalk Cloud9 CodeCommit CloudWatch

EC2 > Target groups > Create target group

Step 1: Specify group details

Step 2: Register targets

Register targets

This is an optional step to create a target group. However, to ensure that your load balancer routes traffic to this target group you must register your targets.

Available instances (1/2)

| Instance ID | Name | Status | Security groups | Zone | Subnet ID |
|---|------|---------|-----------------|-------------|--------------------------|
| <input checked="" type="checkbox"/> i-0a5fab83942dbb4c0 | vm1 | Running | launch-wizard-1 | ap-south-1a | subnet-020801529a032e272 |
| <input type="checkbox"/> i-0acf2dbd05f78b3a | vm2 | Running | launch-wizard-1 | ap-south-1b | subnet-02f703317af35ed66 |

1 selected

Ports for the selected instances
Ports for routing traffic to the selected instances.
80
1-65535 (separate multiple ports with commas)

[Include as pending below](#)

Review targets

Now we can see auto scaling instance is running

The screenshot shows the AWS EC2 Instances page. On the left, a sidebar navigation includes New EC2 Experience, EC2 Dashboard, EC2 Global View, Events, Limits, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images, AMIs, AMI Catalog, and Elastic Block Store. The main content area displays a table of instances:

| Name | Instance ID | Instance state | Instance type | Status check | Alarm status | Availability Zone | Public IPv4 DNS | Public IPv4 IP | Elastic IP |
|------|---------------------|----------------|---------------|-------------------|--------------|-------------------|-----------------|----------------|------------|
| vm1 | i-0a5fab33942dbb4c0 | Running | t2.micro | 2/2 checks passed | No alarms | ap-south-1a | - | 15.206.67.130 | - |
| A5vm | i-064b5771d41248836 | Running | t2.micro | Initializing | No alarms | ap-south-1b | - | - | - |
| vm2 | i-0acf2dbd05f78b3a | Running | t2.micro | 2/2 checks passed | No alarms | ap-south-1b | - | - | - |

Details for instance A5vm are expanded:

| Details | Security | Networking | Storage | Status checks | Monitoring | Tags |
|--|---|--|-------------------------------------|---------------|------------|------|
| Instance summary info | | | | | | |
| Instance ID i-064b5771d41248836 | Public IPv4 address - | Private IPv4 DNS name (IPv4 only) ip-10-0-0-27.ap-south-1.compute.internal | Private IPv4 addresses 10.0.0.27 | | | |
| IPv6 address - | Instance state Running | Instance type t2.micro | Public IPv4 DNS - | | | |
| Hostname type IP name: ip-10-0-0-27.ap-south-1.compute.internal | VPC ID vpc-0831241d2693c390d (vpc1) | VPC ID vpc-0831241d2693c390d (vpc1) | Elastic IP addresses - | | | |
| Answer private resource DNS name - | Subnet ID subnet-02f703317af35ed66 (sub2prv) | AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. Learn more | Auto Scaling Group name AS1 | | | |

Create Endpoint

The screenshot shows the 'Create endpoint' wizard in the AWS VPC service. The top navigation bar includes the AWS logo, Services menu, a search bar, and a keyboard shortcut [Alt+S]. Below the navigation, a breadcrumb trail shows 'VPC > Endpoints > Create endpoint'. The main content area has a title 'Create endpoint' with an 'Info' link. A descriptive text explains the three types of VPC endpoints: Interface endpoints, Gateway Load Balancer endpoints, and Gateway endpoints. It notes that Interface and Gateway Load Balancer endpoints are powered by AWS PrivateLink and use an Elastic Network Interface (ENI) as an entry point for traffic destined to the service. Interface endpoints are typically accessed using the public or private DNS name associated with the service, while Gateway endpoints and Gateway Load Balancer endpoints serve as a target for a route in your route table for traffic destined for the service.

Endpoint settings

Name tag - optional
Creates a tag with a key of 'Name' and a value that you specify.
en

Service category
Select the service category

AWS services
Services provided by Amazon

PrivateLink Ready partner services
Services with an AWS Service Ready designation

AWS Marketplace services
Services that you've purchased through AWS Marketplace

EC2 Instance Connect Endpoint
An elastic network interface that allows you to connect to resources in a private subnet

Other endpoint services
Find services shared with you by service name

VPC
Select the VPC in which to create the endpoint

VPC
The VPC in which to create your endpoint.
vpc-0831241d2693c390d (vpc1)

▶ Additional settings

Using Endpoint connect this new instance

The screenshot shows the AWS Management Console interface for connecting to an EC2 instance. The top navigation bar includes the AWS logo, a 'Services' dropdown, a search bar, and a keyboard shortcut '[Alt+S]'. Below the navigation is a horizontal menu with links: EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, and CloudWatch. The path in the breadcrumb navigation is EC2 > Instances > i-064b5771d41248836 > Connect to instance.

The main content area is titled 'Connect to instance' with a 'Info' link. It instructs the user to connect to the instance using any of the listed options. There are four tabs at the top of the form: 'EC2 Instance Connect' (selected), 'Session Manager', 'SSH client', and 'EC2 serial console'.

Instance ID: i-064b5771d41248836 (ASvm)

Connection Type:

- Connect using EC2 Instance Connect
Connect using the EC2 Instance Connect browser-based client, with a public IPv4 address.
- Connect using EC2 Instance Connect Endpoint
Connect using the EC2 Instance Connect browser-based client, with a private IPv4 address and a VPC endpoint.

Private IP address: 10.0.0.27

User name: root
Enter the user name defined in the AMI used to launch the instance. If you didn't define a custom user name, use the default user name, root.

Max tunnel duration (seconds): 3600
The maximum allowed duration of the SSH connection. Must comply with the maxTunnelDuration condition (if specified) in the IAM policy.
Min 1 second. Max 3600 seconds (1 hour).

EC2 Instance Connect Endpoint:
Only endpoints that have completed the creation process can be selected.
eice-003c425b3c7936677

Note: In most cases, the default user name, root, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

AWS Services Search [Alt+S]

Last login: Mon Jun 26 08:58:15 2023

```

  _\ (   )_ /
  _\ \_\|_|
https://aws.amazon.com/amazon-linux-2/
[root@ip-10-0-0-27 ~]# ls
[root@ip-10-0-0-27 ~]# cd /home/ec2-user
[root@ip-10-0-0-27 ec2-user]# ls
file1 rose santhi.pem
[root@ip-10-0-0-27 ec2-user]# cat /etc/passwd
root:x:0:root:/root:/bin/bash
bin:x:1:bin:/bin:/sbin/nologin
daemon:x:2:daemon:/sbin:/sbin/nologin
adm:x:3:adm:/var/adm:/sbin/nologin
lp:x:4:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:sync:/sbin:/bin/sync
shutdown:x:6:shutdown:/sbin:/sbin/shutdown
halt:x:7:halt:/sbin:/sbin/halt
mail:x:8:mail:/var/spool/mail:/sbin/nologin
operator:x:11:operator:/root:/bin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/sbin/nologin
systemd-network:x:192:192:systemd Network Management:/sbin/nologin
dbus:x:81:81:System message bus:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
libstoragemgmt:x:999:997:daemon account for libstoragemgmt:/var/run/lsm:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
rngd:x:998:996:Random Number Generator Daemon:/var/lib/rngd:/sbin/nologin
chrony:x:997:995:/var/lib/chrony:/sbin/nologin
ec2-instance-connect:x:996:994::/home/ec2-instance-connect:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
ec2-user:x:1000:1000:EC2 Default User:/home/ec2-user:/bin/bash
roja:x:1001:1001:/home/roja:/bin/bash
[root@ip-10-0-0-27 ec2-user]# cat /etc/passwd | grep roja
roja:x:1001:1001:/home/roja:/bin/bash
[root@ip-10-0-0-27 ec2-user]# ls
file1 rose santhi.pem
[root@ip-10-0-0-27 home]# cd ..
[root@ip-10-0-0-27 home]# ls
ec2-user roja
[root@ip-10-0-0-27 home]# []

```

i-064b5771d41248836 (ASvm)

PrivateIPs: 10.0.0.27

CloudShell Feedback Language 90°F

Cloud Watch

Create a Rule

Amazon EventBridge > Rules

Rules

A rule watches for specific types of events. When a matching event occurs, the event is routed to the targets associated with the rule. A rule can be associated with one or more targets.

Select event bus

Event bus

Select or enter event bus name

default

Rules (0)

Find rules Any status Create rule

| Name | Status | Type | Description |
|---|--------|------|-------------|
| No rules No rules to display. Create rule | | | |

warn Services Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch

Amazon EventBridge > Rules > Create rule

Step 1 Define rule detail

Step 2 Build event pattern

Step 3 Select target(s)

Step 4 - optional Configure tags

Step 5 Review and create

Define rule detail

Rule detail

Name Rule1

Maximum of 64 characters consisting of numbers, lower/upper case letters, -, _, =, .

Description - optional rule for autoscaling instances creation

Event bus Info Select the event bus this rule applies to, either the default event bus or a custom or partner event bus.

default

Enable the rule on the selected event bus

Rule type Info

Rule with an event pattern A rule that runs when an event matches the defined event pattern. EventBridge sends the event to the specified target.

Schedule A rule that runs on a schedule

Cancel Next

The screenshot shows the AWS EventBridge 'Create rule' wizard. The top navigation bar includes the AWS logo, 'Services' button, a search bar with placeholder 'Search [Alt+S]', and links for EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, and CloudWatch.

The breadcrumb trail indicates the current step: Amazon EventBridge > Rules > Create rule.

The main content area is titled 'Build event pattern' with an 'Info' link. It is divided into two sections:

- Event source**:
 - Event source: Select the event source from which events are sent.
 - AWS events or EventBridge partner events: Events sent from AWS services or EventBridge partners.
 - Other: Custom events or events sent from more than one source, e.g. events from AWS services and partners.
 - All events: All events sent to your account.
- Sample event - optional**: You don't have to select or enter a sample event, but it's recommended so you can reference it when writing and testing the event pattern, or filter criteria.
 - Sample event type:
 - AWS events
 - EventBridge partner events
 - Enter my own
 - Sample events: Filter by event source and type or by keyword. A dropdown menu is open, showing 'Select' and the number '1'.

Method

Use schema
Use an Amazon EventBridge schema to generate the event pattern.

Use pattern form
Use a template provided by EventBridge to create an event pattern.

Custom pattern (JSON editor)
Write an event pattern in JSON.

Event pattern Info

Event source
AWS service or EventBridge partner as source

AWS services ▾
AWS service

The name of the AWS service as the event source

EC2 ▾

Event type
The type of events as the source of the matching pattern

EC2 Instance State-change Notification ▾

Any state
 Specific state(s)

Any instance
 Specific instance Id(s)

Event pattern
Event pattern, or filter to match the events

```
1 {  
2   "source": ["aws.ec2"],  
3   "detail-type": ["EC2 Instance State-change Notification"]  
4 }
```

Copy Test pattern Edit pattern

Cancel Previous Next

AWS Services Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch

Step 1 Define rule detail

Step 2 Build event pattern

Step 3 Select target(s)

Step 4 - optional Configure tags

Step 5 Review and create

Select target(s)

Permissions
Note: When using the EventBridge console, EventBridge will automatically configure the proper permissions for the selected targets. If you're using the AWS CLI, SDK, or CloudFormation, you'll need to configure the proper permissions.

Target 1

Target types
Select an EventBridge event bus, EventBridge API destination (SaaS partner), or another AWS service as a target.
 EventBridge event bus
 EventBridge API destination
 AWS service

Select a target **Info**
Select target(s) to invoke when an event matches your event pattern or when schedule is triggered (limit of 5 targets per rule)
SNS topic

Topic
newtopic

▶ Additional settings

Add another target Cancel Skip to Review and create Previous Next

Amazon EventBridge Rule Rule1 was created successfully

Amazon EventBridge > Rules Back to CloudWatch Events Rules page

Rules
A rule watches for specific types of events. When a matching event occurs, the event is routed to the targets associated with the rule. A rule can be associated with one or more targets.

Select event bus

Event bus
Select or enter event bus name
default

Rules (1)

| Name | Status | Type | Description |
|-------|---------|----------|---|
| Rule1 | Enabled | Standard | rule for autoscaling instances creation |

Create rule

A role is successfully created.

Create Topic

AWS Services Search [Alt+S] Mumbai San Francisco

Amazon Simple Notification Service

Pub/sub messaging for microservices and serverless applications.

Amazon SNS is a highly available, durable, secure, fully managed pub/sub messaging service that enables you to decouple microservices, distributed systems, and event-driven serverless applications. Amazon SNS provides topics for high-throughput, push-based, many-to-many messaging.

Benefits and features

| | |
|---|---|
| Reliably deliver messages with durability | Amazon SNS uses cross availability zone message storage to provide high message durability. Amazon SNS reliably delivers |
| Automatically scale your workload | Amazon SNS leverages the proven AWS cloud to dynamically scale with your application. Amazon SNS is a fully managed service, taking care of the heavy lifting related to capacity |

Pricing

Amazon SNS has no upfront costs. You pay based on the number of messages you publish, the number of messages you deliver, and any additional API calls for managing topics and subscriptions. Delivery pricing varies by endpoint type.

Learn more

Create topic

Topic name: MyTopic

Next step

Start with an overview

AWS Services Search [Alt+S] Mumbai San Francisco

Amazon SNS > Topics > Create topic

Create topic

Details

Type: **Info** Topic type cannot be modified after topic is created

FIFO (first-in, first-out)

- Strictly-preserved message ordering
- Exactly-once message delivery
- High throughput, up to 300 publishes/second
- Subscription protocols: SQS, Lambda, HTTP, SMS, email, mobile application endpoints

Standard

- Best-effort message ordering
- At-least once message delivery
- Highest throughput in publishers/second
- Subscription protocols: SQS, Lambda, HTTP, SMS, email, mobile application endpoints

Name: newtopic Maximum 256 characters. Can include alphanumeric characters, hyphens (-) and underscores (_).

Display name - optional **Info** To use this topic with SMS subscriptions, enter a display name. Only the first 10 characters are displayed in an SMS message.

newtopic Maximum 100 characters.

AWS Services Search [Alt+S] Mumbai San Francisco

Amazon SNS

Topics

Subscriptions

Subscriptions (0)

No subscriptions found
You don't have any subscriptions to this topic.

Create subscription

AWS Services Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch Simple Notification Service

Amazon SNS > Subscriptions > Create subscription

Create subscription

Details

Topic ARN X

Protocol
The type of endpoint to subscribe

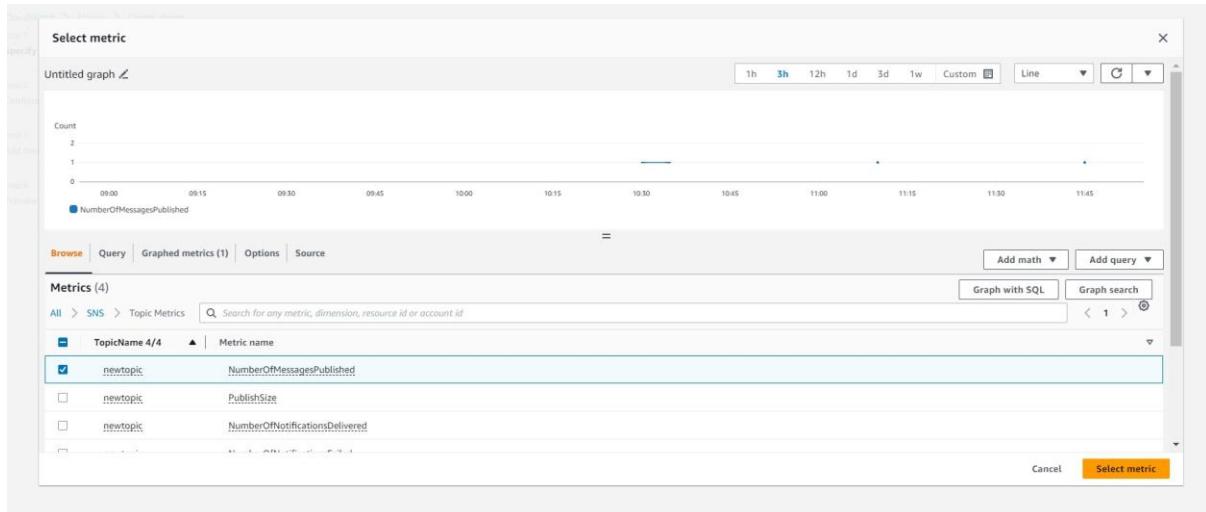
Endpoint
An email address that can receive notifications from Amazon SNS.

Info After your subscription is created, you must confirm it. [Info](#)

Subscription filter policy - optional [Info](#)
This policy filters the messages that a subscriber receives.

Redrive policy (dead-letter queue) - optional [Info](#)
Send undeliverable messages to a dead-letter queue.

Cancel **Create subscription**



Auto Scaling Groups

| Name | Launch template/configuration | Instances | Status | Desired capacity | Min | Max | Availability Zones |
|--------|-------------------------------|-----------|--------|------------------|-----|-----|--------------------------|
| AS1 | template1 Version Default | 1 | - | 1 | 1 | 10 | ap-south-1b, ap-south-1a |
| TestAS | template1 Version Default | 1 | - | 1 | 1 | 10 | ap-south-1b, ap-south-1a |

Auto Scaling group: TestAS

Group details

| | | | |
|---|------------------------|--------|--|
| Auto Scaling group name TestAS | Desired capacity 1 | Status | Amazon Resource Name (ARN) arn:aws:autoscaling:ap-south-1:21623683945:autoScalingGroup:0560-535d-4eaf-a5f1-e9e93e9be029:autoScalingGroupName/TestAS |
| Date created Mon Jun 26 2023 16:04:36 GMT+0530 (India Standard Time) | Minimum capacity 1 | | |
| | Maximum capacity 10 | | |

EC2 Instances

| Name | Instance ID | Instance state | Instance type | Status check | Alarm status | Availability Zone | Public IPv4 DNS | Public IPv4 |
|----------|---------------------|----------------|---------------|-------------------|--------------|-------------------|-----------------|-------------|
| vm1 | i-0a5fab83942dbb4c0 | Running | t2.micro | 2/2 checks passed | No alarms | ap-south-1a | - | 15.206.67.1 |
| TestAsvm | i-012bef669ce4462ba | Running | t2.micro | 2/2 checks passed | No alarms | ap-south-1a | - | - |
| ASvm | i-064b5771d41248836 | Running | t2.micro | 2/2 checks passed | No alarms | ap-south-1b | - | - |
| vm2 | i-0acf2dbd05f78b3a | Running | t2.micro | 2/2 checks passed | No alarms | ap-south-1b | - | - |

Gmail

AWS Notification Message

AWS Notifications <no-reply@sns.amazonaws.com> to me 4:04 PM (32 minutes ago)

```
{"version":"0","id":"0fbcbca-bdf2-868c-38ec0aca41d5","detail-type":"EC2 Instance State-change Notification","source":"aws.ec2","account":"216236839455","time":"2023-06-26T10:34:40Z","region":"ap-south-1","resources":["arn:aws:ec2:ap-south-1:216236839455:instance/i-012bef669ce4462ba"],"detail":{"instance-id":"i-012bef669ce4462ba","state":"pending"}}
```

If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:
https://sns.ap-south-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:ap-south-1:216236839455:newtopic_2bda83f9-9b1a-4b1d-a930-e7235924e452&Endpoint=leelasriborusu@gmail.com

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at <https://aws.amazon.com/support>

AWS Notifications <no-reply@sns.amazonaws.com> 4:05 PM (32 minutes ago)

```
{"version":"0","id":"8f36cfdd-833d-d179-ba5c-a14fd5b49d21","detail-type":"EC2 Instance State-change Notification","source":"aws.ec2","account":"216236839455","time":"2023-06-26T10:35:03Z","region":"ap-south-1","resources":["arn:aws:ec2:ap-south-1:216236839455:instance/i-012bef669ce4462ba"],"detail":{"instance-id":"i-012bef669ce4462ba","state":"running"}}
```

If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:
https://sns.ap-south-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:ap-south-1:216236839455:newtopic_2bda83f9-9b1a-4b1d-a930-e7235924e452&Endpoint=leelasriborusu@gmail.com

Create Alarm

Screenshot of the AWS CloudWatch Metrics & Alarms interface showing the creation of a new alarm.

The navigation bar at the top includes the AWS logo, Services, a search bar, and links for EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, CloudWatch, and Simple Notification Service. The location bar shows "CloudWatch > Alarms > Create alarm".

The main panel is titled "Specify metric and conditions". It displays a graph showing the count of published messages over time. The Y-axis is labeled "Count" with values 0, 1, and 2. The X-axis shows time points: 09:30, 10:30, and 11:30. A single data point is shown at 09:30 with a value of 2. The graph has a legend entry: "NumberOfMessagesPublished".

On the right side of the graph, there are configuration fields:

- Metric**: An "Edit" button is available.
- Graph**: A note states: "This alarm will trigger when the blue line goes above the red line for 1 datapoints within 5 minutes."
- Namespace**: AWS/SNS
- Metric name**: NumberOfMessagesPublished
- TopicName**: newtopic
- Statistic**: Average (selected)
- Period**: 5 minutes

AWS Services Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch Simple Notification Service

CloudWatch > Alarms > Create alarm

Step 1 Specify metric and conditions

Step 2 Configure actions

Step 3 Add name and description

Step 4 Preview and create

Configure actions

Notification

Alarm state trigger Define the alarm state that will trigger this action.

In alarm The metric or expression is outside of the defined threshold.

OK The metric or expression is within the defined threshold.

Insufficient data The alarm has just started or not enough data is available. Remove

Send a notification to the following SNS topic Define the SNS (Simple Notification Service) topic that will receive the notification.

Select an existing SNS topic

Create new topic

Use topic ARN to notify other accounts

Send a notification to... X Only email lists for this account are available.

Email (endpoints) leelasriborusu@gmail.com - View in SNS Console [View in SNS Console](#)

Add notification

AWS Services Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch Simple Notification Service

Average

Period 5 minutes

Conditions

Threshold type

Static Use a value as a threshold

Anomaly detection Use a band as a threshold

Whenever NumberOfMessagesPublished is... Define the alarm condition.

Greater > threshold

Greater/Equal >= threshold

Lower/Equal <= threshold

Lower < threshold

than... Define the threshold value. Must be a number

Additional configuration

Cancel Next

CloudWatch > Alarms > Create alarm

Step 1
Specify metric and conditions

Step 2
Configure actions

Step 3
Add name and description

Step 4
Preview and create

Add name and description

Name and description

Alarm name:

Alarm description - optional [View formatting guidelines](#)

| | |
|---|---------|
| Edit | Preview |
| <pre># This is an H1 **double asterisks will produce strong character** This is [an example](https://example.com/) inline link.</pre> | |

Up to 1024 characters (0/1024)

Info Markdown formatting is only applied when viewing your alarm in the console. The description will remain in plain text in the alarm notifications.

Cancel **Previous** **Next**

Open Cloud Watch

In left side panel click **All alarms**, we see that created alarm

The screenshot shows the AWS CloudWatch Alarms page. The left sidebar has 'CloudWatch' selected. Under 'Alarms', there is a red triangle icon with the number '1', indicating one alarm. The main pane displays a table titled 'Alarms (1/1)'. The table has columns: Name, State, Last state update, Conditions, and Actions. One row is shown for 'alarm1', which is in the 'Insufficient data' state and was last updated on 2023-06-26 12:01:35. The condition is 'NumberOfMessagesPublished >= 5 for 1 datapoints within 5 minutes'. The 'Actions enabled' column shows a green circle with a checkmark. The top right of the page has buttons for 'Create composite alarm', 'Actions', and 'Create alarm'.

RDS

AWS Services Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch

Amazon RDS X

RDS > Subnet groups > Create DB subnet group

Create DB subnet group

To create a new subnet group, give it a name and a description, and choose an existing VPC. You will then be able to add subnets related to that VPC.

Subnet group details

Name
You won't be able to modify the name after your subnet group has been created.
 Must contain from 1 to 255 characters. Alphanumeric characters, spaces, hyphens, underscores, and periods are allowed.

Description

VPC
Choose a VPC identifier that corresponds to the subnets you want to use for your DB subnet group. You won't be able to choose a different VPC identifier after your subnet group has been created.

Add subnets

Availability Zones
Choose the Availability Zones that include the subnets you want to add.
 ▾

ap-south-1b X ap-south-1a X

Subnets
Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.
 ▾

subnet-02f703317af35ed66 (10.0.0.16/28) X
subnet-020801529a032e272 (10.0.0.0/28) X

S | Services | Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch Simple Notification Service

Amazon RDS

Dashboard Databases Query Editor Performance insights Snapshots Exports in Amazon S3 Automated backups Reserved instances Proxies

Subnet groups Parameter groups **Option groups** Custom engine versions

Events Event subscriptions

Recommendations 2

RDS > Option groups > Create

Create option group

Option group details [Info](#)

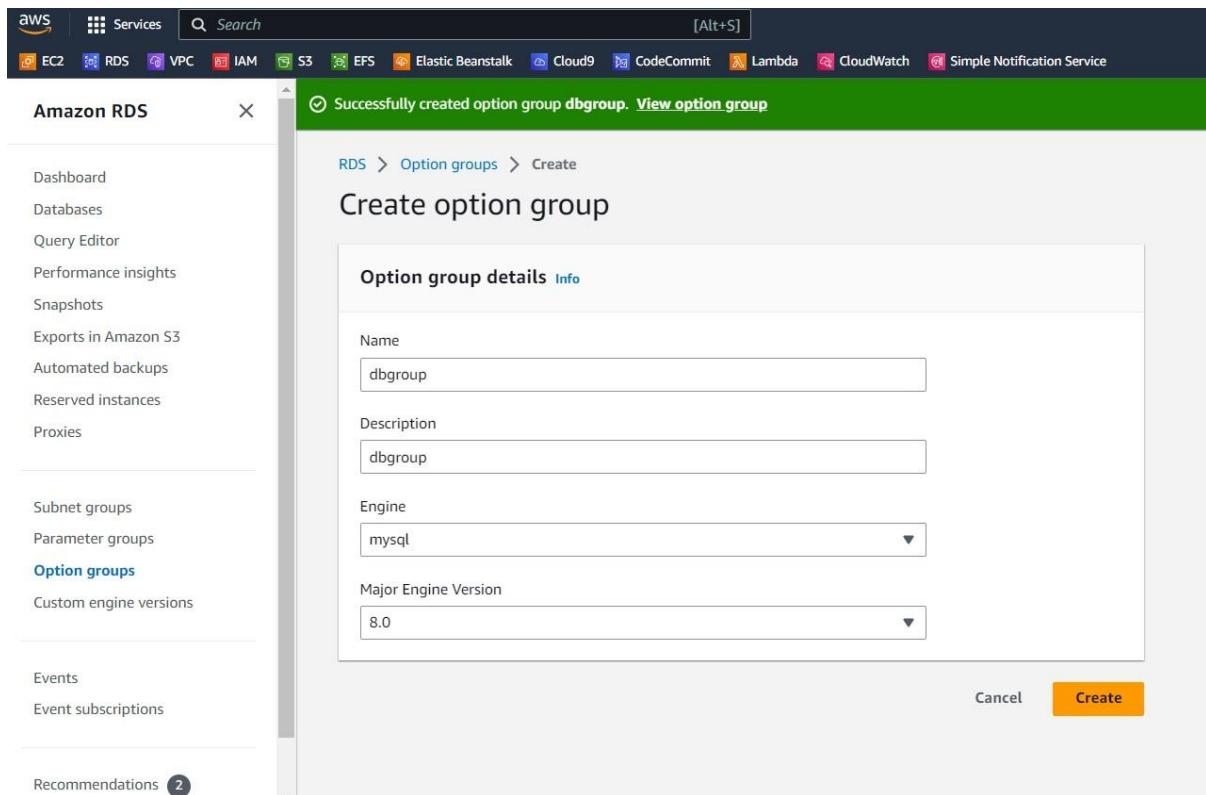
Name: dbgroup

Description: dbgroup

Engine: mysql

Major Engine Version: 8.0

[Cancel](#) [Create](#)



S | Services | Search [Alt+S] Mumbai San Francisco

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-practices configurations. Some configuration options can be changed after the database is created.

Engine options

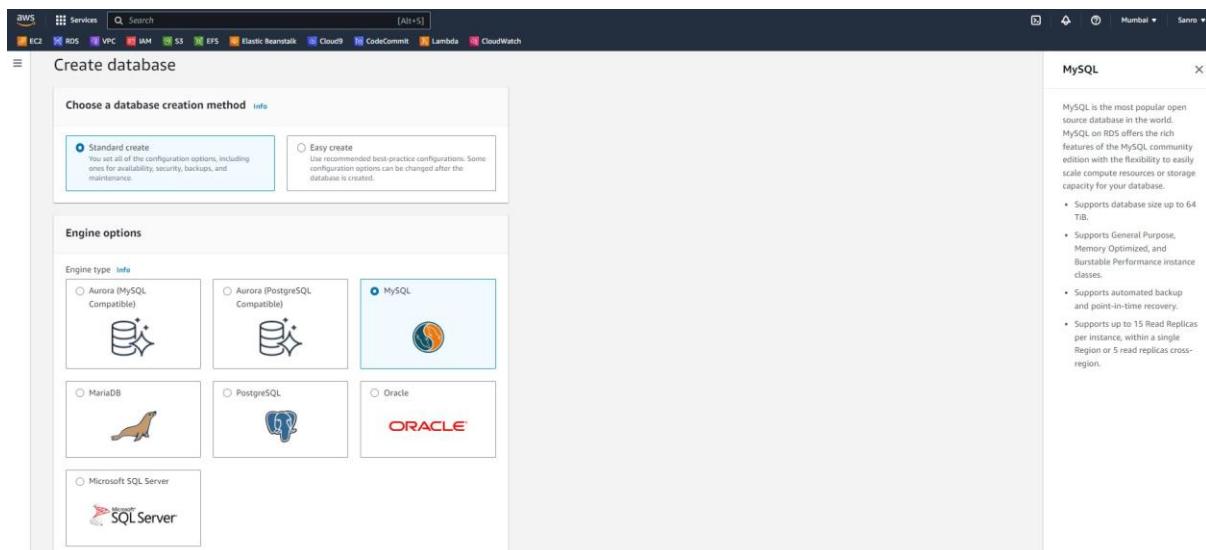
Engine type [Info](#)

| | | |
|---|--|--|
| <input type="radio"/> Aurora (MySQL Compatible) | <input type="radio"/> Aurora (PostgreSQL Compatible) | <input checked="" type="radio"/> MySQL |
| <input type="radio"/> MariaDB | <input type="radio"/> PostgreSQL | <input type="radio"/> Oracle |
| <input type="radio"/> Microsoft SQL Server | | ORACLE |

MySQL

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 read replicas cross-region.





Edition

- MySQL Community



Known issues/limitations

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

▼ Hide filters

- Show versions that support the Multi-AZ DB cluster [Info](#)

Create a A Multi-AZ DB cluster with one primary DB instance and two readable standby DB instances. Multi-AZ DB clusters provide up to 2x faster transaction commit latency and automatic failover in typically under 35 seconds.

- Show versions that support the Amazon RDS Optimized Writes [Info](#)

Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

Engine Version

MySQL 8.0.32



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.

Free tier

Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS. [Info](#)

Settings

DB instance identifier [Info](#)

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.

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. 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.

Manage master credentials in AWS Secrets Manager

Manage master user credentials in Secrets Manager. RDS can generate a password for you and manage it throughout its lifecycle.

 If you manage the master user credentials in Secrets Manager, some RDS features aren't supported.

[Learn more](#) 

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 master password [Info](#)

Instance configuration

The DB instance configuration options below are limited to those supported by the engine that you selected above.



Amazon RDS Optimized Writes - new [Info](#)

Show instance classes that support Amazon RDS Optimized Writes

DB instance class [Info](#)

- Standard classes (includes m classes)
- Memory optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.t2.micro

1 vCPUs 1 GiB RAM Not EBS Optimized

Include previous generation classes

Storage

Storage type [Info](#)

General Purpose SSD (gp2)

Baseline performance determined by volume size

Allocated storage [Info](#)

20

GiB

The minimum value is 20 GiB and the maximum value is 6,144 GiB

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 after the specified threshold is

Connectivity [Info](#)



Compute resource

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

Don't connect to an EC2 compute resource

Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.

Connect to an EC2 compute resource

Set up a connection to an EC2 compute resource for this database.

EC2 instance [Info](#)

Choose the EC2 instance to add as the compute resource for this database. A VPC security group is added to this EC2 instance. A VPC security group is also added to the database with an inbound rule that allows the EC2 instance to access the database.

i-0a5fab83942dbb4c0

vm1



Some VPC settings can't be changed when a compute resource is added

Adding an EC2 compute resource automatically selects the VPC, DB subnet group, and public access settings for this database. To allow the EC2 instance to access the database, a VPC security group rds-ec2-X is added to the database and another called ec2-rds-X to the EC2 instance. You can remove the new security group for the database only by removing the compute resource.

Network type [Info](#)

To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.

IPv4

Your resources can communicate only over the IPv4 addressing protocol.

Dual-stack mode

Your resources can communicate over IPv4, IPv6, or both.

Virtual private cloud (VPC) [Info](#)

Choose the VPC. The VPC defines the virtual networking environment for this DB instance.

vpc1 (vpc-0831241d2693c390d)

2 Subnets, 2 Availability Zones



Only VPCs with a corresponding DB subnet group are listed.

Existing DB subnet groups

dbsg

2 Subnets, 2 Availability Zones



Public access [Info](#)

Yes

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.

No

RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

VPC security group (firewall) [Info](#)

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

Choose existing

Choose existing VPC security groups

Create new

Create new VPC security group

Additional VPC security group

Choose one or more options



launch-wizard-1

Amazon RDS will add a new VPC security group *rds-ec2-1* to allow connectivity with your compute resource.

Availability Zone [Info](#)

ap-south-1a



Certificate authority - optional [Info](#)

Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does so by checking the server certificate that is automatically installed on all databases that you provision.

rds-ca-2019 (default)



If you don't select a certificate authority, RDS chooses one for you.

Database authentication options [Info](#)

Password authentication

Authenticates using database passwords.

Password and IAM database authentication

Authenticates using the database password and user credentials through AWS IAM users and roles.

Password and Kerberos authentication

Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos Authentication.

Monitoring

Monitoring

Enable Enhanced monitoring

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

► Additional configuration

Database options, backup turned on, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned off.

Estimated Monthly costs

| | |
|-------------|-----------|
| DB instance | 17.52 USD |
|-------------|-----------|

| | |
|---------|----------|
| Storage | 2.62 USD |
|---------|----------|

| | |
|--------------|------------------|
| Total | 20.14 USD |
|--------------|------------------|

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

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

Estimated Monthly costs

| | |
|--------------|------------------|
| DB instance | 17.52 USD |
| Storage | 2.62 USD |
| Total | 20.14 USD |

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

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

Estimated monthly costs

The Amazon RDS Free Tier is available to you for 12 months. Each calendar month, the free tier will allow you to use the Amazon RDS resources listed below for free:

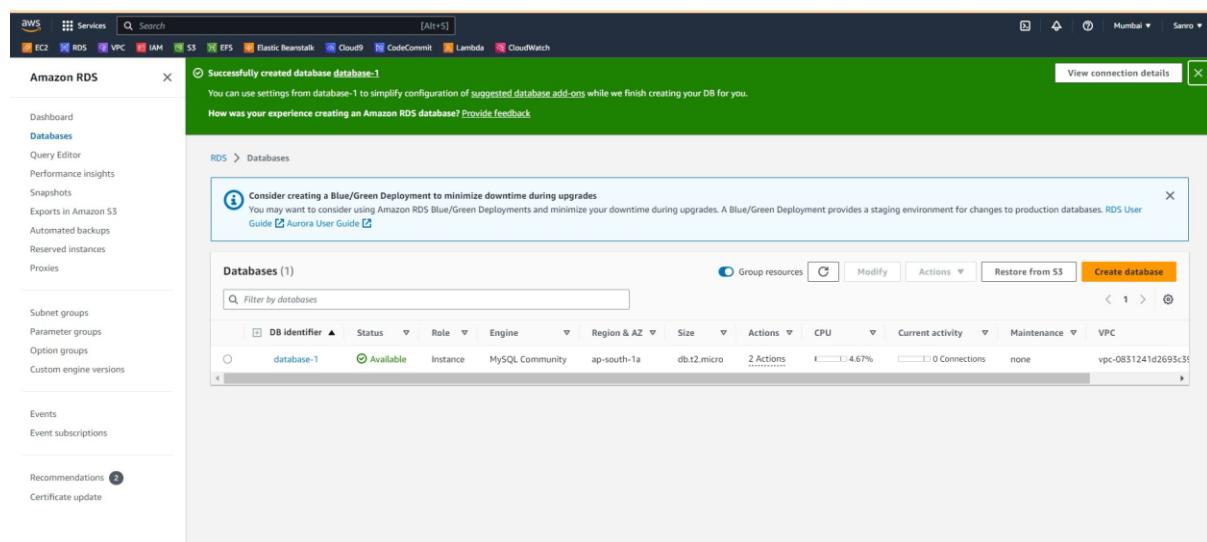
- 750 hrs of Amazon RDS in a Single-AZ db.t2.micro, db.t3.micro or db.t4g.micro Instance.
- 20 GB of General Purpose Storage (SSD).
- 20 GB for automated backup storage and any user-initiated DB Snapshots.

[Learn more about AWS Free Tier.](#)

When your free usage expires or if your application use exceeds the free usage tiers, you simply pay standard, pay-as-you-go service rates as described in the [Amazon RDS Pricing page](#).

 You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

[Cancel](#) [Create database](#)



The screenshot shows the AWS RDS console. On the left, there's a navigation sidebar with links like Amazon RDS, Dashboard, Databases, Query Editor, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Subnet groups, Parameter groups, Option groups, Custom engine versions, Events, Event subscriptions, Recommendations, and Certificate update. The main area has a green header bar with the message "Successfully created database database-1". Below it, there's a note about Blue/Green Deployments and a link to the Aurora User Guide. The main content area shows a table titled "Databases (1)". The table has columns: DB identifier, Status, Role, Engine, Region & AZ, Size, Actions, CPU, Current activity, Maintenance, and VPC. One row is visible for "database-1" which is "Available", running "MySQL Community" on "ap-south-1a" with "db.t2.micro" size, 2 actions, 4.67% CPU, 0 connections, no maintenance, and VPC "vpc-0831241d2693c35".

Connect to instance 1

```
$ chmod 400 santhi.pem
shanthi[BLUPTOP:15:05:17] ~ % ssh -i "santhi.pem" ec2-user@15.206.67.130
Last Login: Mon Jun 26 08:58:08 2023 from 45.123.26.18
[ec2-user@ip-10-0-0-5 ~]$ su
[ec2-user@ip-10-0-0-5 ec2-user]# yum install mysql
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core
amzn2-extras
amzn2-extras-docker
amzn2-extras-kernel-5.10
Resolving Dependencies
--> Running transaction check
--> Package mariadb.x86_64 1:5.5.68-1.amzn2.0.1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

Transaction Summary
Install 1 Package

Total download size: 8.8 M
Is this ok [y/N]: y
Downloaded packages:
mariadb-5.5.68-1.amzn2.0.1.x86_64.rpm | 8.8 MB 00:00:00
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : 1:mariadb-5.5.68-1.amzn2.0.1.x86_64 1/1
Verifying : 1:mariadb-5.5.68-1.amzn2.0.1.x86_64 1/1

Installed:
mariadb.x86_64 1:5.5.68-1.amzn2.0.1

Complete!
```

```
[root@ip-10-0-0-5 ~]# mysql --version
mysql  Ver 15.1 Distrib 5.5.68-MariaDB, for Linux (x86_64) using readline 5.1
[root@ip-10-0-0-5 ~]# mysql -h database-1.c8xq6daaaox.ap-south-1.rds.amazonaws.com -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 17
Server version: 8.0.32 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MySQL [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.00 sec)

MySQL [(none)]> create database db1;
Query OK, 1 row affected (0.00 sec)

MySQL [(none)]> show databases;
+-----+
| Database |
+-----+
| db1 |
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.00 sec)

MySQL [(none)]> use db1
Database changed
```

```

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

MySQL [(none)]> show databases;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
4 rows in set (0.00 sec)

MySQL [(none)]> create database db1;
Query OK, 1 row affected (0.00 sec)

MySQL [(none)]> show databases;
+-----+
| Database      |
+-----+
| db1           |
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
5 rows in set (0.00 sec)

MySQL [(none)]> use db1
Database changed
MySQL [db1]> create table1(
    -> name varchar(255)
    -> );
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'table1(
name varchar(255)
)' at line 1
MySQL [db1]> create table person(
    -> name varchar(255)
    -> );
Query OK, 0 rows affected (0.03 sec)

MySQL [db1]> show tables;
+-----+
| Tables_in_db1 |
+-----+
| person        |
+-----+
1 row in set (0.00 sec)

MySQL [db1]>

```

Read Replica

The screenshot shows the AWS RDS console interface. A modal window is open, indicating that a database named "database-1" has been successfully created. The main RDS dashboard shows a single database entry:

| DB identifier | Status | Role | Engine | Region & AZ | Size | Actions | CPU | Current activity | Maintain |
|---------------|-----------|----------|-----------------|-------------|-------------|-----------|-------|------------------|----------|
| database-1 | Available | Instance | MySQL Community | ap-south-1a | db.t2.micro | 2 Actions | 4.17% | 1 Connections | none |

A context menu is open over the database row, with the "Create read replica" option highlighted.

Create read replica

You are creating a replica DB instance from a source DB instance. This new DB instance will have the source DB instance's DB security groups and DB parameter groups.

Settings

Replica source

Source DB instance identifier
database-1
Role: Instance

DB instance identifier

DB instance identifier: This is the unique key that identifies a DB instance. This parameter is stored as a lowercase string (for example, mydbinstance).
DBfromMumbai

Instance configuration

The DB instance configuration options below are limited to those supported by the engine that you selected above.

DB instance class: Info

- Standard classes (includes m classes)
- Memory optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.t2.micro
1 vCPU - 1 GiB RAM - Not EBS Optimized

AWS Region

Destination Region: The region where the replica will be launched.
US East (N. Virginia)

Storage

Storage type: Info

General Purpose SSD (gp2)
Baseline performance determined by volume size

Allocated storage: Info

20 GiB
The minimum value is 20 GiB and the maximum value is 6,144 GiB

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. Learn more

Storage autoscaling

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 after the specified threshold is exceeded.

Maximum storage threshold

Info

Availability

Deployment options: Info

The following deployment options are limited to those supported by the engine.

- Multi-AZ DB Cluster - new
Creates a primary DB instance and two read-only standby DB instances, with each DB instance in a different Availability Zone (AZ). Provides high availability, data redundancy and increases capacity to serve read workloads.
- Multi-AZ DB instance
Creates a primary DB instance and a standby DB instance in a different AZ. Provides high availability and data redundancy, but the standby DB instance doesn't support connections for read workloads.
- Single DB instance
Creates a writer DB instance with no reader DB instances.

Connectivity

Network type: Info

To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.

- IPv4**
Your resources can communicate only over the IPv4 addressing protocol.
- Dual-stack mode**
Your resources can communicate over IPv6, IPv4, or both.

DB subnet group: Info

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

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**

The screenshot shows the AWS RDS configuration interface. On the left, a sidebar lists various options like Dashboard, Databases, Query Editor, etc. The main panel is titled 'Amazon RDS' and contains several configuration sections:

- Encryption**: A checkbox for 'Enable Enhanced monitoring' is checked.
- Monitoring**: A section for selecting log types to publish to Amazon CloudWatch Logs, with 'Audit log' selected.
- Log exports**: A section for selecting log types to publish to Amazon CloudWatch Logs, with 'Audit log' selected.
- IAM role**: A section for selecting a service-linked role for publishing logs to CloudWatch Logs, with 'RDS service-linked role' selected.
- Maintenance**: A section for enabling auto minor version upgrade, which is checked.
- Deletion protection**: A section for enabling deletion protection, which is unchecked.

At the bottom right are 'Cancel' and 'Create read replica' buttons.

The screenshot shows the AWS RDS Databases page. The sidebar includes options like Dashboard, Databases, Query Editor, etc. The main area displays a table of databases:

| DB identifier | Status | Role | Engine | Region & AZ | Size | Actions | CPU | Current act |
|---------------|-----------|---------|-----------------|-------------|-------------|-----------|-------|-------------|
| dbfrommumbai | Available | Replica | MySQL Community | us-east-1a | db.t2.micro | 2 Actions | 6.00% | 0 C |

A modal window titled 'Introducing Aurora I/O-Optimized' provides information about the new cluster storage configuration.

Connect to instance 2

The screenshot shows a terminal session on an Amazon Linux 2 AMI instance. The session starts with a welcome message and then proceeds with the following commands:

```

Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
[root@ip-10-0-0-28 ~]# yum install mysql -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core
amzn2-docker
amzn2-kernel-5.10
Resolving Dependencies
--> Running transaction check
--> Package mariadb.x86_64 1:5.5.68-1.amzn2.0.1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

Transaction Summary
Install 1 Package

Total download size: 0.8 M
Installed size: 49 M
Downloading packages:
i-Oacfd2dbd05f78b3a (vm2)
PrivateIPs: 10.0.0.28

```

```

AWS Services Search [Alt+S]
EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch

[root@ip-10-0-0-28 ~]# mysql -h database-1.cbxqdasoqj.ap-south-1.rds.amazonaws.com -p 3306 -u admin -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 27
Server version: 8.0.32 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\o' to clear the current input statement.
MySQL [(none)]> show databases;
+ Database
| db |
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
1 rows in set (0.00 sec)

MySQL [(none)]> use db1
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

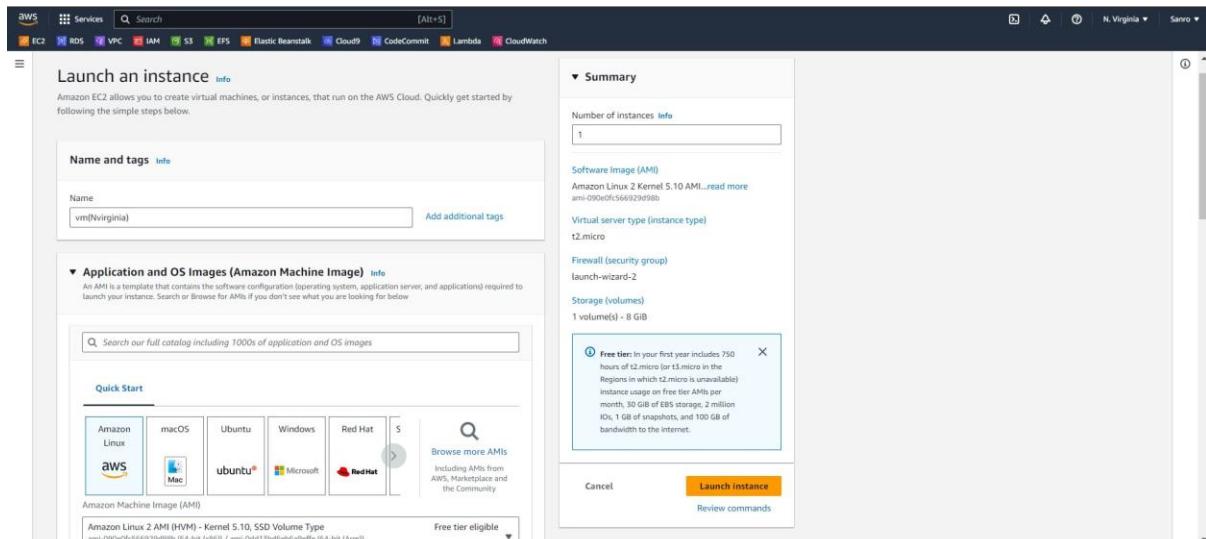
Database changed
MySQL [db1]> create table stu
    > (name varchar(255)
    >     );
Query OK, 0 rows affected (0.03 sec)

MySQL [db1]> show tables;
+ Tables_in_db1
| stu |
+-----+
1 rows in set (0.00 sec)

i-Oa1cf02dd05f78b3a (vm2)
PrivateIPs: 10.0.0.28

```

Create an instance in Other Region(US-EAST-1)



EC2 Services Search [Alt+S]

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type
ami-090e0fc566929d98b (64-bit x86) / ami-0dd13bdedea8fe (64-bit Arm)
Virtualization: hvm ENA enabled: true Root device type: ebs

Description: Amazon Linux 2 Kernel 5.10 AMI 2.0.20230612.0 x86_64 HVM gp2

Architecture: AMI ID: ami-090e0fc566929d98b Verified provider: 64-bit (x86)

Summary

Number of instances: 1

Software Image (AMI): Amazon Linux 2 Kernel 5.10 AMI... read more
ami-090e0fc566929d98b

Virtual server type (instance type): t2.micro

Firewall (security group): launch-wizard-2

Storage (volumes): 1 volume(s) - 8 GiB

Instance type

t2.micro Family: t2 1 vCPU 1 GiB Memory Current generation: true Free tier eligible
On-Demand Windows pricing: 0.0162 USD per Hour
On-Demand SUSE pricing: 0.0116 USD per Hour
On-Demand SHL pricing: 0.0116 USD per Hour
On-Demand Linux pricing: 0.0116 USD per Hour

All generations Compare instance types

Key pair (login) virginiatekey

Key pair name - required: virginiatekey Create new key pair

Cancel Launch instance Review commands

EC2 Services Search [Alt+S]

Network settings

VPC - required: vpc-09da43fad1b2dcce9 (default)

Subnet: subnet-0f31ffa44ff39c23a VPC: vpc-09da43fad1b2dcce9 Owner: 216236839455 Availability Zone: us-east-1a IP addresses available: 4089 CIDR: 172.31.16.0/20

Create new subnet

Auto-assign public IP: Enable

Firewall (security groups): Create security group Select existing security group

Common security groups: launch-wizard-2 sg-024e7007f64b97dfc

Compare security group rules

Advanced network configuration

Configure storage

Advanced

Summary

Number of instances: 1

Software Image (AMI): Amazon Linux 2 Kernel 5.10 AMI... read more
ami-090e0fc566929d98b

Virtual server type (instance type): t2.micro

Firewall (security group): launch-wizard-2

Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Launch instance

Network settings

VPC - required **Info**
vpc-09da43fad1b2dcce9 (default)

Subnet Info
subnet-0f51ffa44ff39c23a
VPC: vpc-09da43fad1b2dcce9 Owner: 216236839455 Availability Zone: us-east-1a IP addresses available: 4089 CIDR: 172.31.0.0/16

Create new subnet

Auto-assign public IP Info
Enable

Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group Select existing security group

Common security groups Info
Select security groups Compare security group rules
launch-wizard-2 sg-024e7007f64b97dc

Security groups that you add or remove here will be added to or removed from all your network interfaces.

Advanced network configuration

Configure storage Info Advanced
1x 8 GiB gp2 Root volume (Not encrypted)

Cancel Launch instance Review commands

Summary

Number of instances **Info**
1

Software image (AMI)
Amazon Linux 2 Kernel 5.10 AMI... read more ami-059e0fc56492d9fb

Virtual server type (instance type)
t2.micro

Firewall (security group)
launch-wizard-2

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro) in the Regions in which t2.micro is unavailable instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Connect to instance Info

Connect to your instance i-0ae53f197ce332dcc (vm(Nvirginia)) using any of these options

EC2 Instance Connect Session Manager **SSH client** EC2 serial console

Instance ID
i-0ae53f197ce332dcc (vm(Nvirginia))

- Open an SSH client.
- Locate your private key file. The key used to launch this instance is virginiate.pem
- Run this command, if necessary, to ensure your key is not publicly viewable.
chmod 400 virginiate.pem
- Connect to your instance using its Public DNS:
ec2-18-205-236-230.compute-1.amazonaws.com

Command copied

ssh -i "virginiate.pem" ec2-user@ec2-18-205-236-230.compute-1.amazonaws.com

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Cancel

© 2023, Amazon Web Services India Private Limited or its affiliates.

```
ssh -i "virginiate.pem" ec2-user@ec2-18-205-236-230.compute-1.amazonaws.com
$ ssh -i "virginiate.pem" ec2-user@ec2-18-205-236-230.compute-1.amazonaws.com
The authenticity of host 'ec2-18-205-236-230.compute-1.amazonaws.com (18.205.236.230)' can't be established.
ECDSA key fingerprint is SHA256:UvAy7m+BRd2es3pDR2IH6PkIKmnOHwX9UGalck3560s.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/fingerprint)? yes
Warning: Permanently added 'ec2-18-205-236-230.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
[ec2-user@ip-172-31-30-44 ~]$ sudo su
[root@ip-172-31-30-44 ec2-user]# yum install mysql -y
Resolving Dependencies
--> Running transaction check
--> Package mariadb.x86_64 1:5.5.68-1.amzn2.0.1 will be installed
--> Finished Dependency Resolution
Dependencies Resolved
Package           Arch      Version          Repository      Size
Installing:      mariadb   x86_64    1:5.5.68-1.amzn2.0.1   amzn2-core      8.8 M
Transaction Summary
Install 1 Package
Total download size: 8.8 M
Installed size: 49 M
Downloading packages:
mariadb-5.5.68-1.amzn2.0.1.x86_64.rpm | 8.8 MB  00:00:00
Resolving Dependencies
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : 1:mariadb-5.5.68-1.amzn2.0.1.x86_64
  Verifying   : 1:mariadb-5.5.68-1.amzn2.0.1.x86_64
Installed:
  mariadb.x86_64 1:5.5.68-1.amzn2.0.1
Complete!
[root@ip-172-31-30-44 ec2-user]# mysql --version
mysql Ver 15.1 Distrib 5.5.68-MariaDB, for Linux (x86_64) using readline 5.1

```

dbfrommumbai

Summary

| DB identifier | CPU | Status | Class |
|---------------|------------------|-----------------|-------------|
| dbfrommumbai | 5.33% | Available | db.t2.micro |
| Role | Current activity | Engine | Region & AZ |
| Replica | 0 Connections | MySQL Community | us-east-1a |

Connectivity & security

| Endpoint & port | Networking | Security |
|---|---------------------------------|--|
| Endpoint dbfrommumbai.cgn1gi0rtj.us-east-1.rds.amazonaws.com 3306 | Availability Zone us-east-1a | VPC security groups launch-wizard-2 (sg-024e7007f64b97dc) |
| | VPC | Active |
| | Port 3306 | Subnet group 09da43fad1b2dcce9 |

Actions

Connectivity & security

Endpoint & port Networking Security

Endpoint Availability Zone VPC security groups
dbfrommumbai.cgn1gi0rtj.us-east-1.rds.amazonaws.com us-east-1a launch-wizard-2 (sg-024e7007f64b97dc)

VPC Active default (sg-0d266e53b564be64)

Port Subnet group
3306 Active

CloudShell Feedback Language Privacy Terms Cookie preferences

© 2023, Amazon Web Services India Private Limited or its affiliates.

```
[root@ip-172-31-30-44 ~]# mysql --version
mysql Ver 15.1 Distrib 5.5.68-MariaDB, for Linux (x86_64) using readline 5.1
[root@ip-172-31-30-44 ~]# mysql -h dbfrommumbai.cgn1gi0rtj.us-east-1.rds.amazonaws.com -P 3306
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MySQL connection id is 23
Server version: 8.0.32 source distribution
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
MySQL [(none)]> show databases;
+-----+
| Database |
+-----+
| db1      |
| information_schema |
| mysql     |
| performance_schema |
| sys      |
+-----+
5 rows in set (0.01 sec)

MySQL [(none)]> use db1;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A
Database changed
MySQL [db1]> show tables;
+-----+
| Tables_in_db1 |
+-----+
| person        |
| stu           |
+-----+
2 rows in set (0.00 sec)

MySQL [db1]> create table teacher(
    ->     name varchar(255)
    -> );
ERROR 1290 (HY000): The MySQL server is running with the --read-only option so it cannot execute this statement
MySQL [db1]>
```

Create S3

The screenshot shows the AWS S3 'Create bucket' configuration page. At the top, there's a navigation bar with the AWS logo, a 'Services' dropdown, a search bar containing 'Search' with a keyboard shortcut '[Alt+S]', and links for EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, CloudWatch, and Simple Notification Service.

The main section is titled 'Create bucket' with an 'Info' link. A sub-instruction says 'Buckets are containers for data stored in S3.' followed by a 'Learn more' link. The 'General configuration' tab is selected.

In the 'General configuration' section, the 'Bucket name' field contains 'dbbucketrds'. A note below it states: 'Bucket name must be unique within the global namespace and follow the bucket naming rules. See rules for bucket naming' with a link.

The 'AWS Region' dropdown is set to 'Asia Pacific (Mumbai) ap-south-1'. Below this, there's a note about 'Copy settings from existing bucket - optional' with a link to 'See rules for bucket naming'. A 'Choose bucket' button is present.

The 'Object Ownership' tab is also visible, showing two options: 'ACLs disabled (recommended)' (selected) and 'ACLs enabled'. Both options have descriptive text below them.

Serviços

Search [Alt+S]

EC2 RDS VPC IAM S3 EFS Elastic Beanstalk Cloud9 CodeCommit Lambda CloudWatch

Bucket owner enforced

Block Public Access settings for this bucket

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to this bucket and its objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to this bucket or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

Block all public access

Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.

- Block public access to buckets and objects granted through new access control lists (ACLs)**
S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.
- Block public access to buckets and objects granted through any access control lists (ACLs)**
S3 will ignore all ACLs that grant public access to buckets and objects.
- Block public access to buckets and objects granted through new public bucket or access point policies**
S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.
- Block public and cross-account access to buckets and objects through any public bucket or access point policies**
S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

Bucket Versioning

Versioning is a means of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your Amazon S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. [Learn more](#)

Bucket Versioning

Disable

Enable

Screenshot of the AWS S3 Bucket creation wizard.

Tags (0) - optional
 You can use bucket tags to track storage costs and organize buckets. [Learn more](#)

No tags associated with this bucket.
[Add tag](#)

Default encryption [Info](#)
 Server-side encryption is automatically applied to new objects stored in this bucket.

Encryption type [Info](#)
 Server-side encryption with Amazon S3 managed keys (SSE-S3)
 Server-side encryption with AWS Key Management Service keys (SSE-KMS)
 Dual-layer server-side encryption with AWS Key Management Service keys (DSSE-KMS)
 Secure your objects with two separate layers of encryption. For details on pricing, see [DSSE-KMS pricing](#) on the [Management & insights](#) tab of the [Amazon S3 pricing page](#).

Bucket Key
 Using an S3 Bucket Key for SSE-KMS reduces encryption costs by lowering calls to AWS KMS. S3 Bucket Keys aren't supported for DSSE-KMS. [Learn more](#)

Disable
 Enable

Advanced settings

Info After creating the bucket, you can upload files and folders to the bucket, and configure additional bucket settings.

[Cancel](#) [Create bucket](#)

Screenshot of the AWS S3 Buckets list after creation.

Successfully created bucket "dbbuckettrds"
 To upload files and folders, or to configure additional bucket settings choose [View details](#).

Buckets
 Amazon S3 > Buckets

Account snapshot
 Storage Lens provides visibility into storage usage and activity trends. [Learn more](#)

Buckets (2) [Info](#)
 Buckets are containers for data stored in S3. Learn more

| Name | AWS Region | Access | Creation date |
|--------------|----------------------------------|-------------------------------|-------------------------------------|
| dbbuckettrds | Asia Pacific (Mumbai) ap-south-1 | Bucket and objects not public | June 26, 2023, 17:51:33 (UTC+05:30) |

The screenshot shows the AWS S3 'Upload' interface. At the top, the navigation bar includes the AWS logo, 'Services' (with 'Amazon S3' selected), a search bar, and a keyboard shortcut '[Alt+S]'. Below the navigation bar, a secondary navigation bar lists various AWS services: EC2, RDS, VPC, IAM, S3, EFS, Elastic Beanstalk, Cloud9, CodeCommit, Lambda, CloudWatch, and CloudFront.

The main content area shows the path: Amazon S3 > Buckets > dbbucketrds > Upload. The title 'Upload' has an 'Info' link. A note below says: 'Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. [Learn more](#)'.

A dashed box contains the instruction: 'Drag and drop files and folders you want to upload here, or choose Add files or Add folder.'

The 'Files and folders' section shows one item: 'state_au.csv' (1 Total, 174.0 B). It includes 'Remove', 'Add files' (which is highlighted with a blue border), and 'Add folder' buttons. A note below says: 'All files and folders in this table will be uploaded.' A search bar 'Find by name' is present.

The 'Destination' section shows the destination as 's3://dbbucketrds'. It includes a 'Destination details' section with the note: 'Bucket settings that impact new objects stored in the specified destination.'

Upload: status

The information below will no longer be available after you navigate away from this page.

| Summary | | |
|----------------------------------|--|-----------------------------|
| Destination s3://dbbucketetrs | Succeeded 1 file, 174.0 B (100.00%) | Failed 0 files, 0 B (0%) |

Files and folders (1 Total, 174.0 B)

| Name | Type | Size | Status |
|--------------|----------|---------|-----------|
| state_au.csv | text/csv | 174.0 B | Succeeded |

IAM Role

Select trusted entity

Trusted entity type

- AWS service
- AWS account
- Web identity
- SAML 2.0 federation
- Custom trust policy

Use case

Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

Common use cases

- EC2
- Lambda

Use cases for other AWS services

Glue

Next Step

Add permissions

Permissions policies (Selected 3/859)

Choose one or more policies to attach to your new role.

Filter policies by property or policy name and press enter:

"glue" X "idsfullaccess" X "S3fullaccess" X

Policy name Type Description

No matches

Set permissions boundary - optional

Set a permissions boundary to control the maximum permissions this role can have. This is not a common setting, but you can use it to delegate permission management to others.

Cancel Previous Next

Identity and Access Management (IAM)

Search IAM

Dashboard

Access management

- User groups
- Users
- Roles**
- Policies
- Identity providers
- Account settings

Access reports

- Access analyzer
- Archive rules
- Analyzers
- Settings
- Credential report
- Organization activity
- Service control policies (SCPs)

Related consoles

Name, review, and create

Role details

Step 1: Select trusted entity

Step 2: Add permissions

Step 3: Name, review, and create

Role name
roleID

Description
Allows Glue to call AWS services on your behalf.

Step 1: Select trusted entities

```

1- []
2-   "Version": "2012-10-17",
3-   "Statement": [
4-     {
5-       "Effect": "Allow",
6-       "Principal": [
7-         "*"
8-       ],
9-       "Service": "glue.amazonaws.com"
10-      },
11-      {
12-        "Action": "sts:AssumeRole"
13-      }
14-    ]
15-  ]

```

Permissions policy summary

| Policy name | Type | Attached as |
|---------------------|-------------|--------------------|
| AmazonRDSFullAccess | AWS managed | Permissions policy |
| AmazonS3FullAccess | AWS managed | Permissions policy |
| AWSGlueServiceRole | AWS managed | Permissions policy |

Tags

Add tags - optional Info

Tags are key-value pairs that you can add to AWS resources to help identify, organize, or search for resources.

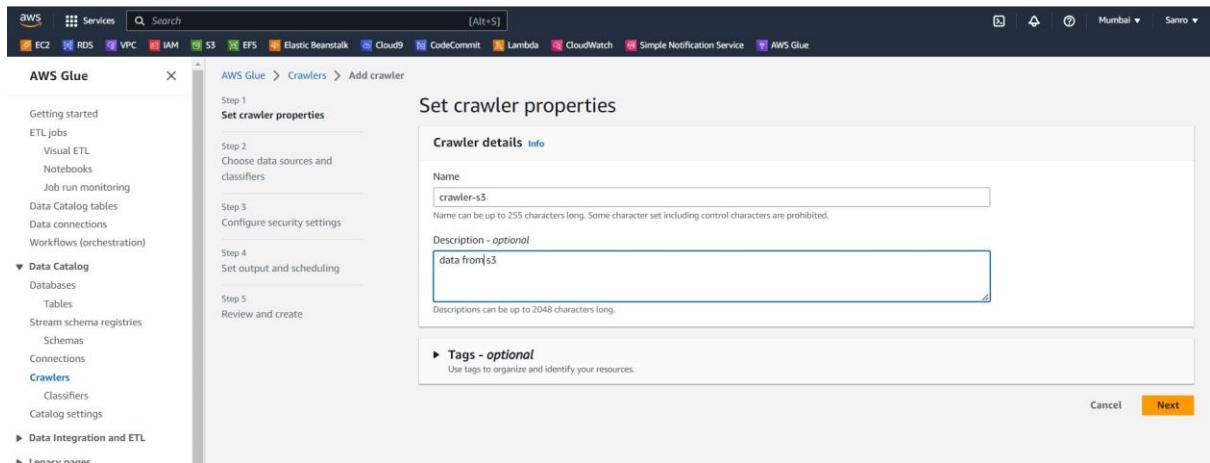
No tags associated with the resource.

Add tag

You can add up to 50 more tags.

Create role

Amazon Glue



Add data source

X

Data source

Choose the source of data to be crawled.

S3



Network connection - optional

Optionally include a Network connection to use with this S3 target. Note that each crawler is limited to one Network connection so any other S3 targets will also use the same connection (or none, if left blank).

 ▼ C

[Clear selection](#)

[Add new connection](#)

Location of S3 data

- In this account
- In a different account

S3 path

Browse for or enter an existing S3 path.

s3://dbbucketrds/state_au.csv X

[View](#)

[Browse S3](#)

All folders and files contained in the S3 path are crawled. For example, type s3://MyBucket/MyFolder/ to crawl all objects in MyFolder within MyBucket.

Subsequent crawler runs

This field is a global field that affects all S3 data sources.

- Crawl all sub-folders

Crawl all folders again with every subsequent crawl.

- Crawl new sub-folders only

Only Amazon S3 folders that were added since the last crawl will be crawled. If the schemas are compatible, new partitions will be added to existing tables.

- Crawl based on events

Rely on Amazon S3 events to control what folders to crawl.

[Cancel](#)

[Add an S3 data source](#)

AWS Glue > Crawlers > Add crawler

Step 1 Set crawler properties

Step 2 Choose data sources and classifiers

Step 3 Configure security settings

Step 4 Set output and scheduling

Step 5 Review and create

Choose data sources and classifiers

Data source configuration

Is your data already mapped to Glue tables?

Not yet Select one or more data sources to be crawled.

Yes Select existing tables from your Glue Data Catalog.

Data sources (1) Info

The list of data sources to be scanned by the crawler.

| Type | Data source | Parameters |
|------|-------------------------------|-------------|
| S3 | s3://dbbucketrds/state_au.csv | Recrawl all |

Custom classifiers - optional

A classifier checks whether a given file is in a format the crawler can handle. If it is, the classifier creates a schema in the form of a StructType object that matches that data format.

Cancel Previous Next

AWS Glue > Crawlers > Add crawler

Step 1 Set crawler properties

Step 2 Choose data sources and classifiers

Step 3 Configure security settings

Step 4 Set output and scheduling

Step 5 Review and create

Configure security settings

IAM role [Info](#)

Existing IAM role

roledb

Create new IAM role Update chosen IAM role View [Edit](#)

Only IAM roles created by the AWS Glue console and have the prefix "AWSGlueServiceRole-" can be updated.

Lake Formation configuration - optional

Allow the crawler to use Lake Formation credentials for crawling the data source. [Learn more.](#)

Use Lake Formation credentials for crawling S3 data source

Checking this box will allow the crawler to use Lake Formation credentials for crawling the data source. If the data source is registered in another account, you must provide the registered account ID. Otherwise, the crawler will crawl only those data sources associated to the account. Only applicable to S3, Glue Catalog, Iceberg, and Hudi data sources.

Security configuration - optional

Enable at-rest encryption with a security configuration.

Cancel Previous Next

AWS Glue > Crawlers > Add crawler

Step 1 Set crawler properties

Step 2 Choose data sources and classifiers

Step 3 Configure security settings

Step 4 Set output and scheduling

Step 5 Review and create

Set output and scheduling

Output configuration [Info](#)

Target database

datas3

Clear selection Add database [Edit](#)

Table name prefix - optional

Type a prefix added to table names

Maximum table threshold - optional

This field sets the maximum number of tables the crawler is allowed to generate. In the event that this number is surpassed, the crawl will fail with an error. If not set, the crawler will automatically generate the number of tables depending on the data schema.

Type a number greater than 0

Advanced options

Crawler schedule

You can define a time-based schedule for your crawlers and jobs in AWS Glue. The definition of these schedules uses the Unix-like cron syntax. [Learn more.](#)

Frequency

On demand

Cancel Previous Next

AWS Glue

Crawler successfully starting
The following crawler is now starting: "crawler-s3"

Crawlers

A crawler connects to a data store, progresses through a prioritized list of classifiers to determine the schema for your data, and then creates metadata tables in your data catalog.

| Name | State | Last run | Last run timestamp | Log |
|------------|-------|-----------|--------------------------|----------|
| crawler-s3 | Ready | Succeeded | June 26, 2023 at 13:5... | View log |

Create a database

Create a database in the AWS Glue Data Catalog.

Database details

Name: datas3
 Database name is required, in lowercase characters, and no longer than 255 characters.

Location - optional
 Set the URI location for use by clients of the Data Catalog.

Description - optional
 database for s3

Descriptions can be up to 2048 characters long.

Create database

AWS Glue

Tables

A table is the metadata definition that represents your data, including its schema. A table can be used as a source or target in a job definition.

| Name | Database | Location | Classification | Deprecated | View data |
|--------------|----------|-------------------------------|----------------|------------|------------|
| state_au_csv | datas3 | s3://dbbucketrds/state_au.csv | csv | - | Table data |

AWS Glue

One table successfully deleted
The following table is now deleted: "rdsb1 (db: db1)"

state_au_csv

Table overview | **Data quality New**

Table details | **Advanced properties**

| | | | |
|--|---|---|---|
| Name: state_au_csv | Description: - | Database: db1 | Classification: csv |
| Location: s3://rdsb1/state_au.csv | Connection: - | Deprecated: - | Last updated: June 28, 2023 at 04:37:44 |
| Input format: org.apache.hadoop.mapred.TextInputFormat | Output format: org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat | Serde serialization lib: org.apache.hadoop.hive.serde2.lazy.LazySimpleSerDe | |

Schema | **Partitions** | **Indexes**

Schema (2)

| # | Column name | Data type | Partition key | Comment |
|---|-------------|-----------|---------------|---------|
| 1 | col0 | string | - | - |
| 2 | col1 | string | - | - |

The screenshot shows the AWS CloudWatch Log Events interface. The left sidebar navigation includes: Favorites and recent dashboards, Alarms (0), Logs (selected), Log groups, Logs Insights, Live tail (New), Metrics, X-Ray traces, Events, Application monitoring, and Insights. The main content area displays log events for the log group '/aws-glue/crawlers /fromrds'. The log entries are timestamped and show the crawler's progress:

- 2023-06-28T09:18:02,928+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] BENCHMARK : Running Start Crawl For Crawler fromrds
- 2023-06-28T09:18:24,682+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] BENCHMARK : Classification complete, writing results to database db1
- 2023-06-28T09:18:24,694+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] INFO : Crawler configured with Configuration {"Version":1.0,"CreatePartitionIndex":true} and SchemaChangePolicy {"UpdateBehavior":"UPDATE_IN_DATABASE", "DeleteBehavior":"DELETE_FROM_DATABASE"}
- 2023-06-28T09:18:36,235+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] INFO : Created table rds01 in database db1
- 2023-06-28T09:18:42,939+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] INFO : Finished writing to Catalog
- 2023-06-28T09:18:42,979+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] INFO : Run Summary For TABLE:
 - [fe37ec47-e5da-45c0-9828-49cb1ce556c5] INFO : Run Summary For TABLE: rds01
- 2023-06-28T09:18:42,979+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] INFO : ADD: 1
- 2023-06-28T09:11:51,441+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] BENCHMARK : Crawler has finished running and is in state READY
- 2023-06-28T09:11:51,441+01:30 [fe37ec47-e5da-45c0-9828-49cb1ce556c5] BENCHMARK : Crawler has finished running and is in state READY