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AWS Mini Project.

Database Backup Automation: EC2 to S3

Key Points :

- Take a backup file of database from ec2-instance to s3 bucket.
- Ensures secure, scalable, and reliable backup storage.
- Simplifies data management with scheduled transfer.

1. Create EC2-instance.

The screenshot shows the 'Launch an instance' wizard in the AWS Management Console. The process is at the 'Name and tags' step. A single instance named 's3-backup-instance' is selected. The 'Summary' panel on the right shows the configuration: 1 instance, Amazon Linux 2023 AMI 2023.7.2..., t3.micro instance type, and 1 volume(s) - 8 GiB storage. A note indicates a free tier of 750 hours per month. Buttons for 'Cancel', 'Launch instance', and 'Preview code' are visible.

2. Launch EC2-instance.

The screenshot shows the AWS CloudShell interface with the following details:

- EC2 Instances**: A new instance is being launched.
- Configure storage**: 1x 8 GiB gp3 volume, Root volume, 3000 IOPS, Not encrypted.
- Software Image (AMI)**: Amazon Linux 2023.7.2...read more
- Virtual server type (instance type)**: t3.micro
- Firewall (security group)**: New security group
- Storage (volumes)**: 1 volume(s) - 8 GiB
- Free tier**: In your first year of opening an AWS account, you get 750 hours per month of free usage.
- Launch instance** button is visible.

3.Successfully created the instance .

The screenshot shows the AWS CloudShell interface with the following details:

- Instances (1/1) Info**: An instance named "s3-backup-instance" (ID: i-0b4cc6fc224315341) is listed, showing it is Running and t3.micro.
- i-0b4cc6fc224315341 (s3-backup-instance)**: Instance summary details:
 - Instance ID**: i-0b4cc6fc224315341
 - Public IPv4 address**: 16.171.249.164 | open address
 - Private IPv4 addresses**: 172.31.43.152
 - Public IPv4 DNS**: ec2-16-171-249-164.eu-north-1.compute.amazonaws.com | open address

4.Add Security group and add (MYSQL/Aurora).

The screenshot shows the 'Edit inbound rules' step of the 'ModifyInboundSecurityGroupRules' wizard. It lists two rules:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-03dff2cab4d960b52	SSH	TCP	22	Custom	0.0.0.0/0
-	MySQL/Aurora	TCP	3306	Anyw...	0.0.0.0/0

Buttons for 'Add rule', 'Delete', 'Preview changes', and 'Save rules' are visible.

5.Get SSH of your ec2-instance

The screenshot shows a MobaXterm window titled '16.171.249.164 (ec2-user)'. The terminal session displays the following text:

```
• MobaXterm Personal Edition v24.2 •
(SSH client, X Server and network tools)

> SSH session to ec2-user@16.171.249.164
  • Direct SSH : ✓
  • SSH compression : ✓
  • SSH-browser : ✓
  • X11-forwarding : ✘ (disabled or not supported by server)

> For more info, ctrl+click on help or visit our website.

# Amazon Linux 2023
[ec2-user@ip-172-31-43-152 ~]$
```

The MobaXterm interface includes a sidebar with session management tools like Terminal, Sessions, View, X server, Tools, Games, Settings, Macros, Help, and a session tree for 'ec2-user@/home/ec2-user/'. A status bar at the bottom shows the weather and system information.

6. Switch to root user and install the mariadb.

```
Authenticating with public key "Imported-Openssh-Key"
  • MobaXterm Personal Edition v24.2 •
  (SSH client, X server and network tools)

  ▶ SSH session to ec2-user@16.171.249.164
    • Direct SSH : ✓
    • SSH compression : ✓
    • SSH-browser : ✓
    • X11-forwarding : ✘ (disabled or not supported by server)

  ▶ For more info, ctrl+click on help or visit our website.

  # 
  # Amazon Linux 2023
  # https://aws.amazon.com/linux/amazon-linux-2023
  #

[ec2-user@ip-172-31-43-152 ~]$ sudo -i
[root@ip-172-31-43-152 ~]# install mariadb105* -y
install: invalid option -- 'y'
Try 'install --help' for more information.
[root@ip-172-31-43-152 ~]# yum install mariadb105* -y
Amazon Linux 2023 Kernel Livepatch repository
Dependencies resolved.
136 kB/s | 15 kB 00:00

Package          Architecture Version       Repository   Size
Installing:
mariadb105      x86_64      3:10.5.25-1.amzn2023.0.1    amazonlinux  1.6 M
mariadb105-backup x86_64      3:10.5.25-1.amzn2023.0.1    amazonlinux  6.3 M
mariadb105-connect-engine x86_64      3:10.5.25-1.amzn2023.0.1    amazonlinux  541 k
mariadb105-cracklib-password-check x86_64      3:10.5.25-1.amzn2023.0.1    amazonlinux  15 k
mariadb105-devel x86_64      3:10.5.25-1.amzn2023.0.1    amazonlinux  1.0 M
mariadb105-errmsg x86_64      3:10.5.25-1.amzn2023.0.1    amazonlinux  213 k
mariadb105-gssapi-server x86_64      3:10.5.25-1.amzn2023.0.1    amazonlinux  17 k

Remote monitoring
Follow terminal folder

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```

7. Start the mariadb.

```
perl-Math-BigRat-0.2614-458.amzn2023.0.2.noarch
perl-Memcached-1.03-477.amzn2023.0.6.noarch
perl-Object-Flashbase-0.099-5.amzn2023.0.2.noarch
perl-Term-Size-Anya-0.002-33.amzn2023.0.2.noarch
perl-Term-Table-0.015-6.amzn2023.0.2.noarch
perl-Tie-4.6-477.amzn2023.0.6.noarch
perl-Time-Hires-4.1.0764-469.amzn2023.0.2.x86_64
perl-base-2.27-477.amzn2023.0.6.noarch
perl-threads-1.2.25-458.amzn2023.0.3.x86_64
sombok-2.4.0-14.amzn2023.0.2.x86_64
zlib-devel-1.2.11-33.amzn2023.0.4.x86_64

perl-Math-Complex-1.50-477.amzn2023.0.6.noarch
perl-NDBM_File-1.15-477.amzn2023.0.6.x86_64
perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64
perl-Term-Size-Perl-0.031-10.amzn2023.0.2.x86_64
perl-Test-Simple-3.1.302183-2.amzn2023.0.2.noarch
perl-time-1.03-477.amzn2023.0.6.noarch
perl-Unicode-Linebreak-2019.001-9.amzn2023.0.2.x86_64
perl-lib-0.65-477.amzn2023.0.6.x86_64
perl-threads-shared-1.61-458.amzn2023.0.2.x86_64
sphinx-2.2.11-24.amzn2023.0.4.x86_64

Complete!
[root@ip-172-31-43-152 ~]# systemctl start mariadb.service
[root@ip-172-31-43-152 ~]# systemctl status mariadb.service
● mariadb.service - MariaDB 10.5 database server
  Loaded: loaded (/usr/lib/systemd/system/mariadb.service; disabled; preset: disabled)
  Active: active (running) since Sun 2025-04-13 13:46:52 UTC; 1min 13s ago
    Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
  Process: 30063 ExecStartPre=/usr/libexec/mariadb-check-socket (code=exited, status=0/SUCCESS)
  Process: 30085 ExecStartPre=/usr/libexec/mariadb-prepare-db-dir mariadb.service (code=exited, status=0/SUCCESS)
  Process: 30245 ExecStartPost=/usr/libexec/mariadb-check-upgrade (code=exited, status=0/SUCCESS)
  Main PID: 30193 (mariadb)
    Status: "Taking your SQL requests now..."
     Tasks: 16 (limit: 1057)
    Memory: 97.0M
      CPU: 509ms
     CGroup: /system.slice/mariadb.service
             └─30193 /usr/libexec/mariadb --basedir=/usr

Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: The second is mysql@localhost, it has no password either, but
Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: you need to be the system 'mysql' user to connect.
Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: After connecting you can set the password, if you would need to be
Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: able to connect as any of these users with a password and without
Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: See the MariaDB Knowledgebase at https://mariadb.com/kb
Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: Please report any problems at https://mariadb.org/jira
Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: The latest information about MariaDB is available at https://mariadb.org
Apr 13 13:46:51 ip-172-31-43-152.eu-north-1.compute.internal mariadb-prepare-db-dir[30125]: Consider joining MariaDB's strong and vibrant community:
Apr 13 13:46:52 ip-172-31-43-152.eu-north-1.compute.internal systemd[1]: Started mariadb.service - MariaDB 10.5 database server.
Tunes 1-26/26 (END)
```

8. Assign password for database

16.171.249.164 (ec2-user)

```
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... 2. 16.171.249.164 (ec2-user) ×
Lines 1-26/26 [END]
[1]+ Stopped                  systemctl status mariadb.service
set mark: mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
haven't set the root password yet, you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password or using the unix socket ensures that nobody
can log into the MariaDB root user without the proper authorisation.

You already have your root account protected, so you can safely answer 'n'.

Switch to unix socket authentication [Y/n] n
... skipping.

You already have your root account protected, so you can safely answer 'n'.

Change the root password? [Y/n] n
... skipping.

By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them. This is intended only for testing, and to make the installation
go a bit smoother. You should remove them before moving into a
production environment.

Remove anonymous users? [Y/n] y
... Success!

Normally, root should only be allowed to connect from 'localhost'. This
ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? [Y/n] y
... Success!
```

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34°C Partly cloudy

Search

7:21 PM 4/13/2025

9. Connect Database .

Create Database - >

Create Table-> insert values on that table .

54.86.185.33 (ec2-user)

```
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
Quick connect... 2. 54.86.185.33 (ec2-user) ×
[root@ip-172-31-89-81 ~]# mysql -h localhost -u root -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 23
Server version: 10.5.25-MariaDB MariaDB Server

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

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

MariaDB [(none)]> create database college;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> use college
Database changed
MariaDB [college]> create table student_info(rollno int, name varchar(20), address varchar(20));
Query OK, 0 rows affected (0.007 sec)

MariaDB [college]> insert into student_info values(1,"darshan","nashik"),(2,"mayuresh","nagar"),(3,"rithesh","pune"),(4,"akshada","nashik"),(5,"damini","nashik"),(6,"harshada","satana");
ERROR 1054 (42S22): Unknown column 'nashik' in 'field list'
MariaDB [college]> insert into student_info values(1,"darshan","nashik"),(2,"mayuresh","nagar"),(3,"rithesh","pune"),(4,"akshada","nashik"),(5,"damini","nashik"),(6,"harshada","satana");
Query OK, 6 rows affected (0.003 sec)
Records: 6  Duplicates: 0  Warnings: 0

MariaDB [college]> select * from student_info;
+-----+-----+-----+
| rollno | name   | address |
+-----+-----+-----+
|    1   | darshan | nashik |
|    2   | mayuresh| nagar   |
|    3   | rithesh | pune    |
|    4   | akshada | nashik |
|    5   | damini  | nashik |
|    6   | harshada| satana  |
+-----+-----+-----+
6 rows in set (0.001 sec)
```

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06:57 PM 21-01-2025

10. Create a Backup File of Database and give a name of that file

```
[root@ip-172-31-43-152 ~]# ls
[root@ip-172-31-43-152 ~]# mysqldump -u root -p1234 collage > ec2_backup.sql
[root@ip-172-31-43-152 ~]# ls
ec2_backup.sql
[root@ip-172-31-43-152 ~]#
```

11. Create a Bucket .

Create bucket Info

Buckets are containers for data stored in S3.

General configuration

AWS Region
Europe (Stockholm) eu-north-1

Bucket type Info

General purpose
Recommended for most use cases and access patterns. General purpose buckets are the original S3 bucket type. They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.

Directory
Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.

Bucket name Info

Bucket names must be 3 to 63 characters and unique within the global namespace. Bucket names must also begin and end with a letter or number. Valid characters are a-z, 0-9, periods (.), and hyphens (-). [Learn More](#)

Copy settings from existing bucket - optional
Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

Format: s3://bucket/prefix

Object Ownership Info

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines the owner of new objects.

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12. There is no data in that bucket.

The screenshot shows the AWS S3 console interface. At the top, there are two tabs: "db-backup-bucket1 - S3 bucket" and "Create S3 bucket | S3 | eu-north-1". The main navigation bar includes links for EC2, S3, IAM, VPC, Route 53, Aurora and RDS, and a search bar with the placeholder "[Alt+S]". Below the navigation, the breadcrumb trail shows "Amazon S3 > Buckets > db-backup-bucket1". The main content area is titled "db-backup-bucket1 Info" and has tabs for Objects, Properties, Permissions, Metrics, Management, and Access Points. The "Objects" tab is selected, showing a table header for Name, Type, Last modified, Size, and Storage class. A message below the table states "No objects" and "You don't have any objects in this bucket.". At the bottom right of the table, there is a blue "Upload" button.

The screenshot shows the Windows taskbar at the bottom of the screen. It features several pinned icons, including CloudShell, Feedback, Search, and various system and application icons like File Explorer, Edge, and File Manager. The status bar at the bottom right displays the date and time as "4/13/2025 7:38 PM".

13. Create a Role and Select the Service .

The screenshot shows the AWS IAM console. The URL in the address bar is "us-east-1.console.aws.amazon.com/iam/home?region=eu-north-1#/roles/create". The main navigation bar includes links for EC2, S3, IAM, VPC, Route 53, Aurora and RDS, and a search bar with the placeholder "[Alt+S]". Below the navigation, the breadcrumb trail shows "IAM > Roles > Create role". The main content area is titled "Select trusted entity" and includes a step indicator "Step 1 Select trusted entity". On the left, there is a sidebar with three steps: "Select trusted entity" (selected), "Add permissions", and "Name, review, and create". The "Trusted entity type" section contains five options: "AWS service" (selected), "AWS account", "Web identity", "SAML 2.0 federation", and "Custom trust policy". The "Use case" section allows selecting a service or use case, with "EC2" currently selected. The status bar at the bottom right displays the date and time as "4/13/2025 7:39 PM".

14. Select the policies of your role.

The screenshot shows the 'Add permissions' step of the IAM role creation wizard. On the left, a sidebar lists three steps: 'Select trusted entity', 'Add permissions' (which is selected), and 'Name, review, and create'. The main area displays a search interface for finding policies. A search bar at the top contains 's3'. Below it is a 'Filter by Type' dropdown set to 'All types' with '13 matches' found. A table lists ten AWS managed policies, each with a checkbox, a policy icon, its name, type ('AWS managed'), and a brief description. The 'AmazonS3FullAccess' policy is highlighted with a blue border and checked. The table has columns for 'Policy name', 'Type', and 'Description'.

15. Give a Role name .

The screenshot shows the 'Name, review, and create' step of the IAM role creation wizard. The sidebar indicates the user is on Step 3: 'Name, review, and create'. The main area is titled 'Role details'. It includes fields for 'Role name' (containing 'ec2-s3-role') and 'Description' (containing 'Allows EC2 instances to call AWS services on your behalf'). Below these is a note about character limits. At the bottom of the page, under 'Step 1: Select trusted entities', there is a 'Trust policy' section showing a JSON-based policy document. The policy starts with 'Version: "2012-10-17"' and 'Statement: [{ "Effect": "Allow" }]'. The browser's status bar at the bottom shows the date as 4/13/2025 and the time as 7:40 PM.

16. Your Role is Successfully Created .

The screenshot shows the AWS IAM Roles page. On the left, the navigation menu is expanded under 'Access management', showing 'Roles' selected. The main area displays a list of roles with columns for 'Role name', 'Trusted entities', and 'Last activity'. A new role, 's3-ec2-role', has been created and is highlighted with a blue border. The details for this role show it is associated with the AWS Service: ec2.

Role name	Trusted entities	Last activity
AWSServiceRoleForAutoScaling	AWS Service: autoscaling (Service-Linked Role)	39 days ago
AWSServiceRoleForElasticLoadBalancing	AWS Service: elasticloadbalancing (Service-Linked Role)	39 days ago
AWSServiceRoleForRDS	AWS Service: rds (Service-Linked Role)	30 minutes
AWSServiceRoleForSupport	AWS Service: support (Service-Linked Role)	-
AWSServiceRoleForTrustedAdvisor	AWS Service: trustedadvisor (Service-Linked Role)	-
rds-monitoring-role	AWS Service: monitoring.rds	-
s3-ec2-role	AWS Service: ec2	-

17. Assign Role to Ec2-instance .

The screenshot shows the AWS EC2 Instances page. The left sidebar is expanded to show 'Instances' selected. In the main pane, an instance named 's3-backup-instance' is listed with its status as 'Running'. To the right of the instance table, a context menu is open over the instance, with the 'Modify IAM role' option highlighted. The details panel for the instance shows its configuration, including its public IP address (16.171.249.164) and private IP address (172.31.43.152).

18. Select the you created role and assign that.

The screenshot shows the 'Modify IAM role' page in the AWS Management Console. At the top, the instance ID 'i-0b4cc6fc224315341' is selected. In the 'IAM role' section, the dropdown menu shows 'ec2-s3-role'. Below the dropdown, there is a link to 'Create new IAM role'. At the bottom right, there are 'Cancel' and 'Update IAM role' buttons.

19. Role Successfully attached to ec2-instance.

The screenshot shows the 'Instances' page in the AWS Management Console. A green banner at the top indicates that the role has been successfully attached to the instance. The main table lists one instance: 's3-backup-instance' (Instance ID: i-0b4cc6fc224315341), which is 'Running'. The details pane for this instance shows the attached IAM role 'ec2-s3-role'. The left sidebar shows the navigation menu for EC2, including 'Instances' which is currently selected.

20. Enter the cmd and then get backup of your database file.

```
[root@ip-172-31-43-152 ~]# ls
[root@ip-172-31-43-152 ~]# mysqldump -u root -p1234 collage > ec2_backup.sql
[root@ip-172-31-43-152 ~]# ls
ec2_backup.sql
[root@ip-172-31-43-152 ~]# aws s3 cp ec2_backup.sql s3://db-backup-bucket1/s3_backup_file.sql
upload: ./ec2_backup.sql to s3://db-backup-bucket1/s3_backup_file.sql
[root@ip-172-31-43-152 ~]#
```

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21. Goto S3 bucket .See your database backup file is .

Instances | EC2 | eu-north-1 | db-backup-bucket1 - S3 bucket | +

eu-north-1.console.aws.amazon.com/s3/buckets/db-backup-bucket1?region=eu-north-1&bucketType=general&tab=objects

aws | Search [Alt+S]

EC2 S3 IAM VPC Route 53 Aurora and RDS

Amazon S3 > Buckets > db-backup-bucket1

db-backup-bucket1 info

Objects Properties Permissions Metrics Management Access Points

Objects (1/1)

Name	Type	Last modified	Size	Storage class
s3_backup_file.sql	sql	April 13, 2025, 19:47:22 (UTC+05:30)	2.0 KB	Standard

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22. For Cross Check (Open it).

The screenshot shows a terminal window with the following details:

- Title Bar:** File Edit Selection View Go Run Terminal Help
- Message Bar:** Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More
- File List:** C: > Users > kanaw > Downloads > s3_backup_file.sql
- Code Content:** The file contains a MySQL dump script. It includes various SQL commands such as SET, CREATE TABLE, and INSERT INTO. The script is designed to backup a database named 'collage'.
- Bottom Status:** Ln 1, Col 1 Spaces: 2 UTF-8 LF ⚙ MS SQL 7:49 PM 4/13/2025
- Icons:** Various icons for file operations (copy, paste, delete, etc.) are visible along the top and bottom of the window.