Project: Automated Backup and Disaster Recovery System

Step-by-Step Implementation

1. Set Up Your Environment

Install Necessary Tools

Install Python: Download from python.org.

Install AWS CLI: Follow the installation guide at AWS CLI Documentation.

Install Docker: Follow the guide at Docker Installation.

Configure AWS CLI

bash

Copy code

aws configure

Enter your AWS Access Key, Secret Key, region, and output format.

2. Create Backup Scripts

Create a Directory for Your Scripts

bash

Copy code

mkdir automated-backup-recovery

cd automated-backup-recovery

mkdir backup-scripts

Create the Backup Script

backup.py

python

Copy code

import os

import subprocess

from datetime import datetime

# Configuration

BACKUP\_DIR = "/path/to/backup"

S3\_BUCKET = "s3://your-bucket-name"

DB\_NAME = "your\_database"

DB\_USER = "username"

DB\_PASSWORD = "password"

# Create backup directory if it doesn't exist

os.makedirs(BACKUP\_DIR, exist\_ok=True)

# Backup database

db\_backup\_file = os.path.join(BACKUP\_DIR, f"db\_backup\_{datetime.now().strftime('%Y-%m-%d')}.sql")

subprocess.run(f"mysqldump -u {DB\_USER} -p{DB\_PASSWORD} {DB\_NAME} > {db\_backup\_file}", shell=True)

# Backup files

files\_backup\_file = os.path.join(BACKUP\_DIR, f"files\_backup\_{datetime.now().strftime('%Y-%m-%d')}.tar.gz")

subprocess.run(f"tar -czf {files\_backup\_file} /path/to/important/files", shell=True)

# Upload to S3

subprocess.run(f"aws s3 cp {db\_backup\_file} {S3\_BUCKET}/", shell=True)

subprocess.run(f"aws s3 cp {files\_backup\_file} {S3\_BUCKET}/", shell=True)

print("Backup completed successfully.")

Create the Restore Script

restore.py

python

Copy code

import os

import subprocess

# Configuration

S3\_BUCKET = "s3://your-bucket-name"

BACKUP\_DIR = "/path/to/backup"

DB\_NAME = "your\_database"

DB\_USER = "username"

DB\_PASSWORD = "password"

# Restore files

subprocess.run(f"aws s3 cp {S3\_BUCKET}/files\_backup\_latest.tar.gz {BACKUP\_DIR}/", shell=True)

subprocess.run(f"tar -xzf {BACKUP\_DIR}/files\_backup\_latest.tar.gz -C /path/to/restore/location", shell=True)

# Restore database

subprocess.run(f"aws s3 cp {S3\_BUCKET}/db\_backup\_latest.sql {BACKUP\_DIR}/", shell=True)

subprocess.run(f"mysql -u {DB\_USER} -p{DB\_PASSWORD} {DB\_NAME} < {BACKUP\_DIR}/db\_backup\_latest.sql", shell=True)

print("Restore completed successfully.")

3. Create a Dockerfile

Create Dockerfile

Dockerfile

dockerfile

Copy code

FROM python:3.9

WORKDIR /app

COPY backup-scripts/ .

RUN pip install awscli

CMD ["python", "backup.py"]

Build Docker Image

bash

Copy code

docker build -t backup-recovery .

4. Run Backups in Docker

Run Backup Container

bash

Copy code

docker run --rm -v /path/to/backup:/path/to/backup backup-recovery

5. Set Up a Cron Job for Automation

Open Crontab

bash

Copy code

crontab -e

Add Cron Job for Daily Backup

bash

Copy code

0 2 \* \* \* docker run --rm -v /path/to/backup:/path/to/backup backup-recovery

This sets the backup to run every day at 2 AM.

6. Monitoring Setup

Use a Simple Python Script for Monitoring

monitor.py

python

Copy code

import subprocess

# Check if the backup was successful (modify based on your backup process)

backup\_success = subprocess.run("aws s3 ls s3://your-bucket-name/", shell=True)

if backup\_success.returncode == 0:

        print("Backup exists. Status: OK")

else:

        print("Backup missing! Status: ERROR")

Run Monitoring Script You can run this script periodically using a cron job or a monitoring tool.

7. Documentation

Create a README.md file

Include:

Project overview

Technologies used

Setup instructions

Backup and restoration instructions

Monitoring setup instructions

Conclusion

This project showcases your skills in automation, cloud management, and disaster recovery planning without relying on Ansible. You'll demonstrate your ability to create a secure, automated backup system and ensure data integrity—key responsibilities in a system administration role.

Feel free to modify any steps or configurations to fit your specific needs. If you have questions or need further assistance, let me know! Good luck!

Sure! Let’s dive deeper into each step of the Automated Backup and Disaster Recovery System project, providing additional details for clarity.

### Project: Automated Backup and Disaster Recovery System

#### 1. Set Up Your Environment

1.1 Install Necessary Tools

* Python: Ensure you have Python 3.x installed. You can verify the installation with:

bash

Copy code

python --version

* AWS CLI: After installation, configure the AWS CLI:

bash

Copy code

aws configure

You'll need your AWS Access Key, Secret Key, region (e.g., us-east-1), and preferred output format (e.g., json).

* Docker: Verify the installation with:

bash

Copy code

docker --version

1.2 Create Directory Structure

bash

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mkdir automated-backup-recovery

cd automated-backup-recovery

mkdir backup-scripts

#### 2. Create Backup Scripts

2.1 Create the Backup Script

* backup.py This script automates the backup of databases and files to an S3 bucket.

python

Copy code

import os

import subprocess

from datetime import datetime

# Configuration

BACKUP\_DIR = "/path/to/backup"    # Local backup directory

S3\_BUCKET = "s3://your-bucket-name"    # S3 bucket for backups

DB\_NAME = "your\_database"    # Database name

DB\_USER = "username"    # Database username

DB\_PASSWORD = "password"    # Database password

# Create backup directory if it doesn't exist

os.makedirs(BACKUP\_DIR, exist\_ok=True)

# Backup database

db\_backup\_file = os.path.join(BACKUP\_DIR, f"db\_backup\_{datetime.now().strftime('%Y-%m-%d')}.sql")

subprocess.run(f"mysqldump -u {DB\_USER} -p{DB\_PASSWORD} {DB\_NAME} > {db\_backup\_file}", shell=True)

# Backup files

files\_backup\_file = os.path.join(BACKUP\_DIR, f"files\_backup\_{datetime.now().strftime('%Y-%m-%d')}.tar.gz")

subprocess.run(f"tar -czf {files\_backup\_file} /path/to/important/files", shell=True)

# Upload to S3

subprocess.run(f"aws s3 cp {db\_backup\_file} {S3\_BUCKET}/", shell=True)

subprocess.run(f"aws s3 cp {files\_backup\_file} {S3\_BUCKET}/", shell=True)

print("Backup completed successfully.")

2.2 Create the Restore Script

* restore.py This script restores the database and files from the S3 bucket.

python

Copy code

import os

import subprocess

# Configuration

S3\_BUCKET = "s3://your-bucket-name"    # S3 bucket

BACKUP\_DIR = "/path/to/backup"    # Local directory for restoring

DB\_NAME = "your\_database"    # Database name

DB\_USER = "username"    # Database username

DB\_PASSWORD = "password"    # Database password

# Restore files

subprocess.run(f"aws s3 cp {S3\_BUCKET}/files\_backup\_latest.tar.gz {BACKUP\_DIR}/", shell=True)

subprocess.run(f"tar -xzf {BACKUP\_DIR}/files\_backup\_latest.tar.gz -C /path/to/restore/location", shell=True)

# Restore database

subprocess.run(f"aws s3 cp {S3\_BUCKET}/db\_backup\_latest.sql {BACKUP\_DIR}/", shell=True)

subprocess.run(f"mysql -u {DB\_USER} -p{DB\_PASSWORD} {DB\_NAME} < {BACKUP\_DIR}/db\_backup\_latest.sql", shell=True)

print("Restore completed successfully.")

#### 3. Create a Dockerfile

3.1 Create Dockerfile

The Dockerfile sets up an environment to run the backup scripts.

* Dockerfile

dockerfile

Copy code

FROM python:3.9

WORKDIR /app

# Copy backup scripts to the container

COPY backup-scripts/ .

# Install AWS CLI

RUN pip install awscli

# Set the default command to run the backup script

CMD ["python", "backup.py"]

3.2 Build Docker Image

Navigate to the project directory and build the Docker image:

bash

Copy code

docker build -t backup-recovery .

#### 4. Run Backups in Docker

4.1 Run Backup Container

Run the Docker container to perform the backup:

bash

Copy code

docker run --rm -v /path/to/backup:/path/to/backup backup-recovery

* The -v flag mounts your local backup directory to the container, allowing it to write backups.

#### 5. Set Up a Cron Job for Automation

5.1 Open Crontab

Edit your crontab file to schedule the backup:

bash

Copy code

crontab -e

5.2 Add Cron Job for Daily Backup

Add the following line to run the backup script daily at 2 AM:

bash

Copy code

0 2 \* \* \* docker run --rm -v /path/to/backup:/path/to/backup backup-recovery

* This entry specifies the minute (0), hour (2), day of month (), month (), and day of week (\*).

#### 6. Monitoring Setup

6.1 Monitoring Script

Create a simple script to check if backups are successful.

* monitor.py

python

Copy code

import subprocess

# Check if the backup was successful

backup\_success = subprocess.run("aws s3 ls s3://your-bucket-name/", shell=True)

if backup\_success.returncode == 0:

        print("Backup exists. Status: OK")

else:

        print("Backup missing! Status: ERROR")

6.2 Run Monitoring Script

You can run this script periodically to check backup status. For example, add to crontab:

bash

Copy code

\*/30 \* \* \* \* python /path/to/monitor.py

This checks the backup every 30 minutes.

#### 7. Documentation

7.1 Create README.md File

Include detailed instructions for the project:

* README.md

markdown

Copy code

# Automated Backup and Disaster Recovery System

## Overview

This project automates the backup of databases and important files to AWS S3, with easy restoration capabilities.

## Technologies Used

- Python

- AWS CLI

- Docker

## Setup Instructions

1. Install Python, AWS CLI, and Docker.

2. Configure AWS CLI with your credentials.

3. Clone this repository.

4. Update the `backup.py` and `restore.py` scripts with your configuration (database credentials, S3 bucket name).

5. Build the Docker image:

      ```bash

      docker build -t backup-recovery .

## Running Backups

To run backups manually:

bash

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docker run --rm -v /path/to/backup:/path/to/backup backup-recovery

## Automation with Cron

To set up daily backups:

1. Edit crontab:

bash

Copy code

crontab -e

1. Add the following line to schedule the backup at 2 AM:

bash

Copy code

0 2 \* \* \* docker run --rm -v /path/to/backup:/path/to/backup backup-recovery

## Monitoring

Run the monitor.py script to check the status of backups:

bash

Copy code

python monitor.py

## Restore Instructions

To restore from the latest backup, run:

bash

Copy code

python restore.py

vbnet

Copy code

### Conclusion

This detailed implementation provides a clear guide on how to set up an automated backup and disaster recovery system using Python, Docker, and AWS S3. The project emphasizes key system administration skills, including automation, cloud storage management, and monitoring.

Feel free to customize the paths and configurations according to your environment. If you have any questions or need further assistance, let me know! Good luck!

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