Experiment 4

Title:	Fundamentals of AWS Cloud Storage and Database Operations Lab	LO2	
Student Name	Mark Lopez	Roll no.	9943
Sign here to indicate that you have read all relevant material provided/ available on Moodle/ Classroom while performing and writing this experiment			

Rubrics:

Criteria	Excellent	Good	Satisfactory	Poor	Total Marks
AWS S3 Mastery (R1)	Complete mastery over S3, including advanced bucket management, security features, and clear, comprehensive documentation with screenshots. (4)	Good understanding and application of S3 features with minor documentation or detail lapses. (3)	Basic bucket management and security implementation, with satisfactory documentation. (2)	Incomplete tasks, unclear documentation, or significant misunderstandings of S3 features. (1)	03
AWS S3 Glacier Proficiency (R2)	Full proficiency in using S3 Glacier for data archiving, including successful integration with other AWS services, documented with clear screenshots. (4)	Good use of S3 Glacier with minor issues in integration or documentation. (3)	Basic use of S3 Glacier for data archiving, with gaps in integration documentation or screenshots. (2)	Poor understanding or application of S3 Glacier, with significant documentation or integration issues. (1)	03
***Amazon RDS* Management (R3)**	Excellent setup, operation, and scaling of databases using Amazon RDS, with comprehensive documentation including screenshots of the instance, connectivity, and data manipulation. (5)	Good setup and operation with minor issues in scaling or detailed documentation. (4)	Basic ability to set up and operate RDS instances, with noticeable gaps in documentation or scalability. (3)	Incomplete setup, poor operation practices, or significant documentation issues. (2)	04
AWS ynamoDB nderstanding 4)	Complete understanding and deployment of applications using AWS DynamoDB, with detailed documentation of the deployment process and application use. (5)	Good deployment with minor issues in application use or documentation completeness. (4)	Basic understanding and application deployment with noticeable gaps in documentation or application functionality. (3)	Poor deployment with significant misunderstanding of DynamoDB concepts or application integration. (2)	04
neliness of bmission 5)	On time (2)	1-week late (1)	2-weeks late (0)	More than 2 weeks late (Deduct up to 5 marks)	1
al Marks					15

Create database Info

Choose a database creation method

- (•) Standard create
  You set all of the configuration options, including ones for availability, security, backups, and maintenance.
- ( ) Easy create
  Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type Info

- ( ) Aurora (MySQL Compatible)
- ( ) Aurora (PostgreSQL Compatible)
- ( ) MySQL
- (•) PostgreSQL
- ( ) MariaDB
- ( ) Oracle

Engine version

PostgreSQL 16.8-R1

[ ] Enable RDS Extended Support Info
Amazon RDS Extended Support is a paid offering. By selecting this option, you consent to being charged for this offering if you are running your database major version past the RDS end of standard support date for that version. Check the end of standard support date for your major version in the RDS for PostgreSQL documentation.

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

Availability and durability

Deployment options Info

Choose the deployment option that provides the availability and durability needed for your use case. AWS is committed to a certain level of uptime depending on the deployment option you choose. Learn more in the Amazon RDS service level agreement (SLA).

- ( ) Multi-AZ DB cluster deployment (3 instances)
  Creates a primary DB instance with two readable standbys in separate Availability Zones. This setup provides:
  - 99.95% uptime
  - Redundancy across Availability Zones
  - Increased read capacity
  - Reduced write latency

  Write/read endpoint — AZ 1
  Reader endpoints — AZ 2
- ( ) Multi-AZ DB instance deployment (2 instances)
  Creates a primary DB instance with a non-readable standby instance in a separate Availability Zone. This setup provides:
  - 99.95% uptime
  - Redundancy across Availability Zones

  Write/read endpoint — AZ 1
  Standby (no endpoint) — AZ 2
- (•) Single-AZ DB instance deployment (1 instance)
  Creates a single DB instance without standby instances. This setup provides:
  - 99.5% uptime
  - No data redundancy

  Write/read endpoint — AZ 1

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.

postgres

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 63 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.

postgres

1 to 16 alphanumeric characters. The first character must be a letter.

Credentials management

You can use AWS Secrets Manager or manage your master user credentials.

- ( ) Managed in AWS Secrets Manager - *most secure*
  RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.
- (•) Self managed
  Create your own password or have RDS create a password that you manage.

[ ] Auto generate password
Amazon RDS can generate a password for you, or you can specify your own password.

Master password | Info

••••••••••

Password strength Strong

Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / ' " @

Confirm master password | Info

••••••••••

▼ **Hide filters**

Include previous generation classes

Standard classes (includes m classes)

Memory optimized classes (includes r and x classes)

Burstable classes (includes t classes)

db.t4g.micro
2 vCPUs 1 GiB RAM Network: Up to 2,085 Mbps

Storage

Storage type Info

Provisioned IOPS SSD (io2) storage volumes are now available.

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

Allocated storage Info

20 GiB

Allocated storage value must be 20 GiB to 6,144 GiB

▶ **Additional storage configuration**

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.

Virtual private cloud (VPC) Info

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

Default VPC (vpc-00a8b71bb6e71c81d)
3 Subnets, 3 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

After a database is created, you can't change its VPC.

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.

default-vpc-00a8b71bb6e71c81d
3 Subnets, 3 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.

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

Existing VPC security groups

Choose one or more options

default ×

Availability Zone Info

No preference

RDS Proxy

RDS Proxy is a fully managed, highly available database proxy that improves application scalability, resiliency, and security.

Create an RDS Proxy Info
RDS automatically creates an IAM role and a Secrets Manager secret for the proxy. RDS Proxy has additional costs. For more information, see Amazon RDS Proxy pricing.

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-rsa2048-g1 (default)
Expiry: May 20, 2061

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

Connectivity & security

Endpoint & port

Endpoint
postgres.cfck6ukym323.ap-south-1.rds.amazonaws.com

Port
5432

Networking

Availability Zone
ap-south-1c

VPC
vpc-00a8b71bb6e71c81d

Subnet group
default-vpc-00a8b71bb6e71c81d

Subnets
subnet-0495f3380099a5529
subnet-0916d6899691790d2
subnet-0100d1cf77544d69c

Network type
IPv4

Security

VPC security groups
default (sg-07737f3f010c7b8c5)
Active

Publicly accessible
Yes

Certificate authority Info
rds-ca-rsa2048-g1

Certificate authority date
May 20, 2061, 00:10 (UTC+05:30)

DB instance certificate expiration date
March 29, 2026, 22:28 (UTC+05:30)

Connected compute resources (0) Info

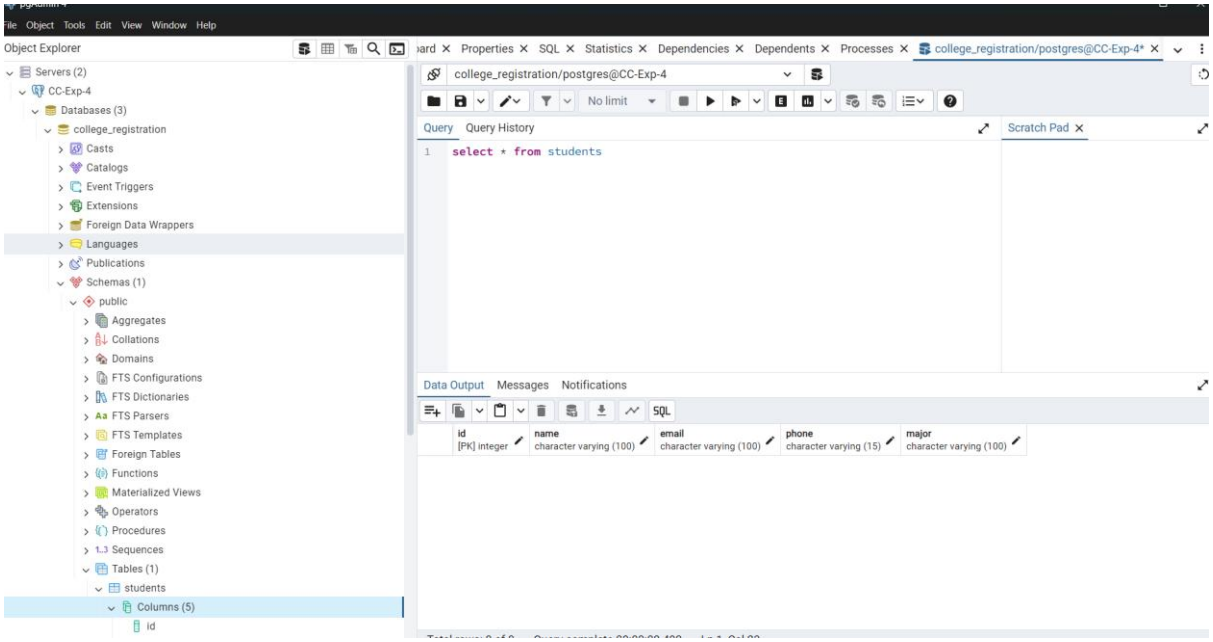
```
ubuntu@ip-172-31-7-194: ~/a
ubuntu@ip-172-31-7-194:~/aws-rds$ sudo vim /etc/nginx/sites-available/demo
```

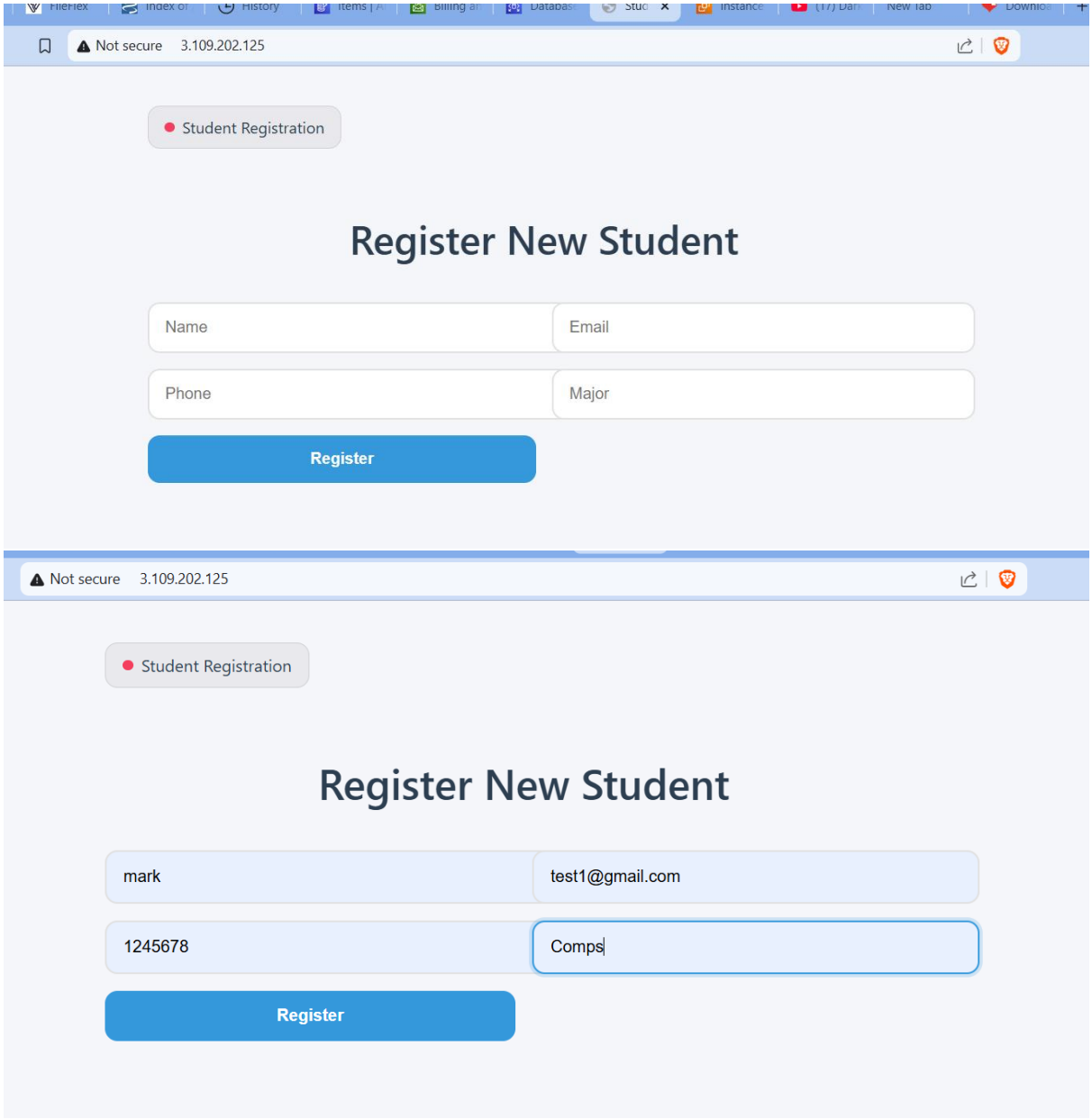
```
ubuntu@ip-172-31-7-194: ~/a
server {
    listen 80;
    server_name 3.109.202.125;

    location / {
        proxy_pass http://127.0.0.1:3000;
        proxy_http_version 1.1;
        proxy_set_header Upgrade $http_upgrade;
        proxy_set_header Connection 'upgrade';
        proxy_set_header Host $host;
        proxy_cache_bypass $http_upgrade;
    }
}
```

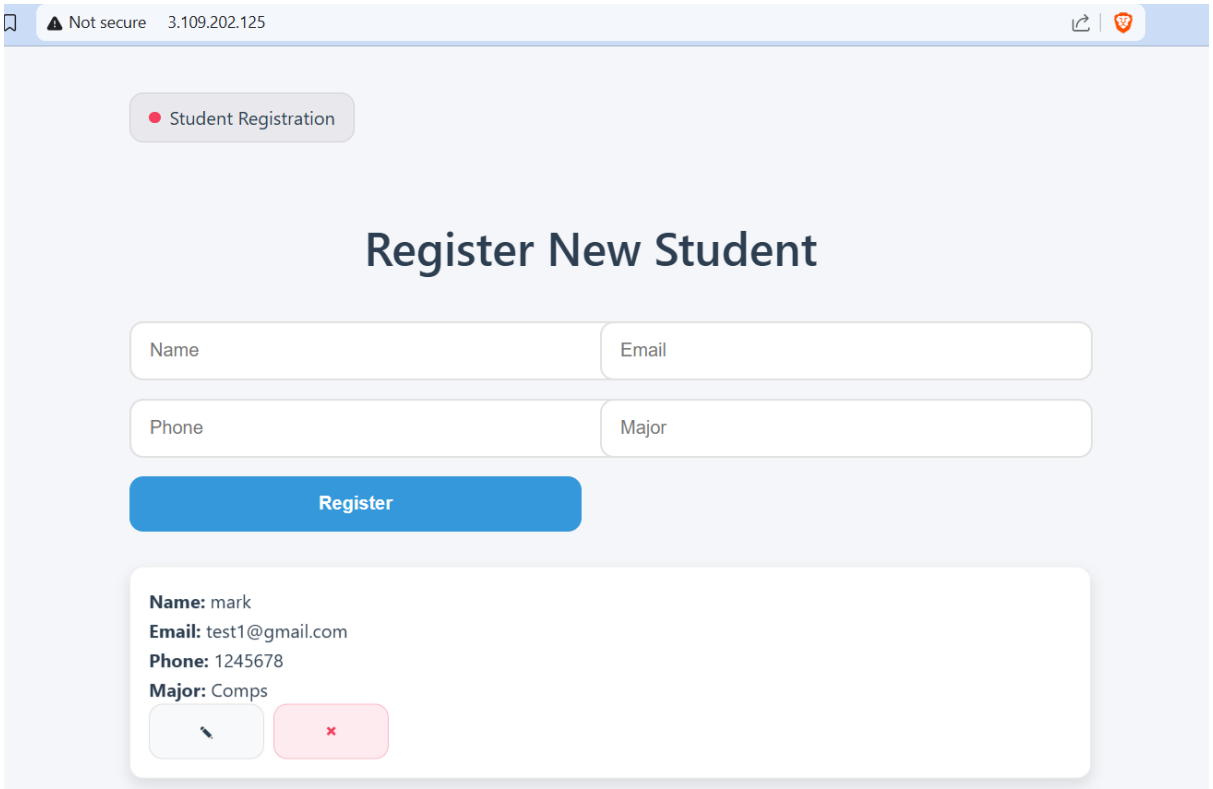
```
ubuntu@ip-172-31-7-194: ~/a
ubuntu@ip-172-31-7-194:~/aws-rds$ sudo ln -s /etc/nginx/sites-available/demo /etc/nginx/sites-enabled
ubuntu@ip-172-31-7-194:~/aws-rds$ sudo nginx -t
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
ubuntu@ip-172-31-7-194:~/aws-rds$ sudo service nginx restart
ubuntu@ip-172-31-7-194:~/aws-rds$
```

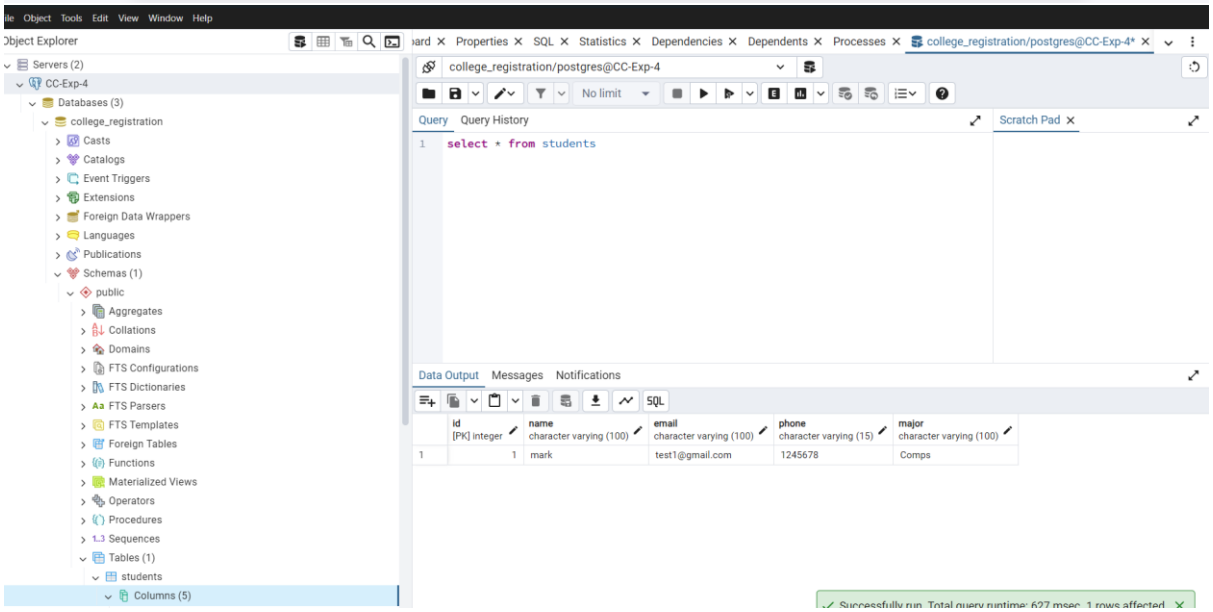
```
ubuntu@ip-172-31-7-194: ~/a   Windows PowerShell

(env) ubuntu@ip-172-31-7-194:~/aws-rds$ sudo vim config.py
(env) ubuntu@ip-172-31-7-194:~/aws-rds$ gunicorn -b 0.0.0.0:3000 app:app
[2025-03-29 17:06:21 +0000] [2561] [INFO] Starting gunicorn 23.0.0
[2025-03-29 17:06:21 +0000] [2561] [INFO] Listening at: http://0.0.0.0:3000 (2561)
[2025-03-29 17:06:21 +0000] [2561] [INFO] Using worker: sync
[2025-03-29 17:06:21 +0000] [2562] [INFO] Booting worker with pid: 2562
```

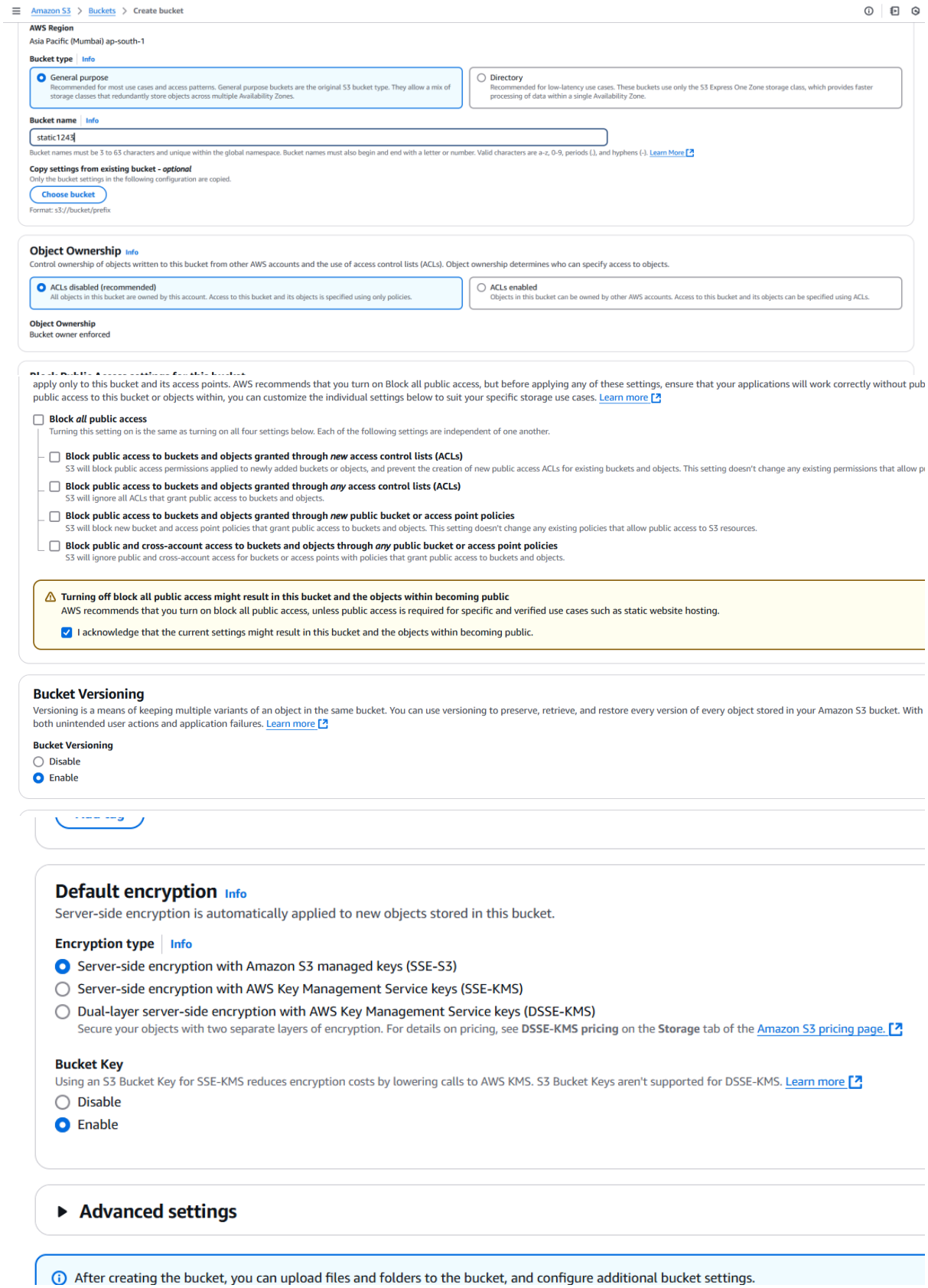
```
PS C:\Users\Mark Lopes> psql -h postgres.cfck6ukym323.ap-south-1.rds.amazonaws.com -U postgres -d postgres
Password for user postgres:

psql (16.4, server 16.8)
WARNING: Console code page (437) differs from Windows code page (1252)
         8-bit characters might not work correctly. See psql reference
         page "Notes for Windows users" for details.
SSL connection (protocol: TLSv1.3, cipher: TLS_AES_256_GCM_SHA384, compression: off)
Type "help" for help.

postgres=> CREATE DATABASE college_registration;
CREATE DATABASE
postgres=> \c college_registration;
psql (16.4, server 16.8)
SSL connection (protocol: TLSv1.3, cipher: TLS_AES_256_GCM_SHA384, compression: off)
You are now connected to database "college_registration" as user "postgres".
college_registration=>
college_registration=> CREATE TABLE students (
college_registration(>     id SERIAL PRIMARY KEY,
college_registration(>     name VARCHAR(100) NOT NULL,
college_registration(>     email VARCHAR(100) UNIQUE NOT NULL,
college_registration(>     phone VARCHAR(15),
college_registration(>     major VARCHAR(100)
college_registration(> );
CREATE TABLE
college_registration=>
```




Not secure 3.109.202.125
Student Registration
Register New Student
Name
Email
Phone
Major
Register
Not secure 3.109.202.125
Student Registration
Register New Student
mark
test1@gmail.com
1245678
Comps
Register


Not secure 3.109.202.125
Student Registration
Register New Student
Name
Email
Phone
Major
Register
Name: mark
Email: test1@gmail.com
Phone: 1245678
Major: Comps


Object Explorer
Servers (2)
CC-Exp-4
Databases (3)
college_registration
Casts
Catalogs
Event Triggers
Extensions
Foreign Data Wrappers
Languages
Publications
Schemas (1)
public
Aggregates
Collations
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Operators
Procedures
Sequences
Tables (1)
students
Columns (5)
college_registration/postgres@CC-Exp-4
Query
Query History
Scratch Pad
select * from students
Data Output
Messages
Notifications
id [PK] integer
name character varying (100)
email character varying (100)
phone character varying (15)
major character varying (100)
1 mark test1@gmail.com 1245678 Comps


Amazon S3 > Buckets > Create bucket
AWS Region
Asia Pacific (Mumbai) ap-south-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
static1243
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 who can specify access to objects.
ACLs disabled (recommended)
All objects in this bucket are owned by this account. Access to this bucket and its objects is specified using only policies.
ACLs enabled
Objects in this bucket can be owned by other AWS accounts. Access to this bucket and its objects can be specified using ACLs.
Object Ownership
Bucket owner enforced
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 pub
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 p
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.
Turning off block all public access might result in this bucket and the objects within becoming public
AWS recommends that you turn on block all public access, unless public access is required for specific and verified use cases such as static website hosting.
I acknowledge that the current settings might result in this bucket and the objects within becoming public.
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 both unintended user actions and application failures. Learn more
Bucket Versioning
Disable
Enable
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 Storage 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
After creating the bucket, you can upload files and folders to the bucket, and configure additional bucket settings.

General purpose buckets | Directory buckets

General purpose buckets (3) Info All AWS Regions

Buckets are containers for data stored in S3.

Find buckets by name

Name	AWS Region
elasticbeanstalk-ap-south-1-202533503126	Asia Pacific (Mumbai) ap-south
markbucky	Asia Pacific (Mumbai) ap-south
static1243	Asia Pacific (Mumbai) ap-south

Drag and drop files and folders you want to upload here, or choose **Add files** or **Add folder**.

Files and folders (10 total, 21.7 MB) Remove Add files

All files and folders in this table will be uploaded.

Find by name

Name	Folder	Type	Size
index.html	-	text/html	2.9 KB
Cafe-Owners.png	images/	image/png	2.7 MB
Cake-Vitrine.png	images/	image/png	3.8 MB
Coffee-and-Pastries.png	images/	image/png	3.1 MB
Coffee-Shop.png	images/	image/png	726.8 KB
Cookies.png	images/	image/png	1.4 MB
Cup-of-Hot-Chocolate.png	images/	image/png	3.6 MB
Strawberry-&-Blueberry-Tarts.png	images/	image/png	2.9 MB
Strawberry-Tarts.png	images/	image/png	3.4 MB
styles.css	css/	text/css	541.0 B

Static website hosting

Use this bucket to host a website or redirect requests. Learn more

We recommend using AWS Amplify Hosting for static website hosting
Deploy a fast, secure, and reliable website quickly with AWS Amplify Hosting. Learn more about Amplify Hosting or View your exis

S3 static website hosting
Enabled

Hosting type
Bucket hosting

Bucket website endpoint
When you configure your bucket as a static website, the website is available at the AWS Region-specific website endpoint of the bucket. Learn more
http://static1243.s3-website.ap-south-1.amazonaws.com

Bucket policy

The bucket policy, written in JSON, provides access to the ob

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "PublicReadGetObject",
      "Effect": "Allow",
      "Principal": "*",
      "Action": "s3:GetObject",
      "Resource": "arn:aws:s3:::static1243/*"
    }
  ]
}
```

static1243

Objects | Properties | Permissions | Metrics | Management | Access Points

Lifecycle configuration

To manage your objects so that they are stored cost effectively throughout their lifecycle, configure their lifecycle. A lifecycle configuration is a set of rul
day.

Default minimum object size for transitions
All storage classes 128K

Lifecycle rules (1)

Use lifecycle rules to define actions you want Amazon S3 to take during an object's lifetime such as transitioning objects to another storage class, archiv

Lifecycle rule name	Status	Scope	Current version actions	Non
30_days	Enabled	Filtered	Transition to Standard-IA, then	-

View lifecycle configuration

Lifecycle rule configuration

Lifecycle rule name
30_days

Status
Enabled

Scope
Filtered

Prefix
test

Object tags
-

Minimum object size
-
When no minimum object size is specified, the minimum object size for tra
determined by the lifecycle configuration. Learn more

Maximum object size
-

Review transition and expiration actions

Current version actions

Day 0
- Objects uploaded

↓

Day 30
- Objects move to Standard-IA

↓

Day 90
- Objects move to Glacier Flexible Retrieval (formerly Glacier)

Noncurrent versions actions

Day 0
No actions defined.

Not secure static1243.s3-website.ap-south-1.amazonaws.com

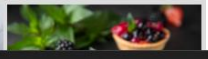
Café

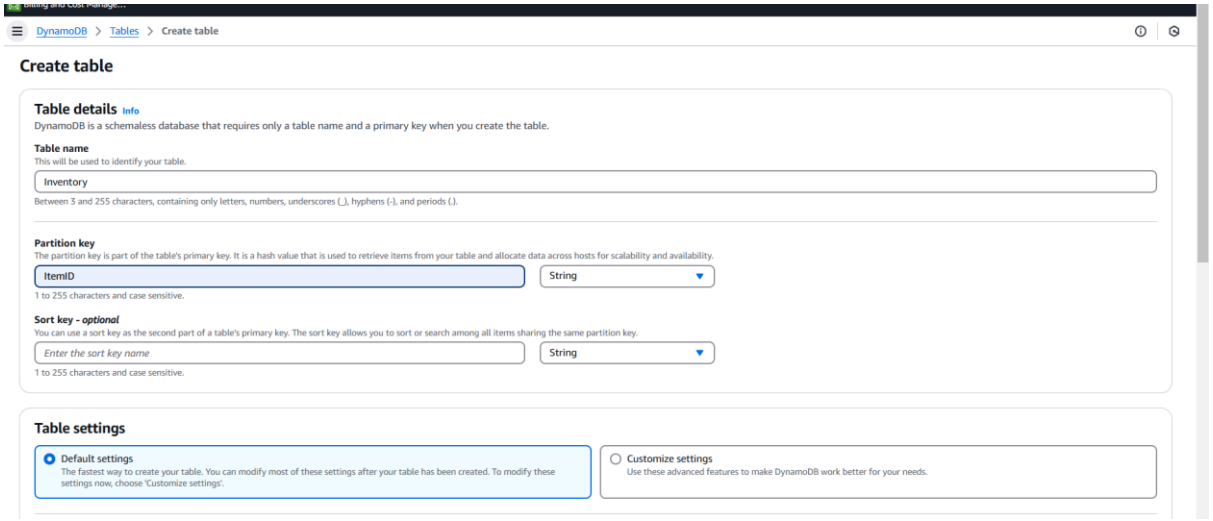
The Café offers an assortment of delicious and delectable pastries and coffees that will put a smile on your face. From cookies to croissants, tarts and cakes, each treat is specially prepared to excite your tastebuds and brighten your day!

Frank bakes a rich variety of cookies. Try them all!

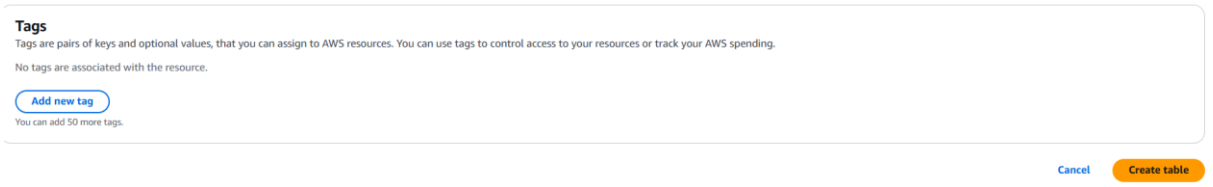
Tea
Coffee
Latte
Hot

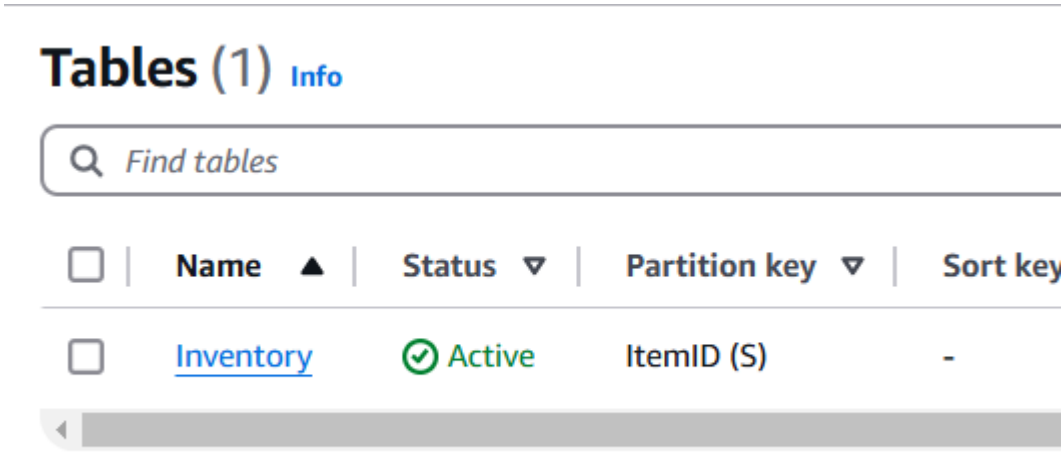
Our tarts are always a customer favorite!

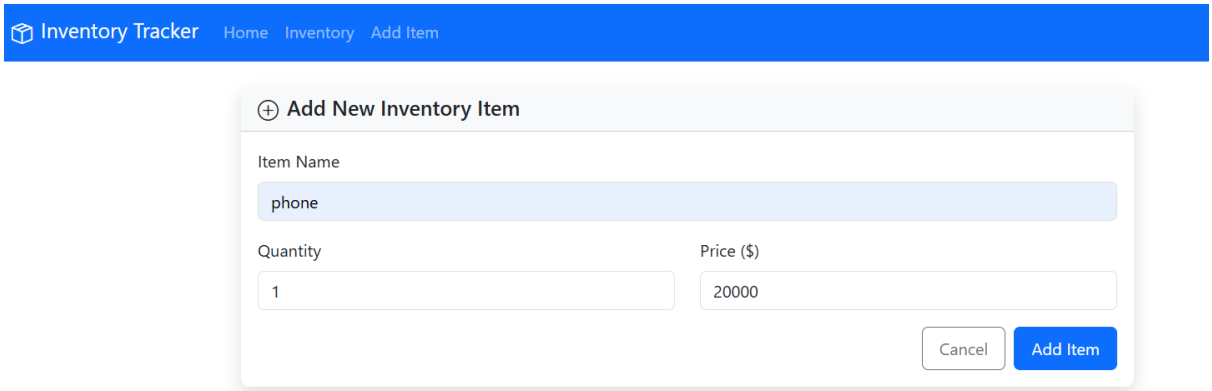


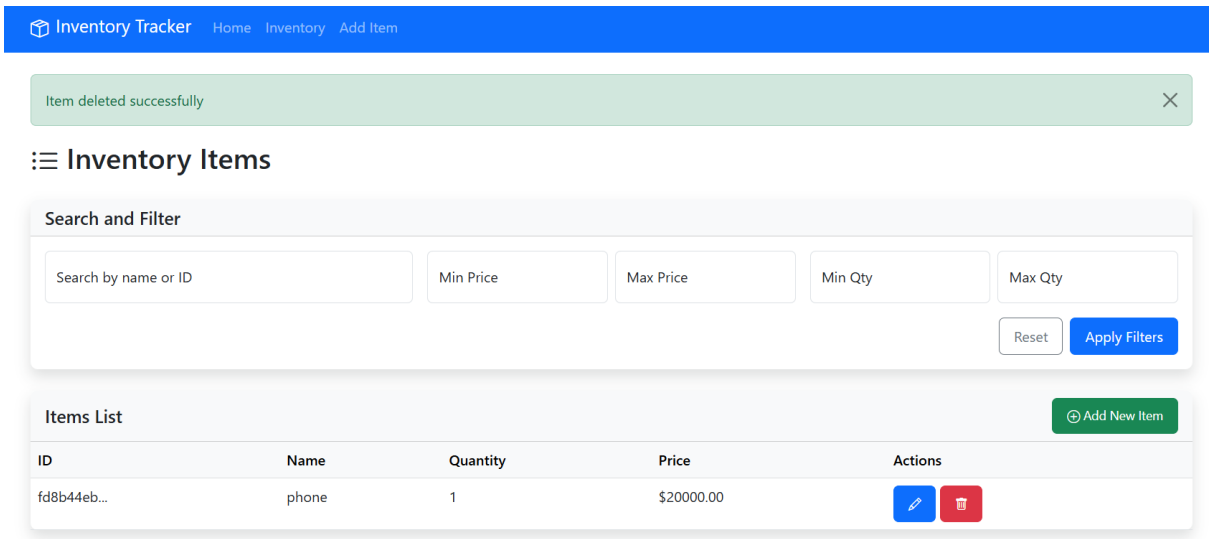


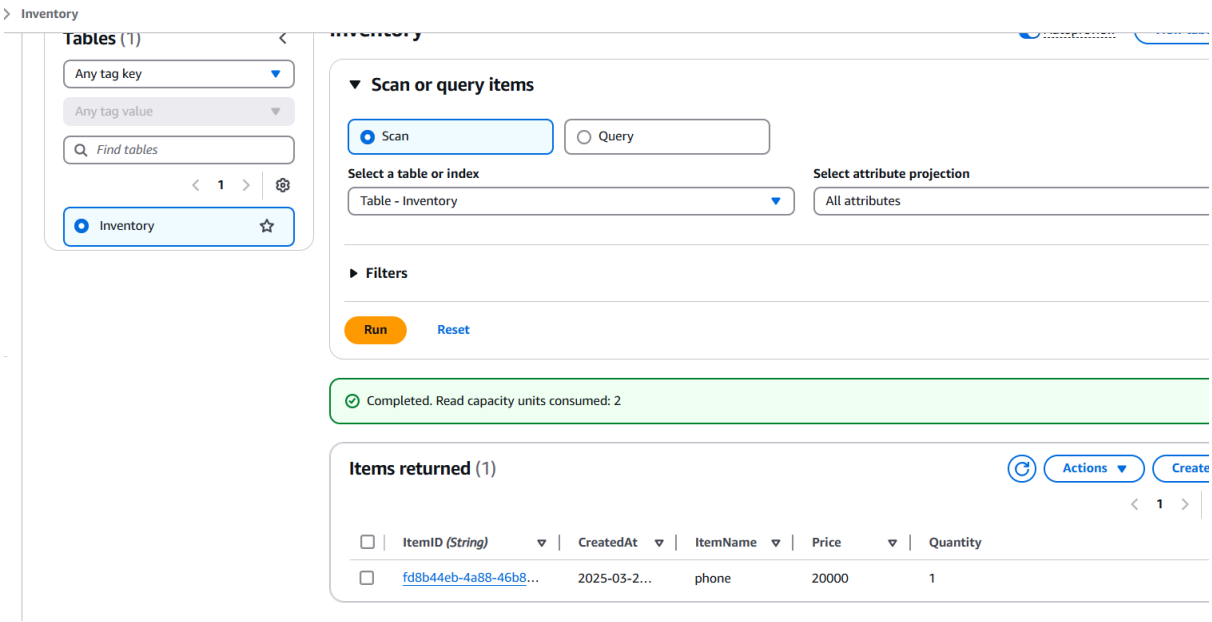
Setting	Value	Editable after creation
Table class	DynamoDB Standard	Yes
Capacity mode	On-demand	Yes
Maximum read capacity units	-	Yes
Maximum write capacity units	-	Yes
Local secondary indexes	-	No
Global secondary indexes	-	Yes
Encryption key management	Owned by Amazon DynamoDB	Yes
Deletion protection	Off	Yes
Resource-based policy	Not active	Yes






Inventory Tracker
Home
Inventory
Add Item
Add New Inventory Item
Item Name
phone
Quantity
1
Price ($)
20000
Cancel
Add Item


Inventory Tracker
Home
Inventory
Add Item
Item deleted successfully
Inventory Items
Search and Filter
Search by name or ID
Min Price
Max Price
Min Qty
Max Qty
Reset
Apply Filters
Items List
Add New Item
ID
Name
Quantity
Price
Actions
fd8b44eb...
phone
1
$20000.00


Inventory
Tables (1)
Any tag key
Any tag value
Find tables
1
Inventory
Scan or query items
Scan
Query
Select a table or index
Table - Inventory
Select attribute projection
All attributes
Filters
Run
Reset
Completed. Read capacity units consumed: 2
Items returned (1)
Actions
Create
1
ItemID (String)
CreatedAt
ItemName
Price
Quantity
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