Experiment 06 - Cloud Computing

December 28, 2022

Aim

To create table in DynamoDB and perform CRUD operations through console and AWS SDK along with exploring various ways to query data in DynamoDB

Theory

- **DynamoDB** : Amazon DynamoDB is a fully managed proprietary NoSQL database service that supports key–value and document data structures and is offered by Amazon.com as part of the Amazon Web Services portfolio. DynamoDB exposes a similar data model to and derives its name from Dynamo, but has a different underlying implementation.
- **Queries in Dynamo** : The Query operation in Amazon DynamoDB finds items based on primary key values. You must provide the name of the partition key attribute and a single value for that attribute. Query returns all items with that partition key value. Optionally, you can provide a sort key attribute and use a comparison operator to refine the search results.
- **Backups in Dynamo** : Point-in-time recovery (PITR) provides continuous backups of your DynamoDB table data. When enabled, DynamoDB maintains incremental backups of your table for the last 35 days until you explicitly turn it off.

Results

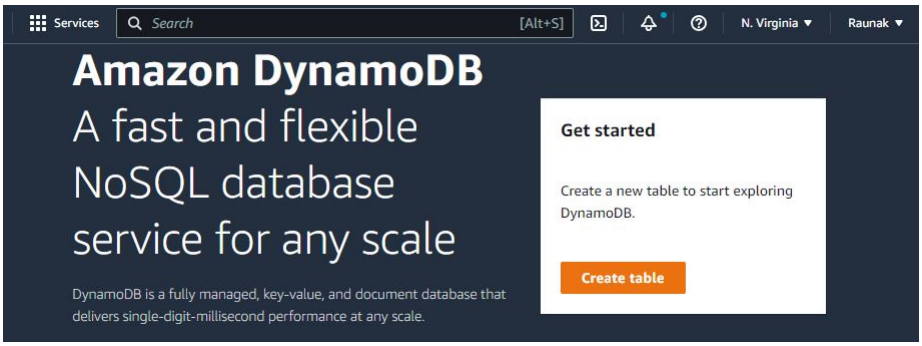

Figure 1: Start by creating a table by searching for DynamoDB Service from the search bar

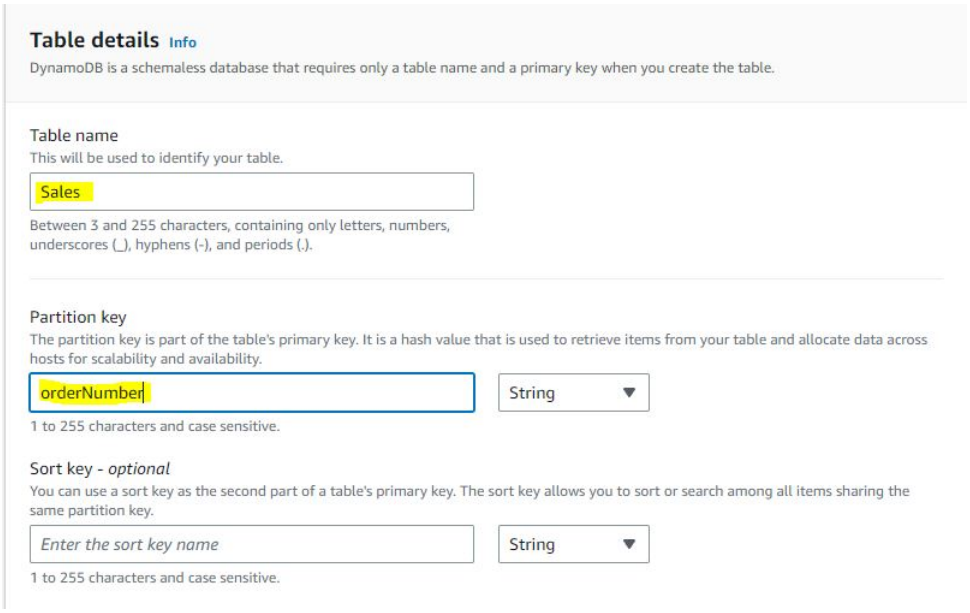

Figure 2: Name the table and name a primary key

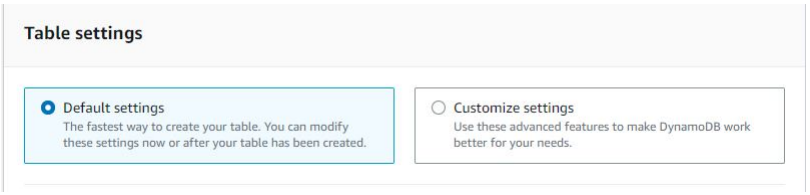

Figure 3: Create the table using the default settings

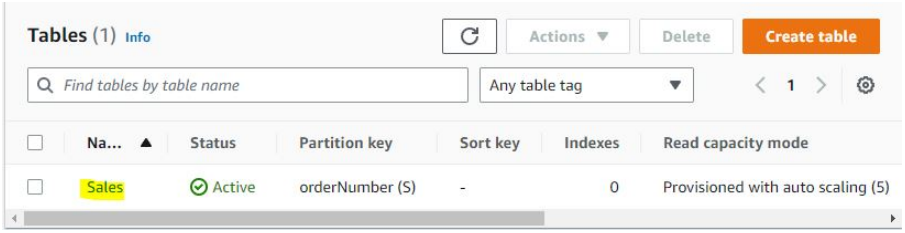

Figure 4: Successful creation of the table in Dynamo

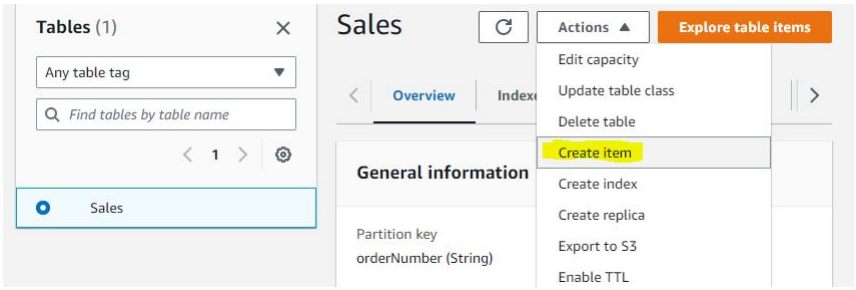

Figure 5: After selecting the table, one can create the item

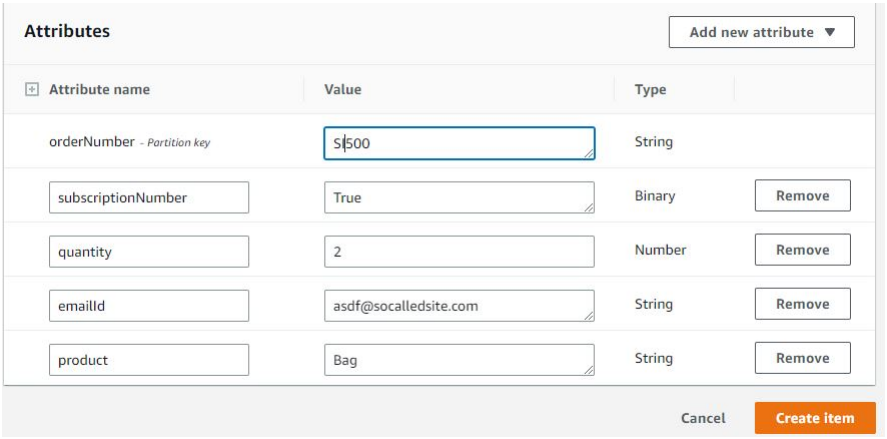

Figure 6: Name the attributes with values and note the respective data types

Figure 7: JSON View can be selected too

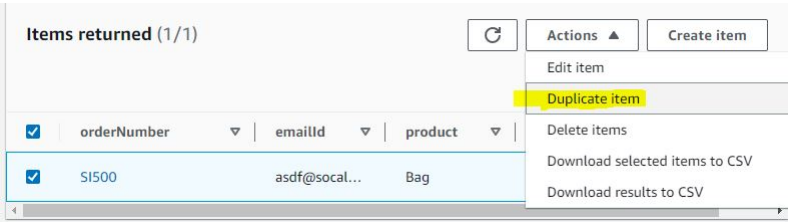

Figure 8: Duplication of the items can be done and specific changes can be made in values

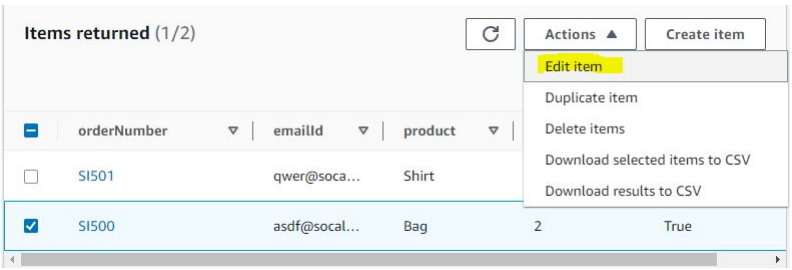

Figure 9: Successful replicate value created

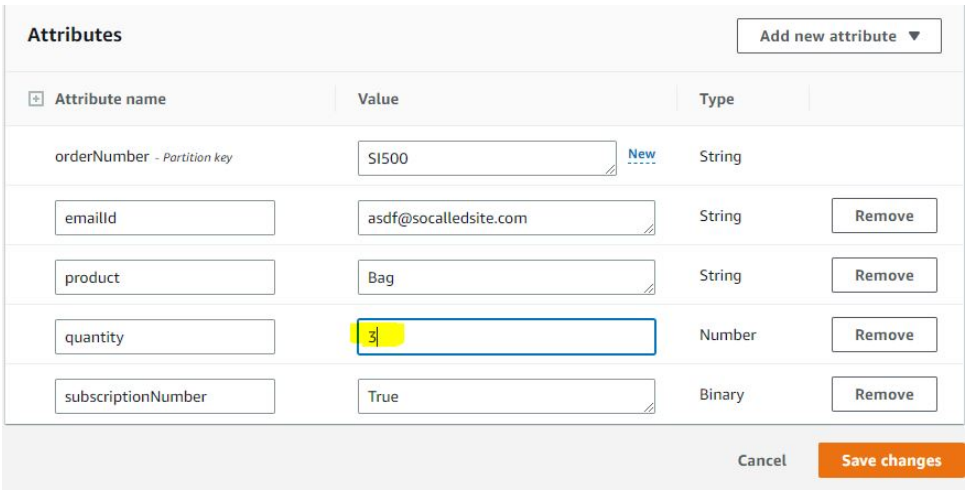

Figure 10: Values can be edited too

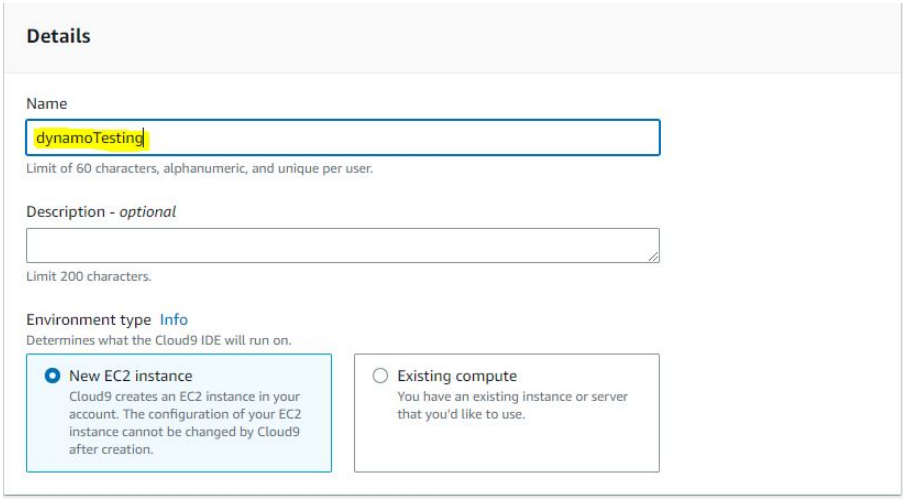

Figure 11: Managing the dynamoDB table using cloud9 environment

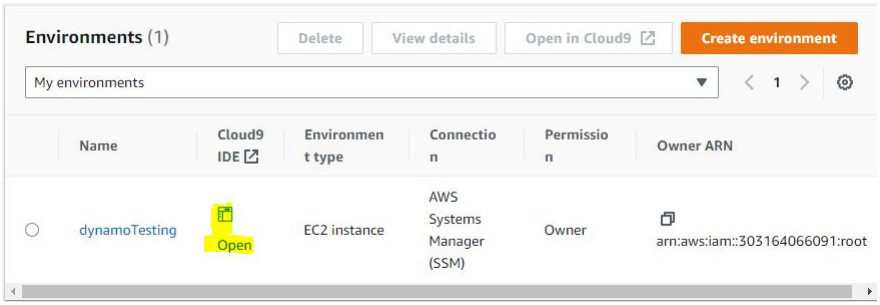

Figure 12: Open option can be selected that opens environment in browser tab

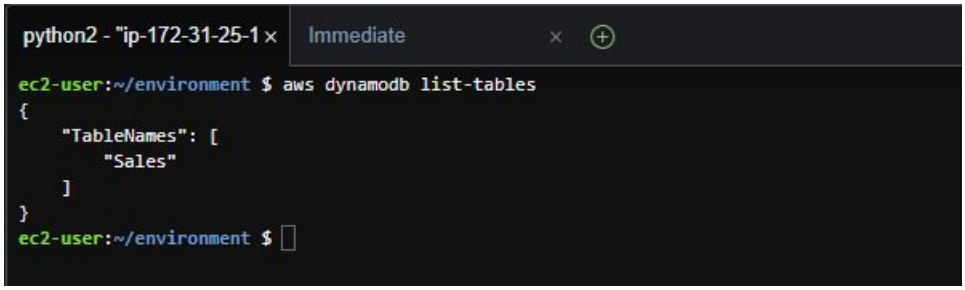

Figure 13: The terminal based console can be used and checked for existing tables using `aws dynamodb list-tables` command

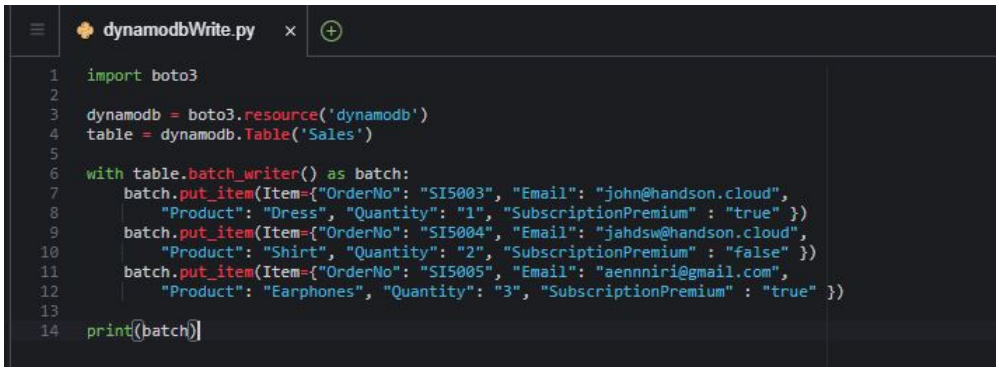

Figure 14: Creation of the new file and following code inserts values in table using boto3

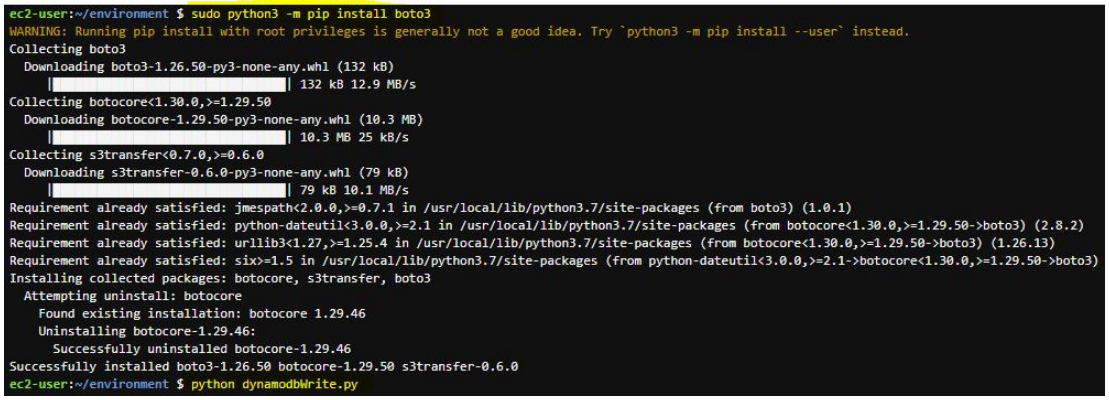

Figure 15: Installation of boto SDK and file execution can be seen in the highlighted commands

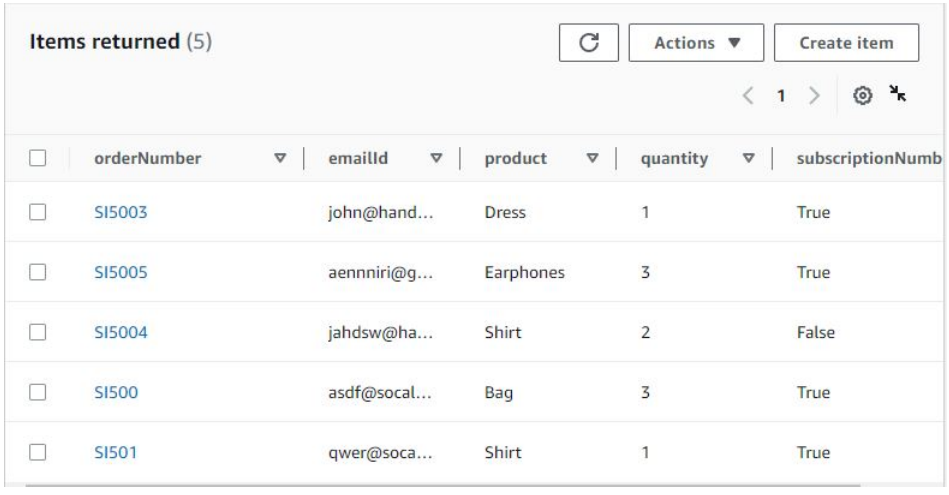

Figure 16: Successful addition of the records

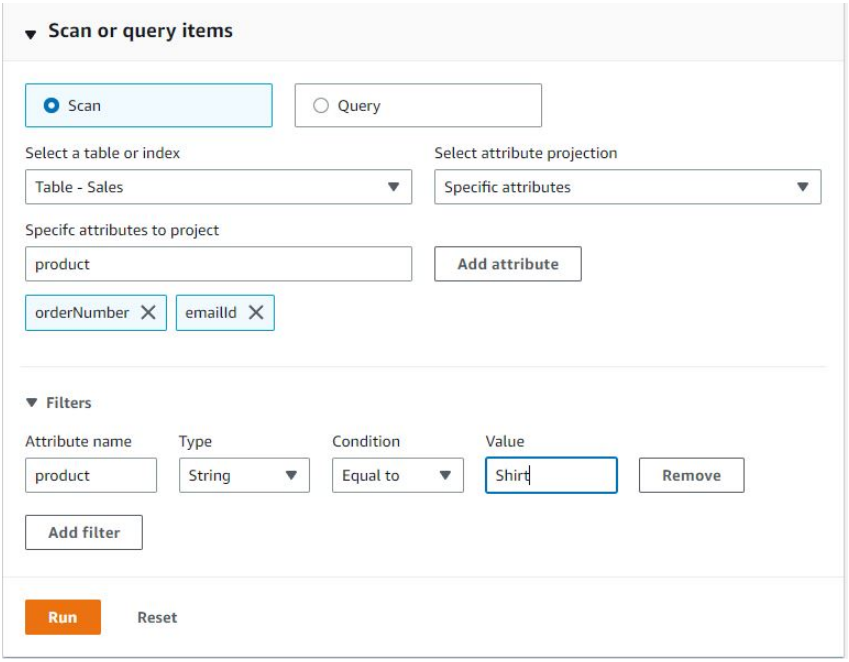

Figure 17: Scanning for items can be done by specifying the attributes

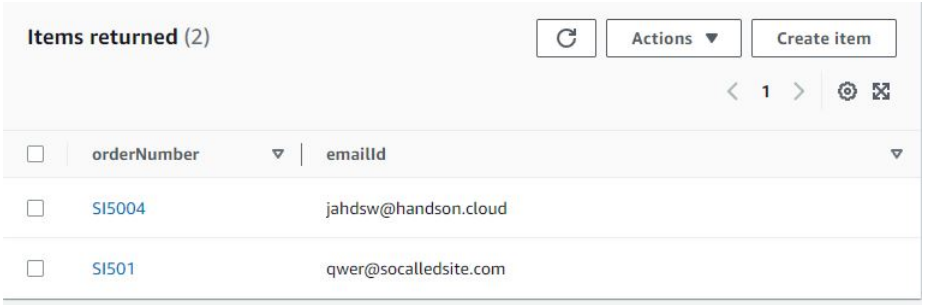

Figure 18: Retrieved items after execution of the scan

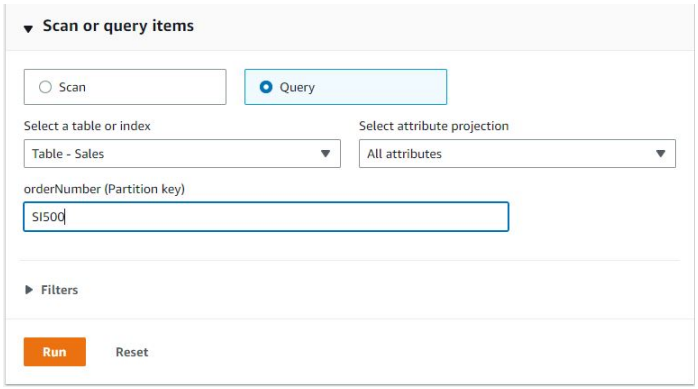

Figure 19: Query can be used and retrieving the item can be done using primary key

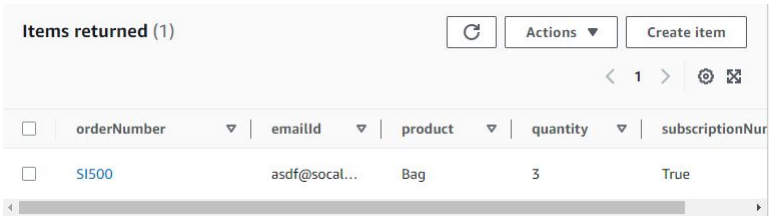

Figure 20: Retrieved items after execution of the query

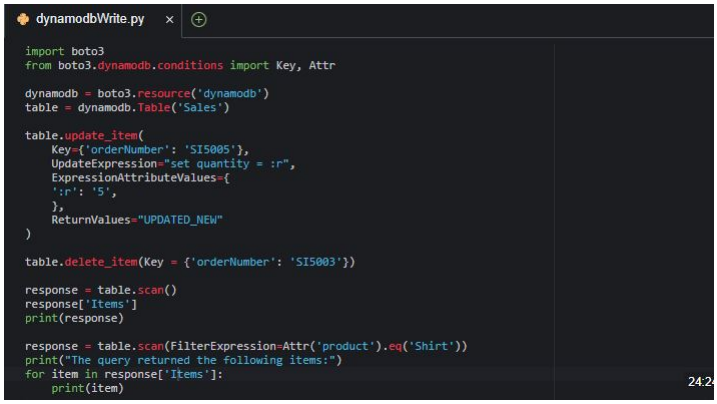

Figure 21: Editing the existing item using the SDK from Environment

Figure 22: Successful execution of the script

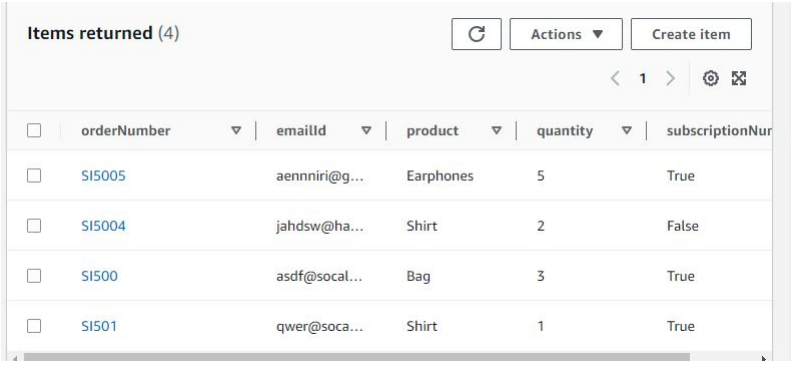

Figure 23: Changes of the tuple can also be seen on the respective dashboard

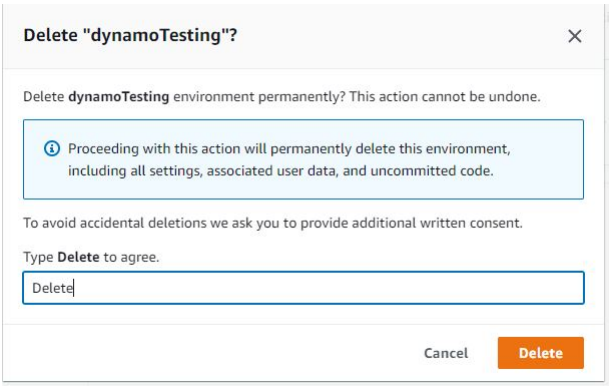

Figure 24: Deletion of the cloud9 environment

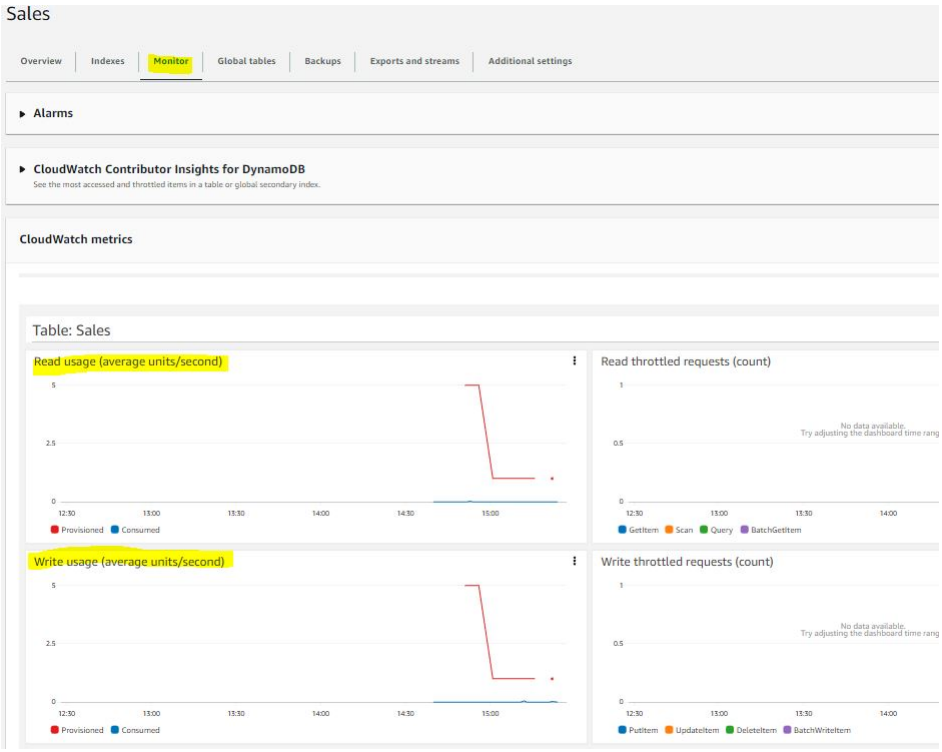

Figure 25: Monitoring of the table can be done which provides analytics

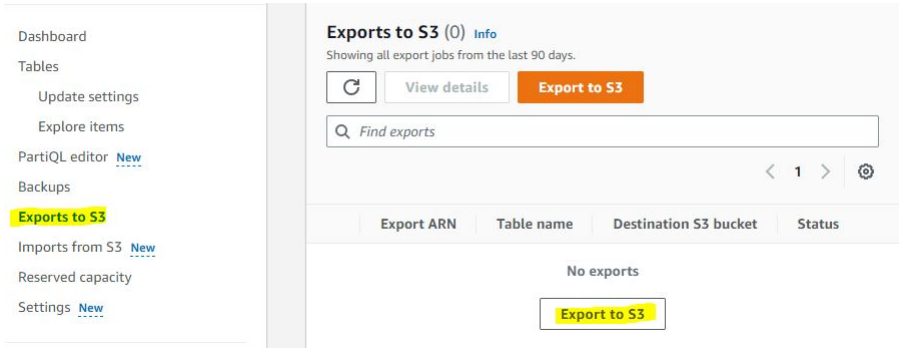

Figure 26: The table can be exported to S3 Bucket

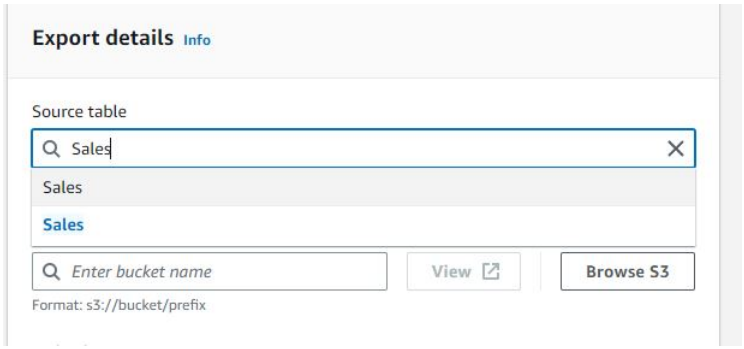

Figure 27: Exporting the table by first naming it

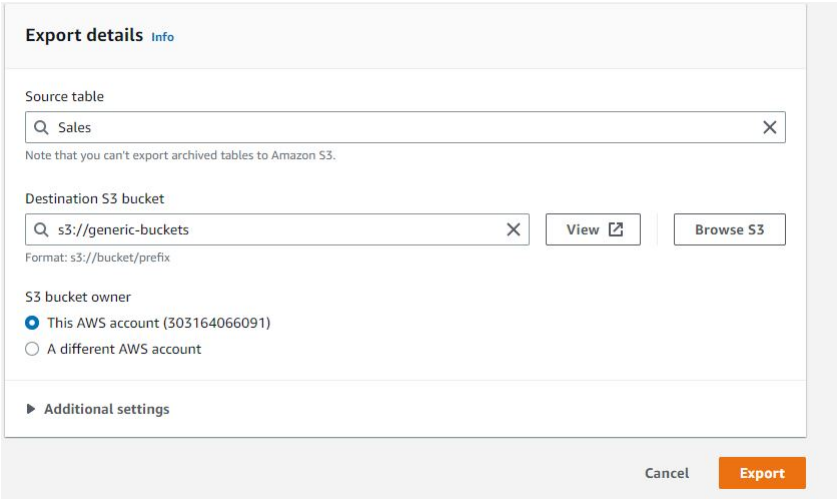

Figure 28: Create a S3 bucket prior and browse it through the panel of export

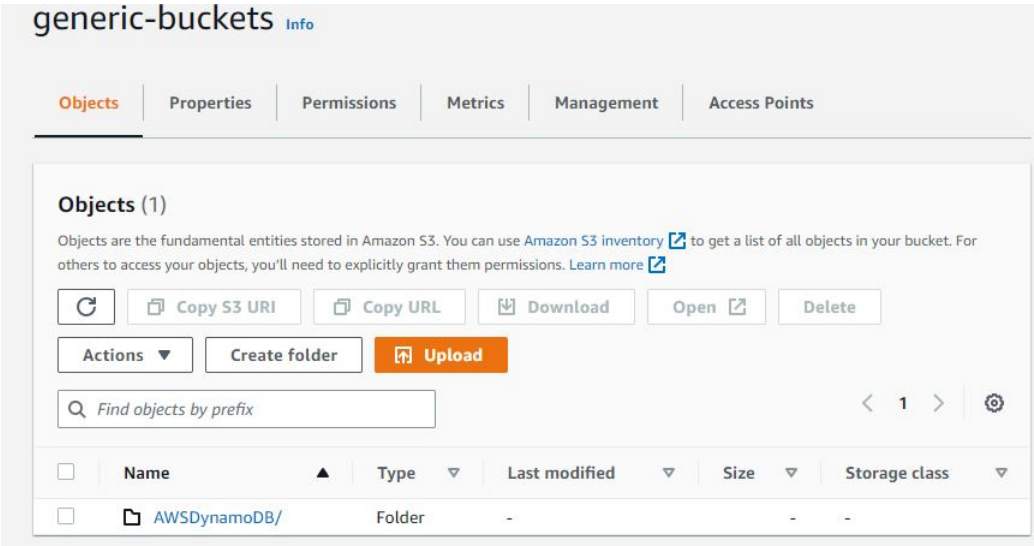

Figure 29: Successful table export in the existing bucket

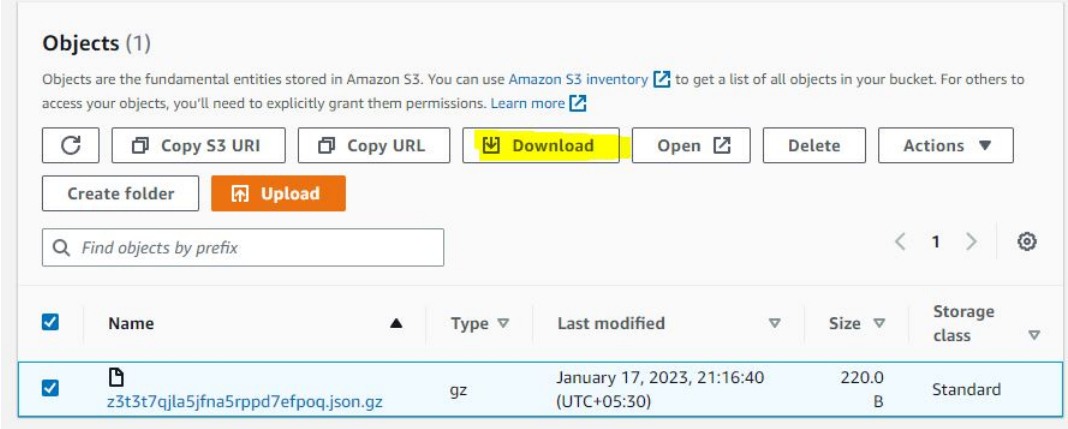

Figure 30: The data can be downloaded by browsing to the object in the exported directory

Figure 31: After unzipping the downloaded file the JSON file can be viewed

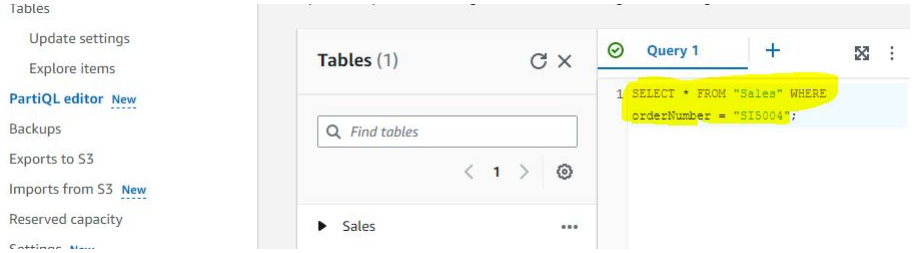

Figure 32: PartiQL can be used to execute queries respectively

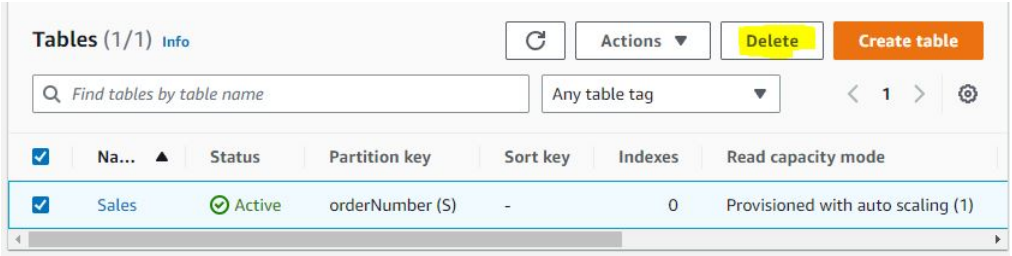

Figure 33: Deletion of the table can be done respectively

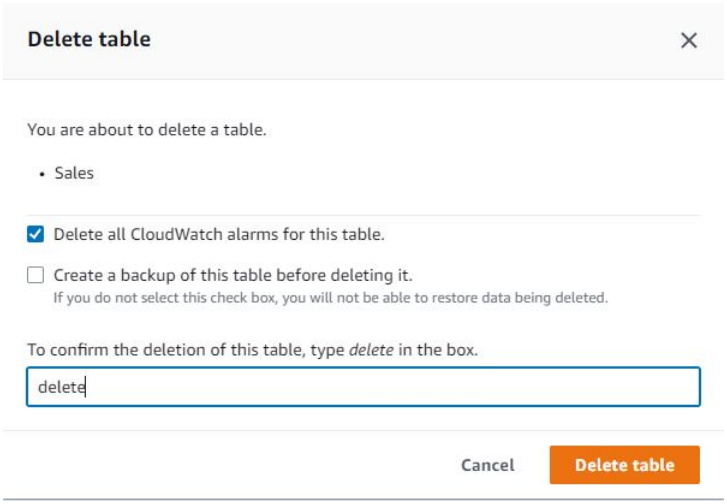

Figure 34: Deletion of the table by confirming the latter step

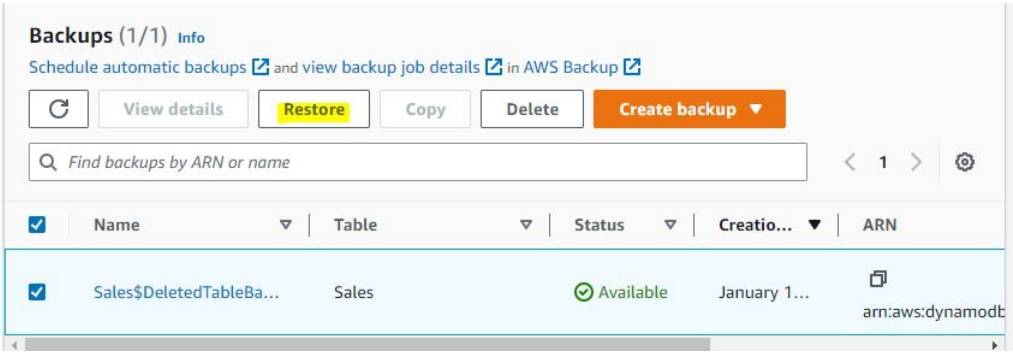

Figure 35: In the section of backups found on left panel the retrieval of the deleted data can be done. Since the option of PITR is enabled the backup cannot be deleted. It will be automatically deleted in the span of 35 days

Conclusion

This experiment is successful demonstration of many ways of operating with the DynamoDB. The service can be used to create the NoSQL based tables. The deletion process can be done along with restoration using the backups seamlessly and using the PITR that deletes the backup in the span of 35 days. The demonstration of Cloud9 environment is also done which effectively can be used to connect the table. The boto SDK is also demonstrated for manipulation of the table by leveraging Python programming language. The querying can be done using PartiQL in form of typical SQL as well as exporting to S3 Bucket can also be done. The execution of the all the process has been successfully shown in the results section of this experiment respectively.