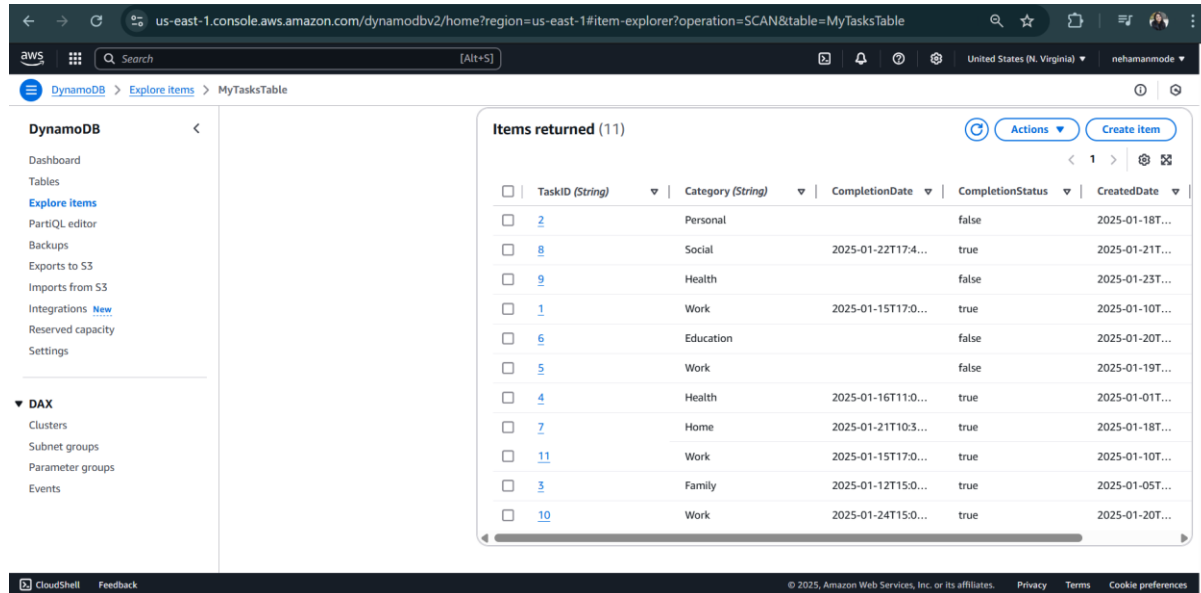


AWS Project: Data Pipeline with QuickSight, DynamoDB, Athena, S3 & IAM

This project demonstrates how to integrate AWS DynamoDB with Athena using Lambda and Glue to enable querying, and then visualize the results in Amazon QuickSight. Below are the step-by-step implementations of this solution.

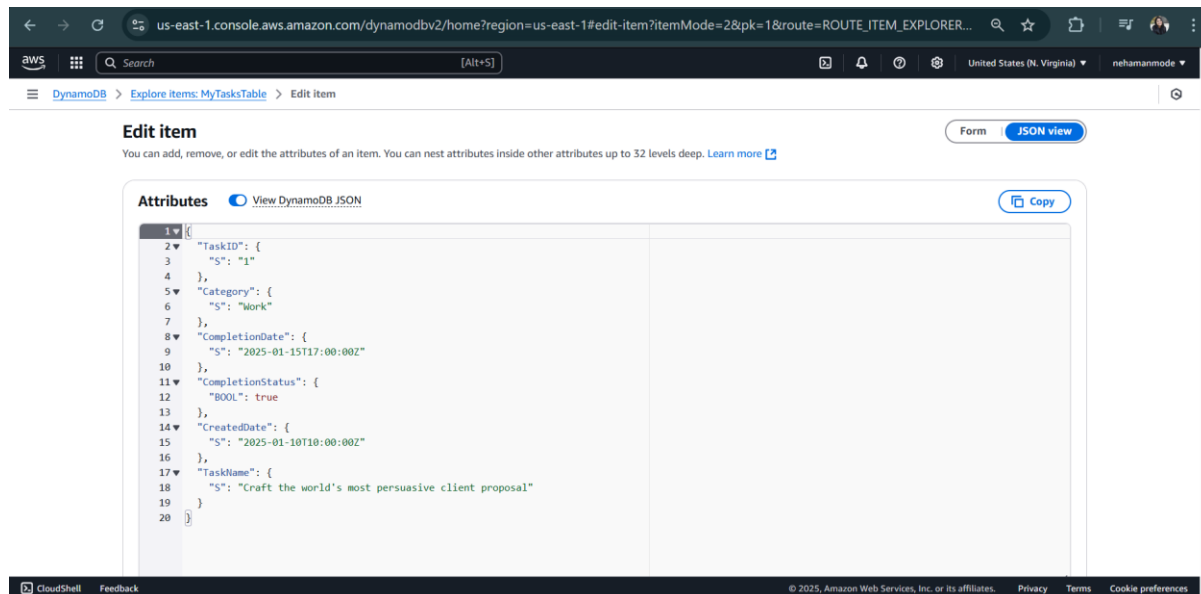
Step 1: Create DynamoDB Table

Create a table named `MyTasksTable` in DynamoDB and insert data items.



The screenshot shows the AWS DynamoDB console interface. The left sidebar contains navigation links for Dashboard, Tables, Explore items, PartiQL editor, Backups, Exports to S3, Imports from S3, Integrations, Reserved capacity, and Settings. The main area displays the 'MyTasksTable' with a table of 11 items. The table has columns: TaskID (String), Category (String), CompletionDate, CompletionStatus, and CreatedDate. The items are listed with their respective values, including TaskID, Category, CompletionDate, CompletionStatus, and CreatedDate.

TaskID (String)	Category (String)	CompletionDate	CompletionStatus	CreatedDate
2	Personal		false	2025-01-18T...
8	Social	2025-01-22T17:4...	true	2025-01-21T...
9	Health		false	2025-01-23T...
1	Work	2025-01-15T17:0...	true	2025-01-10T...
6	Education		false	2025-01-20T...
5	Work		false	2025-01-19T...
4	Health	2025-01-16T11:0...	true	2025-01-01T...
7	Home	2025-01-21T10:3...	true	2025-01-18T...
11	Work	2025-01-15T17:0...	true	2025-01-10T...
3	Family	2025-01-12T15:0...	true	2025-01-05T...
10	Work	2025-01-24T15:0...	true	2025-01-20T...

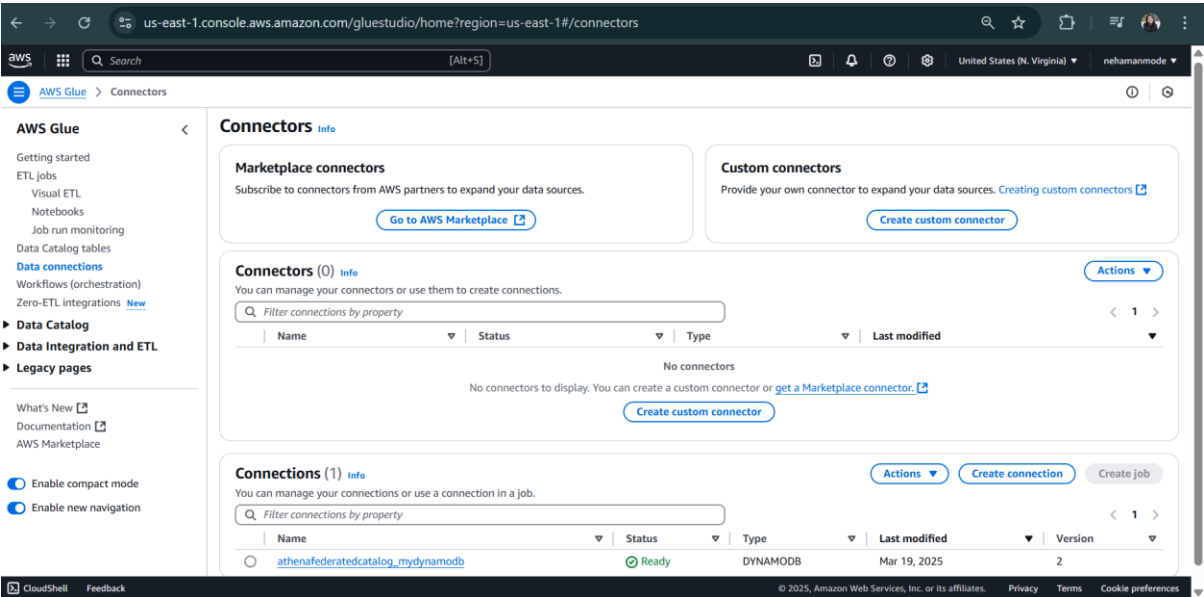
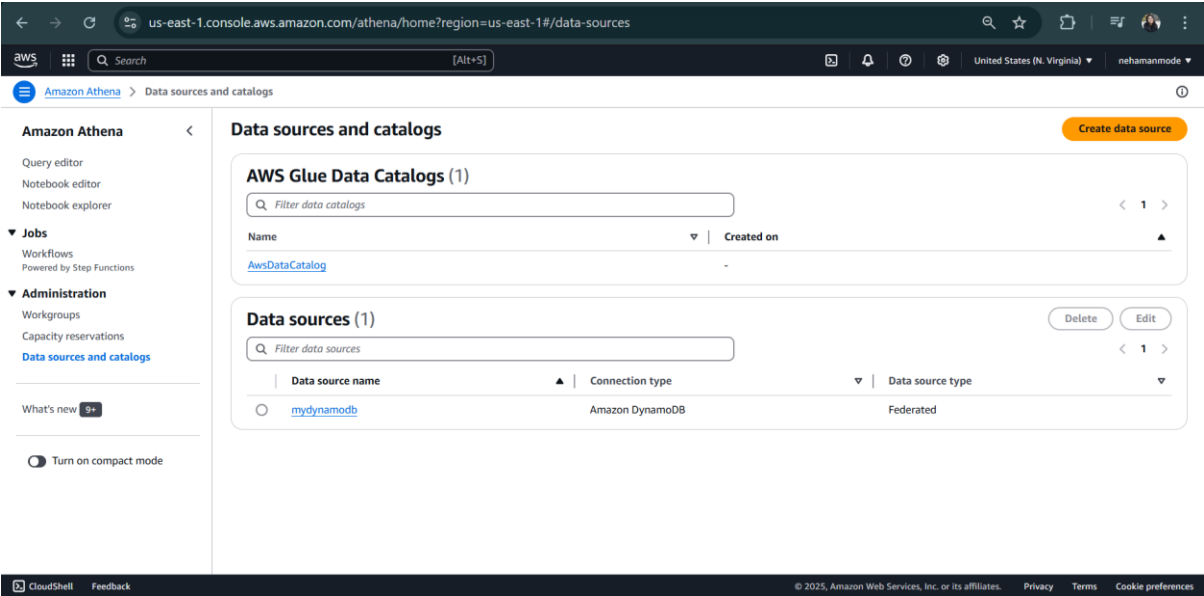


The screenshot shows the AWS DynamoDB console interface for editing an item. The left sidebar contains navigation links for Dashboard, Tables, Explore items, PartiQL editor, Backups, Exports to S3, Imports from S3, Integrations, Reserved capacity, and Settings. The main area displays the 'Edit item' view for a specific item. The 'Attributes' section shows the JSON representation of the item, including TaskID, Category, CompletionDate, CompletionStatus, CreatedDate, and TaskName.

```
1 {
2   "TaskID": {
3     "S": "1"
4   },
5   "Category": {
6     "S": "Work"
7   },
8   "CompletionDate": {
9     "S": "2025-01-15T17:00:00Z"
10  },
11  "CompletionStatus": {
12    "BOOL": true
13  },
14  "CreatedDate": {
15    "S": "2025-01-10T10:00:00Z"
16  },
17  "TaskName": {
18    "S": "Craft the world's most persuasive client proposal"
19  }
20 }
```

Step 2: Create Data Source in DynamoDB

Define a data source in DynamoDB (mydynamodb), which creates a default AWS Glue connection.



Step 3: Setup S3 Spill Bucket

Create an S3 spill bucket for Athena queries and specify its location while setting up DynamoDB.

us-east-1.console.aws.amazon.com/s3/buckets?region=us-east-1&bucketType=general

Account snapshot - updated every 24 hours All AWS Regions [View Storage Lens dashboard](#)

Storage lens provides visibility into storage usage and activity trends. Metrics don't include directory buckets. [Learn more](#)

General purpose buckets | Directory buckets

General purpose buckets (2) All AWS Regions [Copy ARN](#) [Empty](#) [Delete](#) [Create bucket](#)

Buckets are containers for data stored in S3.

Find buckets by name

Name	AWS Region	IAM Access Analyzer	Creation date
athena-query-result1903	US East (N. Virginia) us-east-1	View analyzer for us-east-1	March 19, 2025, 16:10:58 (UTC-04:00)
athena-spill-location1903	US East (N. Virginia) us-east-1	View analyzer for us-east-1	March 19, 2025, 16:06:54 (UTC-04:00)

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Step 4: Connect to Athena

Use Athena to query data from DynamoDB, fetching relevant records.

us-east-1.console.aws.amazon.com/athena/home?region=us-east-1#/query-editor/history/e0c007ed-3fc2-46c8-bee9-708cae8225ae

Amazon Athena > Query editor

Editor | Recent queries | Saved queries | Settings

Workgroup: primary

Data

Data source: mydynamodb

Database: default

Tables and views

mytaskstable

CreatedDate: varchar

TaskID: varchar

Category: varchar

TaskName: varchar

CompletionStatus: boolean

CompletionDate: varchar

Query 1: select * from mytaskstable

SQL Ln 1, Col 27

Run again Explain Cancel Clear Create

Reuse query results up to 60 minutes ago

Query results | Query stats

Completed Time in queue: 155 ms Run time: 4.122 sec Data scanned: 1.05 KB

Results (10) Copy Download results CSV

Search rows

#	createddate	taskid	category	taskname	completionstatus	compi
1	2025-01-18T08:00:00Z	2	Personal	Master the art of doing nothing for 10 minutes (meditation)	false	

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Step 5: Store Query Results in S3

Configure Athena to save query results in the designated S3 bucket.

us-east-1.console.aws.amazon.com/s3/buckets?region=us-east-1&bucketType=general

Search [Alt+S]

United States (N. Virginia) nehamanmode

Amazon S3 > Buckets

Account snapshot - updated every 24 hours All AWS Regions View Storage Lens dashboard

General purpose buckets Directory buckets

General purpose buckets (2) Info All AWS Regions Buckets are containers for data stored in S3. Find buckets by name < 1 > [Settings]

	Name	AWS Region	IAM Access Analyzer	Creation date
	athena-query-result1903	US East (N. Virginia) us-east-1	View analyzer for us-east-1	March 19, 2025, 16:10:58 (UTC-04:00)
	athena-spill-location1903	US East (N. Virginia) us-east-1	View analyzer for us-east-1	March 19, 2025, 16:06:54 (UTC-04:00)

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us-east-1.console.aws.amazon.com/athena/home?region=us-east-1#/query-editor/settings

Search [Alt+S]

United States (N. Virginia) nehamanmode

Amazon Athena > Query editor

Editor Recent queries Saved queries Settings Workgroup primary

Query result and encryption settings Manage

Query result location s3://athena-query-result1903/ [Link]	Encrypt query results -	Expected bucket owner -	Assign bucket owner full control over query results Turned off
---	----------------------------	----------------------------	---

Step 6: View Athena Query Results

Validate that data retrieval is successful.

Amazon Athena

Query editor

mytaskstable

CreatedDate
TaskID
Category
TaskName
CompletionStatus
CompletionDate

Views (0)

Completed

Time in queue: 155 ms

Run time: 4.122 sec

Data scanned: 1.05 KB

Copy

Download results CSV

Results (10)

Search rows

#	createddate	taskid	category	taskname	completionstatus	compi
1	2025-01-18T08:00:00Z	2	Personal	Master the art of doing nothing for 10 minutes (meditation)	false	
2	2025-01-21T12:15:00Z	8	Social	Ping an old friend IRL	true	2025-
3	2025-01-23T07:30:00Z	9	Health	Annual physical exam	false	
4	2025-01-10T10:00:00Z	1	Work	Craft the world's most persuasive client proposal	true	2025-
5	2025-01-20T14:00:00Z	6	Education	Complete AWS Certified Cloud Practitioner course	false	
6	2025-01-19T13:00:00Z	5	Work	Submit the quarterly financial report	false	
7	2025-01-01T09:00:00Z	4	Health	Survive a 5K run without questioning all life choices	true	2025-
8	2025-01-18T09:00:00Z	7	Home	Deep clean the kitchen (because AI can't do that yet)	true	2025-
9	2025-01-05T10:00:00Z	3	Family	Host a legendary birthday bash for Mom	true	2025-
10	2025-01-20T10:00:00Z	10	Work	Write a client proposal that doesn't sound like it was AI-generated	true	2025-

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Step 7: Setup QuickSight Permissions

Provide IAM permissions to allow QuickSight to invoke the Lambda function and access the S3 spill bucket.

us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#/roles/details/aws-quicksight-service-role-v0/editPolicy/quicksight-invoke...

Search

Global

nehamanmode

IAM

Roles

aws-quicksight-service-role-v0

Edit policy

Step 1

Modify permissions in quicksight-invoke-lambda

Step 2

Review and save

Modify permissions in quicksight-invoke-lambda

Add permissions by selecting services, actions, resources, and conditions. Build permission statements using the JSON editor.

Policy editor

Visual

JSON

Actions

Visual

1

2

3

4

5

6

7

8

9

10

Version: "2012-10-17",

Statement: [

{

Effect: "Allow",

Action: "lambda:InvokeFunction",

Resource: "arn:aws:lambda:us-east-1:9082047594081:function:athenafederatedcatalog_mydynamodb"

}

]

Edit statement

Select a statement

Select an existing statement in the policy or add a new statement.

Add new statement

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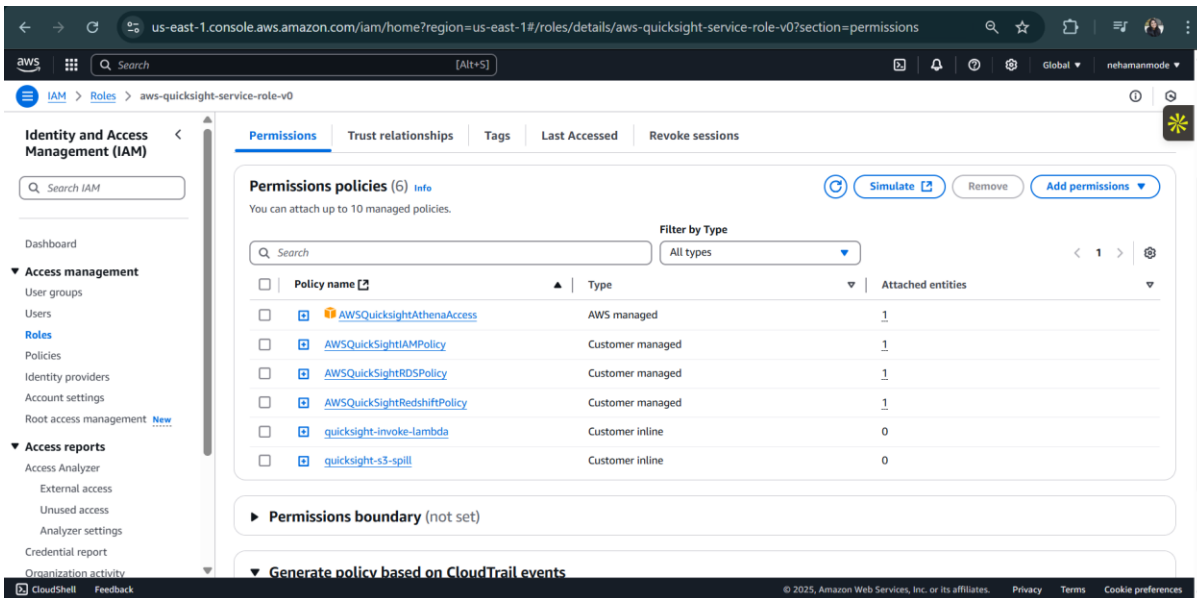
Step 8: Update IAM Policies

Modify Lambda function's policy and attach necessary permissions for QuickSight.

The image shows two screenshots from the AWS console. The top screenshot displays the AWS Lambda 'Functions' page in the 'us-east-1' region. A table lists functions, with 'athenafederatedcatalog_mydynamodb' selected. The function's description is 'Enables Amazon Athena to communicate with DynamoDB, making your tables accessible via SQL'. The package type is 'Image' and the runtime is '-'. The last modified time is '54 minutes ago'. On the right, there's a 'Tutorials' sidebar with a 'Create a simple web app' tutorial.

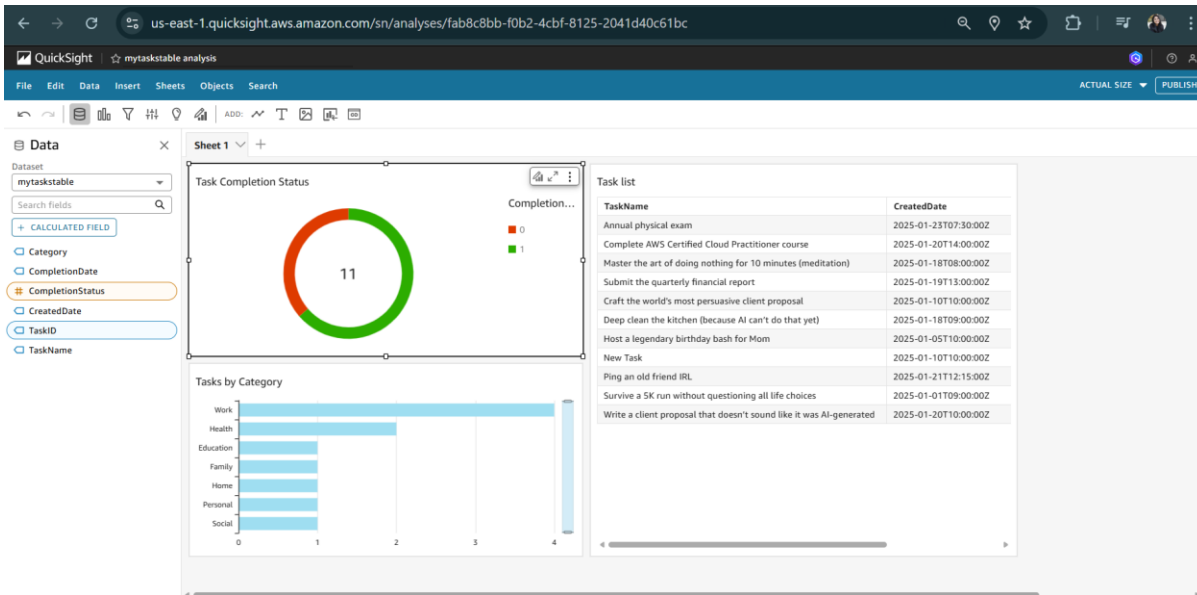
The bottom screenshot shows the 'IAM' console, specifically the 'Edit policy' page for the 'aws-quicksight-service-role-v0' role. The page title is 'Modify permissions in quicksight-s3-spill'. The policy editor is in 'JSON' mode, showing a policy with a single statement that allows 's3:ListBucket' and 's3:GetObject' actions on the resource 'arn:aws:s3:::athena-spill-location1983'. The right sidebar shows the 'Edit statement' section with a 'Select a statement' button and an 'Add new statement' button.

```
1 {
2   "Version": "2012-10-17",
3   "Statement": [
4     {
5       "Effect": "Allow",
6       "Action": [
7         "s3:ListBucket",
8         "s3:GetObject"
9       ],
10      "Resource": [
11        "arn:aws:s3:::athena-spill-location1983",
12        "arn:aws:s3:::athena-spill-location1983/*"
13      ]
14    }
15  ]
16 }
```



Step 9: Connect QuickSight to Athena

In QuickSight, connect to Athena using the Lambda connector and start building dashboards.



Project Summary

This project successfully integrates AWS DynamoDB with Athena for structured querying, stores results in S3, and visualizes the data in QuickSight. It demonstrates how AWS Glue, Lambda, IAM, and S3 can work together to enable analytics.