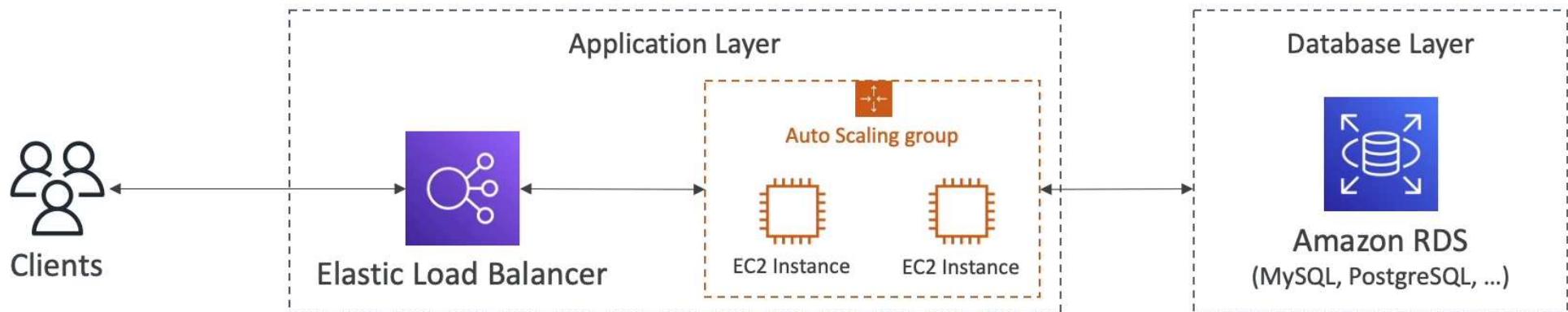


DynamoDB

NOSQL Serverless Database

Traditional Architecture



- Traditional applications leverage RDBMS databases
- These databases have the SQL query language
- Strong requirements about how the data should be modeled
- Ability to do query joins, aggregations, complex computations
- Vertical scaling (getting a more powerful CPU / RAM / IO)
- Horizontal scaling (increasing reading capability by adding EC2 / RDS Read Replicas)

NoSQL databases

- NoSQL databases are non-relational databases and are distributed
 - NoSQL databases include MongoDB, DynamoDB, ...
 - NoSQL databases do not support query joins (or just limited support)
 - All the data that is needed for a query is present in one row
 - NoSQL databases don't perform aggregations such as "SUM", "AVG", ...
 - NoSQL databases scale horizontally
-
- There's no "right or wrong" for NoSQL vs SQL, they just require to model the data differently and think about user queries differently

Amazon DynamoDB



- Fully managed, highly available with replication across multiple AZs
- NoSQL database - not a relational database
- Scales to massive workloads, distributed database
- Millions of requests per seconds, trillions of row, 100s of TB of storage
- Fast and consistent in performance (low latency on retrieval)
- Integrated with IAM for security, authorization and administration
- Enables event driven programming with DynamoDB Streams
- Low cost and auto-scaling capabilities
- Standard & Infrequent Access (IA) Table Class

DynamoDB - Basics

- DynamoDB is made of **Tables**
- Each table has a **Primary Key** (must be decided at creation time)
- Each table can have an infinite number of items (= rows)
- Each item has **attributes** (can be added over time – can be null)
- Maximum size of an item is **400KB**
- Data types supported are:
 - **Scalar Types** – String, Number, Binary, Boolean, Null
 - **Document Types** – List, Map
 - **Set Types** – String Set, Number Set, Binary Set

DynamoDB – Primary Keys

- Option I: Partition Key (HASH)

- Partition key must be unique for each item
- Partition key must be “diverse” so that the data is distributed
- Example: “User_ID” for a users table

Primary Key		Attributes		
Partition Key				
User_ID	First_Name	Last_Name	Age	
7791a3d6-...	John	William	46	
873e0634-...	Oliver		24	
a80f73a1-...	Katie	Lucas	31	

DynamoDB – Primary Keys

- Option 2: Partition Key + Sort Key (HASH + RANGE)
 - The combination must be unique for each item
 - Data is grouped by partition key
 - Example: users-games table, “User_ID” for Partition Key and “Game_ID” for Sort Key

Primary Key		Attributes	
Partition Key	Sort Key	Score	Result
User_ID	Game_ID	Score	Result
7791a3d6-...	4421	92	Win
Same partition key Different sort key	873e0634-...	1894	Lose
	873e0634-...	4521	Win

DynamoDB – Partition Keys (Exercise)

- We're building a movie database
- What is the best Partition Key to maximize data distribution?
 - movie_id
 - producer_name
 - leader_actor_name
 - movie_language

Terminology Comparison with SQK

SQL / RDBMS	DynamoDB
Tables	Tables
Rows	Items
Columns	Attributes
Primary Keys - Multicolumn and Optional	Primary Keys – Mandatory, Minimum One and Maximum Two attributes
Indexes	Local Secondary Indexes
Views	Global Secondary Indexes

AWS Management Console eu-west-1.console.aws.amazon.com/console/home?region=eu-west-1

Services dynamodb

Ireland AdministratorAccess/stephane

Search results for 'dynamodb'

Services (1)

Features (5)

Blogs (432)

>Loading

>Loading

>Loading

>Loading

DynamoDB ☆ Managed NoSQL Database

See all 5 results ▶

Tables

DynamoDB feature

Backups

DynamoDB feature

Preferences

DynamoDB feature

Reserved capacity

DynamoDB feature

Dashboard | Amazon DynamoDB + eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dashboard

aws Services Search for services, features, blogs, docs, and more [Option+S] Paused Update

Ireland AdministratorAccess/stephane

DynamoDB

Dashboard

Tables

- Update settings
- Explore items
- PartiQL editor [New](#)
- Backups
- Exports to S3
- Reserved capacity

DAX

- Clusters
- Subnet groups
- Parameter groups
- Events

Tell us what you think

Return to the previous console

Feedback

DynamoDB > Dashboard

Dashboard

Alarms (0)

Manage in CloudWatch [\[CloudWatch Metrics\]](#)

Find alarms

Alarm name [\[Edit\]](#) Status

No custom alarms

DAX clusters (0)

[View details](#)

Find clusters

Cluster name [\[Edit\]](#) Status

Create resources

Create an Amazon DynamoDB table for fast and predictable database performance at any scale. [Learn more](#) [\[CloudWatch Metrics\]](#)

[Create table](#)

Amazon DynamoDB Accelerator (DAX) is a fully-managed, highly-available, in-memory caching service for DynamoDB. [Learn more](#) [\[CloudWatch Metrics\]](#)

[Create DAX cluster](#)

What's new

© 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences [\[CloudWatch Metrics\]](#)

Create table | Amazon DynamoDB + eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

aws Services Search for services, features, blogs, docs, and more [Option+S] Ireland AdministratorAccess/stephane

Provisioned capacity units
2

Secondary indexes

Name	Type	Partition key	Sort key	Projected attributes
No indexes Use secondary indexes to perform queries on attributes that are not part of your table's primary key.				

Estimated cost

Based on your settings, below is the total estimated cost of provisioned read and write capacity for your table and indexes. To learn more, see [Amazon DynamoDB pricing](#) for provisioned capacity.

Total read capacity units 2	Total write capacity units 2	Region eu-west-1	Estimated cost \$1.32 / month
--------------------------------	---------------------------------	---------------------	----------------------------------

List tables | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#tables

Services ▾

aws stephane-aws Ireland Support

DynamoDB X

Search for services, features, marketplace products, and docs [Option+S]

The Users table was created successfully.

DynamoDB > Tables

Tables (1) Info

Find tables by table name Any table tag

C Actions Delete Create table

< 1 > ⚙

	Name ▲	Status	Partition key	Sort key	Indexes	Read capacity mode	Write capacity mode
<input type="checkbox"/>	Users	Active	user_id (String)	-	0	Provisioned (2)	Provisioned (2)

Dashboard

Tables

Items New

PartiQL editor New

Backups

Exports to S3 New

Reserved capacity

DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

Feedback English (US) ▾

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=Users&initialTableGroup=%23all

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Tables > Users

Tables (1) C X

Tag: Any table tag

Find tables by name

< 1 > ⚙️

Users

Actions ▾ View items

Overview Indexes Monitor Global tables Backups Exports and streams Ac >

General information

Partition key user_id (String)	Sort key -	Capacity mode Provisioned	Table status Active No active alarms
Indexes 0 globals, 0 locals	DynamoDB stream Disabled	Point-in-time recovery (PITR) Disabled	Time to Live (TTL) Info Disabled
Replication Regions 0 Regions	Encryption Owned by Amazon	Date created September 16, 2021, 08:12:13 (UTC+01:00)	
Amazon Resource Name (ARN)			

Items | Amazon DynamoDB Man X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=Users&autoScanAttribute

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

Find tables by name < 1 > ⚙️

Users

▶ Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (1)

Actions ▾ Create item

Find items < 1 > ⚙️ ✎

	user_id	first_name	last_name
<input type="checkbox"/>	john123	John	Doe

The screenshot shows the AWS DynamoDB Item Explorer interface. On the left, there's a sidebar with a search bar and a 'Find tables by name' input field. Below it, a list of tables is shown, with 'Users' selected. The main area displays a table with one item. The table has columns: user_id, first_name, and last_name. The item in the table is: user_id: john123, first_name: John, last_name: Doe. There are buttons for 'Run' and 'Reset' under the filters section. Below the table, a message indicates 'Completed' with 'Read capacity units consumed: 0.5'. At the bottom, there are 'Actions' and 'Create item' buttons, along with a search bar and navigation controls.

Edit item | Amazon DynamoDB | X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#edit-item?table=Users&ref=%23item-explorer%3Ftable%3DUsers&route=ROUTE_ITEM_EXPLORER&itemMode=1

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws ▾ Ireland ▾ Support ▾

✓ The item has been saved successfully.

DynamoDB > Items: Users > Item editor

Create item

Form JSON

Attributes		
Attribute name	Value	Type
user_id - Partition key	john123	String
first_name	Johnny	String

Add new attribute ▼ Remove

✖ The conditional request failed

Cancel Create item

This screenshot shows the AWS DynamoDB Item Editor interface. At the top, a green banner indicates 'The item has been saved successfully.' Below this, the navigation path is 'DynamoDB > Items: Users > Item editor'. The main section is titled 'Create item' with tabs for 'Form' and 'JSON'. Under 'Attributes', there are two items: 'user_id - Partition key' with value 'john123' (Type: String) and 'first_name' with value 'Johnny' (Type: String). A 'Remove' button is available for the second row. A 'Add new attribute' button is at the bottom left. A red-bordered error message '✖ The conditional request failed' is displayed below the table. At the bottom right are 'Cancel' and 'Create item' buttons. The footer includes links for Feedback, English (US), Privacy Policy, Terms of Use, and Cookie preferences.

Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

☰ The item has been saved successfully. X i

DynamoDB > Tables > Create table

Create table

Table details Info

DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table.

Table name
This will be used to identify your table.
 Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.)

Partition key
The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.
 String ▾
1 to 255 characters and case sensitive.

Sort key - optional
You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=UserPosts&initialTableGroup=%23all

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

DynamoDB > Tables > UserPosts

Tables (2) Actions ▾ View items

Tag Any table tag Find tables by name

UserPosts < 1 > 🔍

UserPosts (selected) Users

UserPosts

Overview Indexes Monitor Global tables Backups Exports and streams Ac >

General information

Partition key user_id (String)	Sort key post_ts (String)	Capacity mode Provisioned	Table status Active No active alarms
Indexes 0 globals, 0 locals	DynamoDB stream Disabled	Point-in-time recovery (PITR) Disabled	Time to Live (TTL) Info Disabled
Replication Regions 0 Regions	Encryption Owned by Amazon	Date created September 16, 2021, 08:16:36 (UTC+01:00)	
Amazon Resource Name (ARN)			

Edit item | Amazon DynamoDB | X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#edit-item?table=UserPosts&ref=%23Item_explorer%3Ftable%3DUserPosts&route=ROUTE_ITEM_EXPLORER&itemMode=1

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Items: UserPosts > Item editor

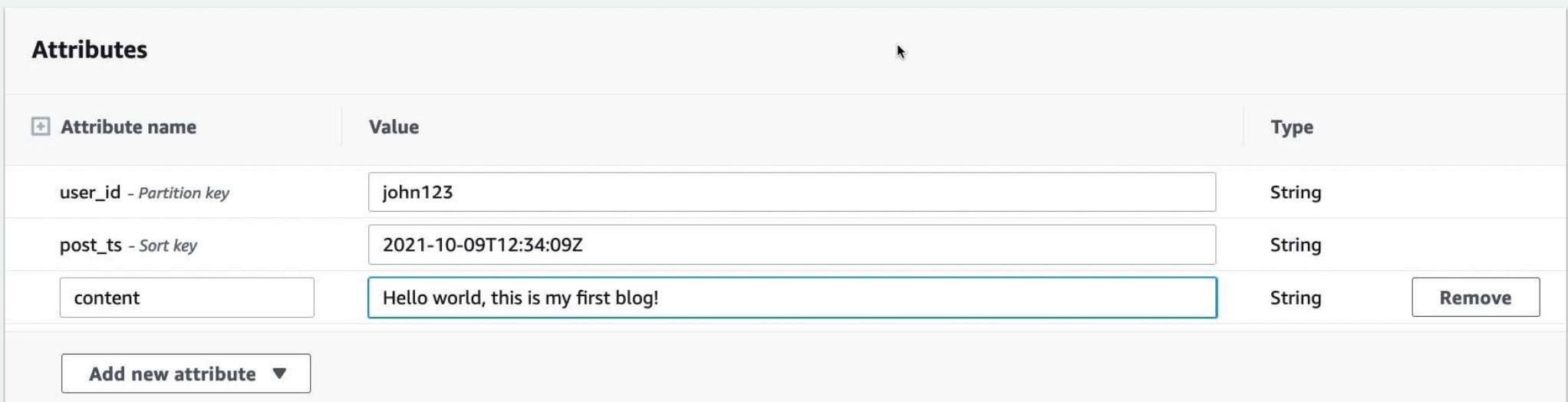
Create item

Form JSON

Attributes		
Attribute name	Value	Type
user_id - Partition key	john123	String
post_ts - Sort key	2021-10-09T12:34:09Z	String
content	Hello world, this is my first blog!	String

Add new attribute ▼

Cancel Create item



Items | Amazon DynamoDB Man X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=UserPosts&autoScanAttribute

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

Tag Any table tag Find tables by name < 1 > 🔍

UserPosts (selected) Users

Scan Query Table or index UserPosts Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (1)

Actions Create item Find items < 1 > 🔍

	user_id	post_ts	content
<input type="checkbox"/>	john123	2021-10-0...	Hello world, this is my first blog!

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Edit item | Amazon DynamoDB | X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#edit-item?table=UserPosts&ref=%23Item_explorer%3Ftable%3DUserPosts&route=ROUTE_ITEM_EXPLORER&itemMode=1

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

✓ The item has been saved successfully.

DynamoDB > Items: UserPosts > Item editor

Create item

Form JSON

Attributes		
Attribute name	Value	Type
user_id - Partition key	john123	String
post_ts - Sort key	2021-11-04T14:53:00Z	String
content	Second post yay!	String

Add new attribute ▼

Cancel Create item

The screenshot shows the AWS DynamoDB Item Editor interface. At the top, there's a success message: "The item has been saved successfully." Below this, the navigation path is "DynamoDB > Items: UserPosts > Item editor". The main title is "Create item" with "Form" and "JSON" tabs. The "Attributes" section contains a table with three rows. The first row is the header: "Attribute name", "Value", and "Type". The second row has "user_id - Partition key" as the attribute name, "john123" as the value, and "String" as the type. The third row has "post_ts - Sort key" as the attribute name, "2021-11-04T14:53:00Z" as the value, and "String" as the type. The fourth row has "content" as the attribute name, "Second post yay!" as the value, and "String" as the type. There is also a "Remove" button next to the "content" row. At the bottom, there are "Cancel" and "Create item" buttons. The "Create item" button is highlighted with an orange background and white text.

DynamoDB in Big Data

- Common use cases include:
 - Mobile apps
 - Gaming
 - Digital ad serving
 - Live voting
 - Audience interaction for live events
 - Sensor networks
 - Log ingestion
 - Access control for web-based content
 - Metadata storage for Amazon S3 objects
 - E-commerce shopping carts
 - Web session management

DynamoDB – Read/Write Capacity Modes

- Control how you manage your table's capacity (read/write throughput)
- Provisioned Mode (default)
 - You specify the number of reads/writes per second
 - You need to plan capacity beforehand
 - Pay for provisioned read & write capacity units
- On-Demand Mode
 - Read/writes automatically scale up/down with your workloads
 - No capacity planning needed
 - Pay for what you use, more expensive (\$\$\$)
- You can switch between different modes once every 24 hours

R/W Capacity Modes – Provisioned

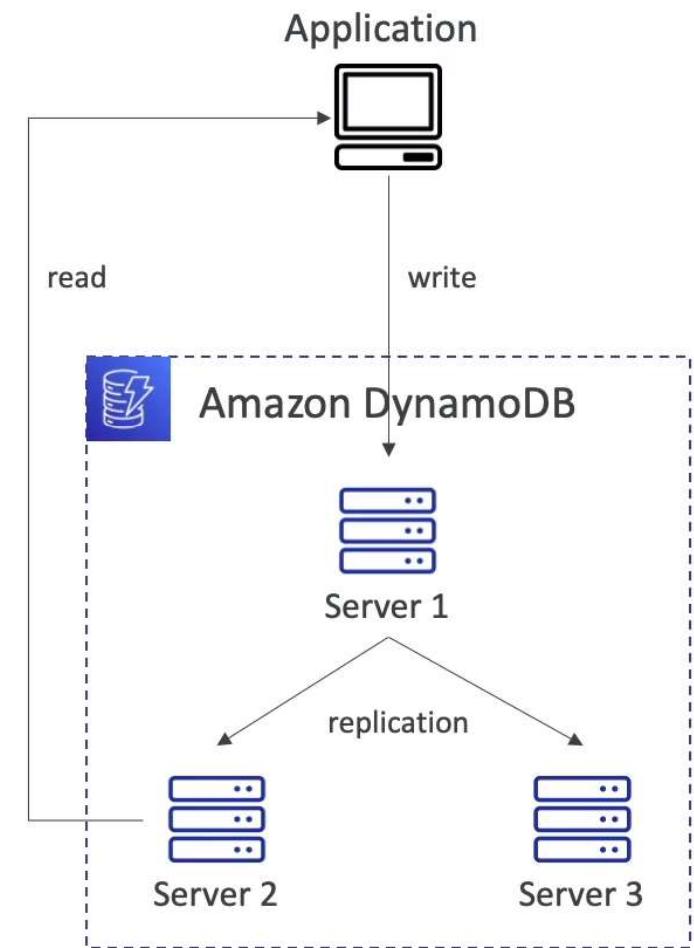
- Table must have provisioned read and write capacity units
- Read Capacity Units (RCU) – throughput for reads
- Write Capacity Units (WCU) – throughput for writes
- Option to setup [auto-scaling](#) of throughput to meet demand
- Throughput can be exceeded temporarily using “Burst Capacity”
- If Burst Capacity has been consumed, you’ll get a “ProvisionedThroughputExceededException”
- It’s then advised to do an [exponential backoff](#) retry

DynamoDB – Write Capacity Units (WCUs)

- One Write Capacity Unit (WCU) represents one write per second for an item up to 1 KB in size
- If the items are larger than 1 KB, more WCUs are consumed
- Example 1: we write 10 items per second, with item size 2 KB
 - We need $10 * \left(\frac{2 \text{ KB}}{1 \text{ KB}}\right) = 20 \text{ WCUs}$
- Example 2: we write 6 items per second, with item size 4.5 KB
 - We need $6 * \left(\frac{5 \text{ KB}}{1 \text{ KB}}\right) = 30 \text{ WCUs}$ (4.5 gets rounded to the upper KB)
- Example 3: we write 120 items per minute, with item size 2 KB
 - We need $\left(\frac{120}{60}\right) * \left(\frac{2 \text{ KB}}{1 \text{ KB}}\right) = 4 \text{ WCUs}$

Strongly Consistent Read vs. Eventually Consistent Read

- Eventually Consistent Read (default)
 - If we read just after a write, it's possible we'll get some stale data because of replication
- Strongly Consistent Read
 - If we read just after a write, we will get the correct data
 - Set "ConsistentRead" parameter to True in API calls (GetItem, BatchGetItem, Query, Scan)
 - Consumes twice the RCU

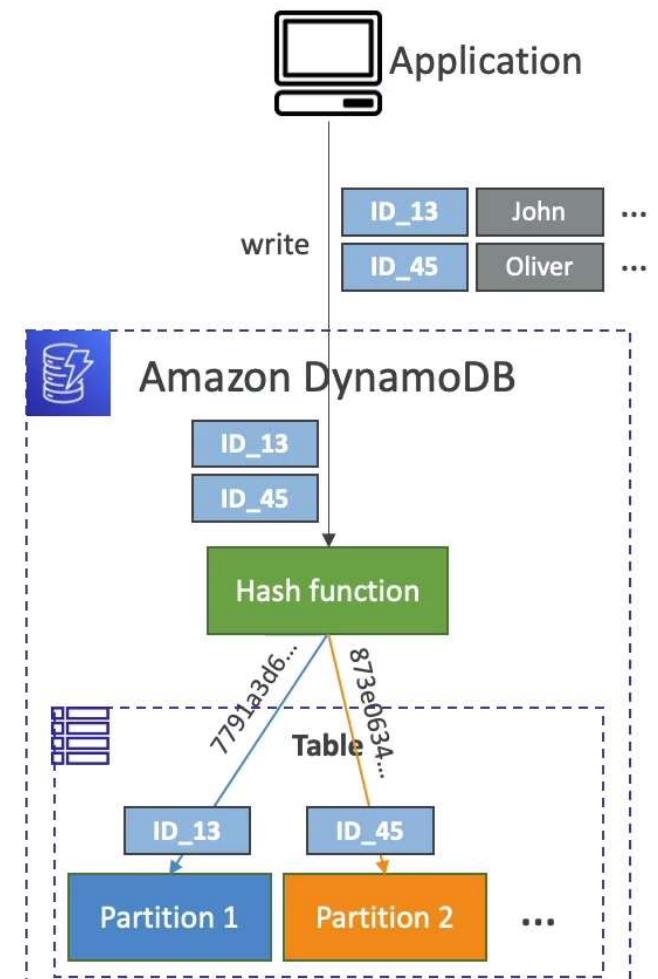


DynamoDB – Read Capacity Units (RCU)

- One *Read Capacity Unit (RCU)* represents one Strongly Consistent Read per second, or two Eventually Consistent Reads per second, for an item up to 4 KB in size
- If the items are larger than 4 KB, more RCUs are consumed
- Example 1: 10 Strongly Consistent Reads per second, with item size 4 KB
 - We need $10 * \left(\frac{4\ KB}{4\ KB}\right) = 10\ RCUs$
- Example 2: 16 Eventually Consistent Reads per second, with item size 12 KB
 - We need $\left(\frac{16}{2}\right) * \left(\frac{12\ KB}{4\ KB}\right) = 24\ RCUs$
- Example 3: 10 Strongly Consistent Reads per second, with item size 6 KB
 - We need $10 * \left(\frac{8\ KB}{4\ KB}\right) = 20\ RCUs$ (we must round up 6 KB to 8 KB)

DynamoDB – Partitions Internal

- Data is stored in partitions
- Partition Keys go through a hashing algorithm to know to which partition they go to
- To compute the number of partitions:
 - $\# \text{ of partitions}_{\text{by capacity}} = \left(\frac{\text{RCUs}_{\text{Total}}}{3000} \right) + \left(\frac{\text{WCUs}_{\text{Total}}}{1000} \right)$
 - $\# \text{ of partitions}_{\text{by size}} = \frac{\text{Total Size}}{10 \text{ GB}}$
 - $\# \text{ of partitions} = \text{ceil}(\max(\# \text{ of partitions}_{\text{by capacity}}, \# \text{ of partitions}_{\text{by size}}))$
- WCUs and RCUs are spread evenly across partitions



DynamoDB – Throttling

- If we exceed provisioned RCUs or WCUs, we get “ProvisionedThroughputExceededException”
- Reasons:
 - Hot Keys – one partition key is being read too many times (e.g., popular item)
 - Hot Partitions
 - Very large items, remember RCU and WCU depends on size of items
- Solutions:
 - Exponential backoff when exception is encountered (already in SDK)
 - Distribute partition keys as much as possible
 - If RCU issue, we can use DynamoDB Accelerator (DAX)

R/W Capacity Modes – On-Demand

- Read/writes automatically scale up/down with your workloads
- No capacity planning needed (WCU / RCU)
- Unlimited WCU & RCU, no throttle, more expensive
- You're charged for reads/writes that you use in terms of RRU and WRU
- Read Request Units (RRU) – throughput for reads (same as RCU)
- Write Request Units (WRU) – throughput for writes (same as WCU)
- 2.5x more expensive than provisioned capacity (use with care)
- Use cases: unknown workloads, unpredictable application traffic, ...

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=Users&tab=overview

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Tables > Users

Tables (2) C X

Tag: Any table tag

Find tables by name

< 1 > ⚙

UserPosts

Users (selected)

Users

Actions ▾ View items

Overview Indexes Monitor Global tables Backups Exports and streams Ac >

General information

Partition key user_id (String)	Sort key -	Capacity mode Provisioned	Table status Active ⓘ No active alarms
Indexes 0 globals, 0 locals	DynamoDB stream Disabled	Point-in-time recovery (PITR) Disabled	Time to Live (TTL) ⓘ Disabled
Replication Regions 0 Regions	Encryption Owned by Amazon	Date created September 16, 2021, 08:12:13 (UTC+01:00)	
Amazon Resource Name (ARN)			

Feedback English (US) ⓘ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=Users&tab=settings

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Tables > Users

Tables (2)

Tag: Any table tag

Find tables by name

< 1 >

UserPosts (radio button)

Users (radio button, selected)

Users

Actions ▾ View items

< Indexes Monitor Global tables Backups Exports and streams Additional settings >

Read/write capacity

The read/write capacity mode controls how you are charged for read and write throughput and how you manage capacity.

Edit

Capacity mode: Provisioned

Table capacity

Read capacity auto scaling: Off	Write capacity auto scaling: Off
Provisioned read capacity units: 2	Provisioned write capacity units: 2

Estimated cost

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

Edit read/write capacity | Amazon X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#capacity-settings?table=Users

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

On-demand Simplify billing by paying for the actual reads and writes your application performs.

Provisioned Manage and optimize your costs by allocating read/write capacity in advance.

▼ Capacity calculator

Average item size (KB) 6

Item read/second 3

Item write/second 2

Read consistency

- Eventually consistent
- Eventually consistent
- Strongly consistent
- Transactional

Read capacity units 3 Write capacity units 12 Region eu-west-1 Estimated cost US\$6.90 / month

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

Edit read/write capacity | Amazon X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#capacity-settings?table=Users

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

Table capacity

Read capacity

Auto scaling [Info](#)
Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On
 Off

Provisioned capacity units

2

Write capacity

Auto scaling [Info](#)
Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On
 Off

Provisioned capacity units

2

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

Edit read/write capacity | Amazon X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#capacity-settings?table=Users

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

Table capacity

Read capacity

Auto scaling [Info](#)
Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On
 Off

Minimum capacity units	Maximum capacity units	Target utilization (%)
1	100	70

Write capacity

Auto scaling [Info](#)
Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On
 Off

Minimum capacity units	Maximum capacity units	Target utilization (%)
1	10	70

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

Edit read/write capacity | Amazon X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#capacity-settings?table=Users

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On
 Off

Minimum capacity units Maximum capacity units Target utilization (%)

1 3 70

Estimated cost

Based on your settings, below is the total estimated cost of provisioned read and write capacity for your table and indexes. To learn more, see [Amazon DynamoDB pricing](#) for provisioned capacity.

Total read capacity units	Total write capacity units	Region	Estimated cost
5	2	eu-west-1	US\$1.65 / month

By enabling auto scaling, you authorize DynamoDB to scale capacity by using the DynamoDB auto scaling service-linked role: AWSServiceRoleForApplicationAutoScaling_DynamoDBTable.

Cancel Save changes

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

[View table](#) | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=Users&tab=settings

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

Users

Table capacity

Read capacity auto scaling	On	Write capacity auto scaling	On
Provisioned read capacity units	2	Provisioned write capacity units	2
Provisioned range for reads	1 - 3	Provisioned range for writes	1 - 3
Target read capacity utilization	70%	Target write capacity utilization	70%

▶ Estimated cost

Auto scaling activities (2)

Recent events of automatic scaling. [Learn more](#)

Find events

Start time	End time	Target	Des
September 16, 2021, 08:45:20 (UTC+01:00)	September 16, 2021, 08:45:55 (UTC+01:00)	table/Users	Sett

DynamoDB – Writing Data

- **PutItem**
 - Creates a new item or fully replace an old item (same Primary Key)
 - Consumes WCUs
- **UpdateItem**

DynamoDB – Reading Data

- **GetItem**
 - Read based on Primary key
 - Primary Key can be HASH or HASH+RANGE
 - Eventually Consistent Read (default)

DynamoDB – Reading Data (Query)

- Query returns items based on:
 - KeyConditionExpression
 - Partition Key value (must be = operator) – required
 - Sort Key value (=, <, <=, >, >=, Between, Begins with) – optional
 - FilterExpression
 - Additional filtering after the Query operation (before data returned to you)
 - Use only with non-key attributes (does not allow HASH or RANGE attributes)
- Returns:
 - The number of items specified in Limit
 - Or up to 1 MB of data
- Ability to do pagination on the results
- Can query table, a Local Secondary Index, or a Global Secondary Index

DynamoDB – Reading Data (Scan)

- Scan the entire table and then filter out data (inefficient)
- Returns up to 1 MB of data – use pagination to keep on reading
- Consumes a lot of RCU
- Limit impact using `Limit` or reduce the size of the result and pause
- For faster performance, use **Parallel Scan**
 - Multiple workers scan multiple data segments at the same time
 - Increases the throughput and RCU consumed
 - Limit the impact of parallel scans just like you would for Scans
- Can use `ProjectionExpression` & `FilterExpression` (no changes to RCU)

DynamoDB – Deleting Data

- **DeleteItem**
 - Delete an individual item
 - Ability to perform a conditional delete
- **DeleteTable**
 - Delete a whole table and all its items
 - Much quicker deletion than calling **DeleteItem** on all items

DynamoDB – Batch Operations

- Allows you to save in latency by reducing the number of API calls
- Operations are done in parallel for better efficiency
- Part of a batch can fail; in which case we need to try again for the failed items
- **BatchWriteItem**
 - Up to 25 PutItem and/or DeleteItem in one call
 - Up to 16 MB of data written, up to 400 KB of data per item
 - Can't update items (use UpdateItem)
 - UnprocessedItems for failed write operations (exponential backoff or add WCU)
- **BatchGetItem**
 - Return items from one or more tables
 - Up to 100 items, up to 16 MB of data
 - Items are retrieved in parallel to minimize latency
 - UnprocessedKeys for failed read operations (exponential backoff or add RCU)

DynamoDB – PartiQL

- SQL-compatible query language for DynamoDB
- Allows you to select, insert, update, and delete data in DynamoDB using SQL
- Run queries across multiple DynamoDB tables
- Run PartiQL queries from:
 - AWS Management Console
 - NoSQL Workbench for DynamoDB
 - DynamoDB APIs
 - AWS CLI
 - AWS SDK

```
SELECT OrderID, Total  
FROM Orders  
WHERE OrderID IN [1, 2, 3]  
ORDER BY OrderID DESC
```

DynamoDB – Local Secondary Index (LSI)

- Alternative Sort Key for your table (same Partition Key as that of base table)
- The Sort Key consists of one scalar attribute (String, Number, or Binary)
- Up to 5 Local Secondary Indexes per table
- Must be defined at table creation time
- Attribute Projections – can contain some or all the attributes of the base table (KEYS_ONLY, INCLUDE, ALL)

Primary Key		Attributes		
Partition Key	Sort Key	LSI	Score	Result
User_ID	Game_ID	Game_TS	92	Win
7791a3d6-...	4421	"2021-03-15T17:43:08"		Lose
873e0634-...	4521	"2021-06-20T19:02:32"		
a80f73a1-...	1894	"2021-02-11T04:11:31"	77	Win

DynamoDB – Global Secondary Index (GSI)

- Alternative Primary Key (HASH or HASH+RANGE) from the base table
- Speed up queries on non-key attributes
- The Index Key consists of scalar attributes (String, Number, or Binary)
- Attribute Projections – some or all the attributes of the base table (KEYS_ONLY, INCLUDE, ALL)
- Must provision RCUs & WCUs for the index
- Can be added/modified after table creation

Partition Key	Sort Key	Attributes
User_ID	Game_ID	Game_TS
7791a3d6-...	4421	"2021-03-15T17:43:08"
873e0634-...	4521	"2021-06-20T19:02:32"
a80f73a1-...	1894	"2021-02-11T04:11:31"

TABLE (query by “User_ID”)

Partition Key	Sort Key	Attributes
Game_ID	Game_TS	User_ID
4421	"2021-03-15T17:43:08"	7791a3d6-...
4521	"2021-06-20T19:02:32"	873e0634-...
1894	"2021-02-11T04:11:31"	a80f73a1-...

INDEX GSI (query by “Game_ID”)

DynamoDB – Indexes and Throttling

- Global Secondary Index (GSI):
 - If the writes are throttled on the GSI, then the main table will be throttled!
 - Even if the WCU on the main tables are fine
 - Choose your GSI partition key carefully!
 - Assign your WCU capacity carefully!
- Local Secondary Index (LSI):
 - Uses the WCUs and RCUs of the main table
 - No special throttling considerations

List tables | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#tables

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB X

Dashboard

Tables

Items New

PartiQL editor New

Backups

Exports to S3 New

Reserved capacity

▼ DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

DynamoDB > Tables

Tables (2) Info

Actions ▾ Delete Create table

Find tables by table name Any table tag

<input type="checkbox"/>	Name ▲	Status	Partition key	Sort key	Indexes	Read capacity mode
<input type="checkbox"/>	UserPosts	✓ Active	user_id (String)	post_ts (String)	0	Provisioned (2)
<input type="checkbox"/>	Users	✓ Active	user_id (String)	-	0	Provisioned with auto scaling (1)

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB X

Dashboard

Tables

Items [New](#)

PartiQL editor [New](#)

Backups

Exports to S3 [New](#)

Reserved capacity

DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

DynamoDB > Tables > Create table

Create table

Table details Info

DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table.

Table name

This will be used to identify your table.

Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.)

Partition key

The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.

String ▾

1 to 255 characters and case sensitive.

Sort key - optional

You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.

String ▾

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. [Privacy Policy](#) [Terms of Use](#) [Cookie preferences](#)

Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

DynamoDB Services

Dashboard Tables

Items [New](#) Partition editor [New](#) Backups Exports to S3 [New](#) Reserved capacity

DAX Clusters Subnet groups Parameter groups Events

Tell us what you think Return to the previous console

Table name This will be used to identify your table. Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.).

Partition key The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.

String 1 to 255 characters and case sensitive.

Sort key - optional You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.

String 1 to 255 characters and case sensitive.

Settings

Default settings The fastest way to create your table. You can modify these settings now or after your table has been created.

Customize settings Use these advanced features to make DynamoDB work better for your needs.

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

DynamoDB Services Ireland Support

Dashboard Tables Items New PartiQL editor New Backups Exports to S3 New Reserved capacity

DAX Clusters Subnet groups Parameter groups Events

Sort key Data type

game_id String

1 to 255 characters.

Index name

game_id-index

Between 3 and 255 characters. Only A-Z, a-z, 0-9, underscore characters, hyphens, and periods allowed.

Attribute projections

A projection is the set of attributes that is copied from a table into a secondary index.

All All of the table attributes are projected into the index.

Only keys Only the index and primary keys are projected into the index.

Include All attributes described in "Only keys" and other non-key attributes that you specify.

Attribute name

Enter attribute name

Add a new attribute

Tell us what you think

Cancel Create index

Return to the previous console

Encryption at rest

Feedback English (US) © 2008 – 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

DynamoDB

Dashboard

Tables

Items New

PartiQL editor New

Backups

Exports to S3 New

Reserved capacity

DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

Feedback English (US) ▾

New global secondary index

Create global secondary indexes to query attributes outside the primary key of your original table. [Learn more](#)

Partition key

Enter the partition key name

Data type: String

1 to 255 characters.

Sort key - optional

Enter the sort key name

Data type: String

1 to 255 characters.

Index name

Type the index name

Between 3 and 255 characters. Only A-Z, a-z, 0-9, underscore characters, hyphens, and periods allowed.

Attribute projections

A projection is the set of attributes that is copied from a table into a secondary index.

All

All of the table attributes are projected into the index.

Only keys

Only the index and primary keys are projected into the index.

Include

All attributes described in "Only keys" and other non-key attributes that you specify.

Terms of Use

Cookie preferences

https://docs.aws.amazon.com/amazondynamodb/latest/developerguide/SecondaryIndexes.html

Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

DynamoDB

Dashboard

Tables

Items New

PartiQL editor New

Backups

Exports to S3 New

Reserved capacity

DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

Sort key - optional

Enter the sort key name

Data type

String

Index name

Type the index name

Between 3 and 255 characters. Only A-Z, a-z, 0-9, underscore characters, hyphens, and periods allowed.

Attribute projections

A projection is the set of attributes that is copied from a table into a secondary index.

All
All of the table attributes are projected into the index.

Only keys
Only the index and primary keys are projected into the index.

Include
All attributes described in "Only keys" and other non-key attributes that you specify.

ⓘ By default, the global secondary index's capacity is the same as your base table's capacity. You can change the index's capacity in the table's settings after you create the table.

Cancel Create index

aws Ireland Support

index

es

nd

and you

© 2008 – 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB

Dashboard

Tables

Items [New](#)

PartiQL editor [New](#)

Backups

Exports to S3 [New](#)

Reserved capacity

DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

Encryption at rest [Info](#)

All user data stored in Amazon DynamoDB is fully encrypted at rest. By default, Amazon DynamoDB manages the encryption key, and you are not charged any fee for using it.

Encryption key management

Owned by Amazon DynamoDB [Learn more](#) ⓘ
The key is owned and managed by DynamoDB. You are not charged an additional fee for using this customer master key (CMK).

AWS managed CMK [Learn more](#) ⓘ
The key is stored in your account and is managed by AWS Key Management Service (AWS KMS). AWS KMS charges apply.

Stored in your account, and owned and managed by you [Learn more](#) ⓘ
The key is stored in your account and is owned and managed by you. AWS KMS charges apply.

Tags

Tags are pairs of keys and optional values, that you can assign to AWS resources. You can use tags to control access to your resources or track your AWS spending.

No tags are associated with the resource.

Add new tag

You can add 50 more tags.

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Items | Amazon DynamoDB Man X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=demo_indexes&autoScanAttribute

Services ▾ [Option+S]

aws stephane-aws Ireland Support

Tables (3) demo_indexes

Tag Any table tag

Find tables by name

< 1 >

UserPosts

Users

demo_indexes

Table or index demo_indexes

user_id (Partition key) Enter partition key value

game_ts (Sort key) Equal to Enter sort key value Sort descending

▶ Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (0) Actions ▾ Create item

Find items < 1 >

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

Items | Amazon DynamoDB Man X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=demo_indexes&autoScanAttribute

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

Tables (5) demo_indexes

Tag Any table tag ▾

Find tables by name

< 1 > ⚙

UserPosts

Users

demo_indexes

Table or index

demo_indexes

Table

demo_indexes

Index

game_id-index

descending

Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (0)

Actions ▾ Create item

Find items

< 1 > ⚙ ✎

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Items | Amazon DynamoDB Man X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=demo_indexes&autoScanAttribute

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

Tables (5) demo_indexes

Tag Any table tag

Find tables by name

< 1 >

UserPosts

Users

demo_indexes

Scan Query

Table or index demo_indexes

user_id (Partition key) Enter partition key value

game_ts (Sort key) Equal to Enter sort key value Sort descending

▶ Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (0) Actions ▾ Create item

Find items < 1 >

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=demo_indexes

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

Tag Any table tag ▾

Find tables by name

< 1 > ⚙

UserPosts

Users

demo_indexes

Overview Indexes Monitor Global tables Backups Exports and streams Ac > ⓘ

General information

Partition key user_id (String)	Sort key game_ts (String)	Capacity mode Provisioned	Table status Active No active alarms
Indexes 0 globals, 1 locals	DynamoDB stream Disabled	Point-in-time recovery (PITR) Disabled	Time to Live (TTL) Info Disabled
Replication Regions 0 Regions	Encryption Owned by Amazon	Date created September 16, 2021, 09:21:48 (UTC+01:00)	
Amazon Resource Name (ARN) arn:aws:dynamodb:eu-west-1:211442049068:table/demo_indexes			

Items summary

Get live item count View items

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Read d2te40gozuauf2.cloudfront.net

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=demo_indexes&tab=indexes

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

DynamoDB > Tables > demo_indexes

Tables (3) Actions ▾ View items

Tag Any table tag Find tables by name < 1 > ⚙

UserPosts
Users
demo_indexes

demo_indexes

< Overview Indexes Monitor Global tables Backups Exports and streams Ac >

Global secondary indexes (0) Info

Delete Create index Find indexes < 1 > ⚙

Name	Status	Partition key	Sort key	Read capacity	Write capacity	Projected a
No global secondary indexes						
Global secondary indexes allow you to perform queries on attributes that are not part of the table's primary key.						
Create index						

Local secondary indexes (1) Info

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

Create index | Amazon DynamoDB

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-index?table=demo_indexes

Services ▾

Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

Index capacity Info

Read capacity

Read capacity settings

Copy from base table

Customize settings

Auto scaling Info

Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On

Off

Provisioned capacity units

1

Write capacity

Write capacity settings

Copy from base table

Customize settings

Create index | Amazon DynamoDB

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-index?table=demo_indexes

Services ▾ [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On
 Off

Provisioned capacity units

1

Write capacity

Write capacity settings

Copy from base table
 Customize settings

Auto scaling [Info](#)

Dynamically adjusts provisioned throughput capacity on your behalf in response to actual traffic patterns.

On
 Off

Provisioned capacity units

1

Estimated cost

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=demo_indexes&tab=indexes

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

DynamoDB > Tables > demo_indexes

demo_indexes

Actions View items

Overview Indexes Monitor Global tables Backups Exports and streams

Global secondary indexes (1) Info

Delete Create index

Find indexes

Name	Status	Partition key	Sort key	Read capacity
game_id-game_ts-index	Creating	game_id	game_ts	1 Auto scaling is off

Local secondary indexes (1) Info

Name	Partition key	Sort key	Projected attributes
game_id-index	user_id	game_id	All

Tables (3)

Tag Any table tag

Find tables by name

< 1 > Settings

UserPosts

Users

demo_indexes

Items | Amazon DynamoDB Man X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=demo_indexes&autoScanAttribute

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾ Autopreview

Items Info

Tables (3)

Tag: Any table tag

Find tables by name: game_id-index

UserPosts, Users, demo_indexes (selected)

Table or index: game_id-index

Table: demo_indexes

Index: game_id-index (selected), game_id-game_ts-index

Filters

Run, Reset

Completed: Read capacity units consumed: 0.5

View table details

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Items | Amazon DynamoDB Man X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=demo_indexes&autoScanAttribute

Services ▾ [Option+S]

aws stephane-aws Ireland Support

Tag: Any table tag

Find tables by name: game_id-game_ts-index

UserPosts

Users

demo_indexes

Scan Query

Table or index: game_id-game_ts-index

game_id (Partition key): Enter partition key value

game_ts (Sort key): Equal to Enter sort key value Sort descending

Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (0)

Actions Create item

Find items

< 1 > ⚙️ ✖️

DynamoDB - PartiQL

- Use a SQL-like syntax to manipulate DynamoDB tables



The screenshot shows a software interface for running PartiQL queries. At the top, there's a header with a green checkmark icon, the text "Query 1", and a "+" button. Below the header is a code editor area containing a single line of SQL-like code:

```
1 SELECT * FROM "demo_indexes" WHERE "user_id" = 'partitionKeyValue' AND  
    "game_ts" = 'sortKeyValue'
```

- Supports some (but not all) statements:
 - INSERT
 - UPDATE
 - SELECT
 - DELETE
- It supports Batch operations

List tables | Amazon DynamoDB +

eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#tables

aws Services Search for services, features, blogs, docs, and more [Option+S] Paused Update

Ireland AdministratorAccess/stephane

DynamoDB

Dashboard

Tables

- Update settings
- Explore items
- PartiQL editor New
- Backups
- Exports to S3
- Reserved capacity

DAX

- Clusters
- Subnet groups
- Parameter groups
- Events

Tell us what you think

[Return to the previous console](#)

Feedback

Tables (3) Info

Find tables by table name Any table tag < 1 > ⚙️

<input type="checkbox"/>	Name	Status	Partition key	Sort key	Indexes	Read capacity mode	Write capacity mode
<input type="checkbox"/>	demo_indexes	Active	user_id (S)	game_ts (S)	1	Provisioned (1)	Provisioned
<input type="checkbox"/>	UserPosts	Active	user_id (S)	post_id (S)	0	Provisioned (1)	Provisioned
<input type="checkbox"/>	Users	Active	user_id (S)	-	0	Provisioned (1)	Provisioned

© 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

List tables | Amazon DynamoDB | PartiQL editor | Amazon DynamoDB | View table | Amazon DynamoDB | View table | Amazon DynamoDB | View table | Amazon DynamoDB | +

eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?initialTagKey=&name=Users&tab=overview

Paused Update

DynamoDB Services Search for services, features, blogs, docs, and more [Option+S]

Ireland AdministratorAccess/stephane

DynamoDB

- Dashboard
- Tables
 - Update settings**
 - Explore items
- PartiQL editor [New](#)
- Backups
- Exports to S3
- Reserved capacity

DAX

- Clusters
- Subnet groups
- Parameter groups
- Events

Tell us what you think
[Return to the previous console](#)

Feedback

Waiting for eu-west-1.console.aws.amazon.com...

DynamoDB > Tables > Users

Tables (3)

- Any table tag
- Find tables by table name

< 1 >

- demo_indexes
- UserPosts
- Users**

Users

C Actions Explore table items

Overview Indexes Monitor Global tables Backup >

General information

Partition key	Sort key
user_id (String)	-
Capacity mode	Table status
Provisioned	<input checked="" type="checkbox"/> Active
	<input checked="" type="checkbox"/> No active alarms

▶ Additional info

Items summary

DynamoDB updates the following information approximately every six hours.

© 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

List tables | Amazon DynamoDB | PartiQL editor | Amazon DynamoDB | Items | Amazon DynamoDB Manager | View table | Amazon DynamoDB | View table | Amazon DynamoDB | + eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?initialTagKey=&maximize=true&table=Users Paused Update

DynamoDB Services Search for services, features, blogs, docs, and more [Option+S] Ireland AdministratorAccess/stephane

DynamoDB

- Dashboard
- Tables
- Update settings
- Explore items**
- PartiQL editor New
- Backups
- Exports to S3
- Reserved capacity

DAX

- Clusters
- Subnet groups
- Parameter groups
- Events

Tell us what you think
Return to the previous console
Feedback

DynamoDB > Items > Users

Tables (3)

- demo_indexes
- UserPosts
- Users**

Any table tag Find tables by table name

Users

Autopreview C Actions ▾ Create item

Update table settings

Scan/Query items

Scan Query

Table or index: Users

Filters

Run Reset

Completed Read capacity units consumed: 0.5

© 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

List tables | Amazon DynamoDB | PartiQL editor | Amazon DynamoDB | Items | Amazon DynamoDB | Items | Amazon DynamoDB | Items | Amazon DynamoDB | + eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#partiql-editor

aws Services Search for services, features, blogs, docs, and more [Option+S] Paused Update

DynamoDB > PartiQL editor

PartiQL editor

Operations performed using the PartiQL editor might incur charges. [Learn more](#)

Resources C X

Find tables

Tables (3) < 1 > ⚙️

- UserPosts
- Users
 - user_id ...
 - Partition key
- demo_indexes

Query 1 +

```
1 SELECT * FROM "Users"
```

Run Clear

List tables | Amazon DynamoDB | PartiQL editor | Amazon DynamoDB | Items | Amazon DynamoDB | Items | Amazon DynamoDB | Items | Amazon DynamoDB | +

eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#partiql-editor

aws Services Search for services, features, blogs, docs, and more [Option+S] Paused Update

Ireland AdministratorAccess/stephane

PartiQL editor

Operations performed using the PartiQL editor might incur charges. [Learn more](#)

Resources C X

Tables (3) < 1 > ⚙️

- UserPosts
- Users
- demo_indexes** ...
 - user_id** ...

Partition key
 - game_ts** ...

Sort key
 - game_id-game_ts-index** ...

Global secondary index

Query 1 +

```
1 SELECT * FROM "demo_indexes"
```

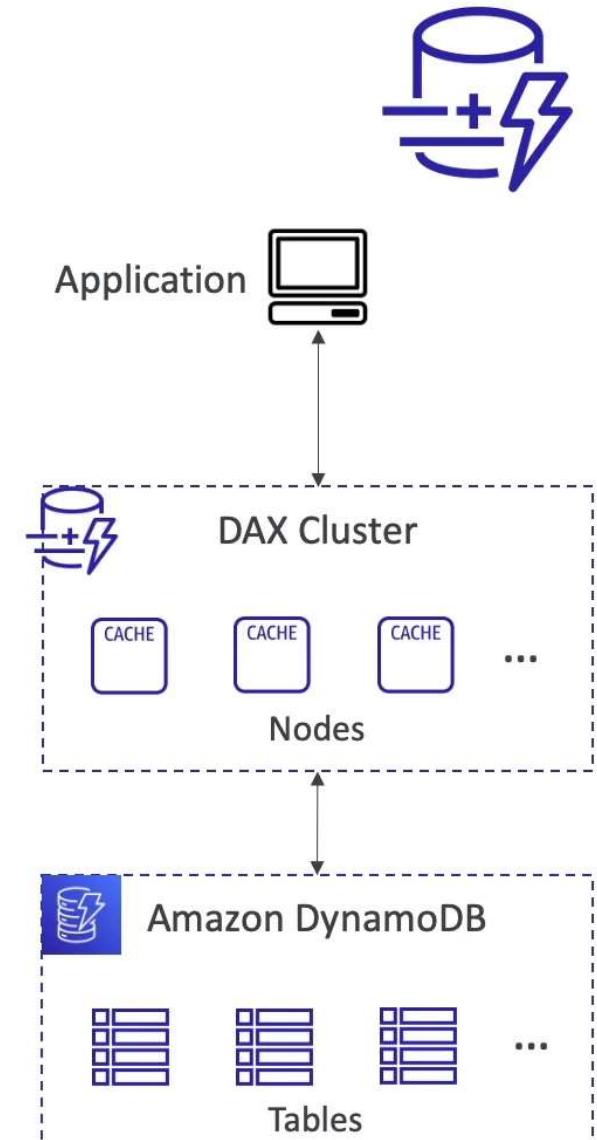
Run query

- Scan table
- Add to editor
- Query table
- Table name
- Set item
- Drop item

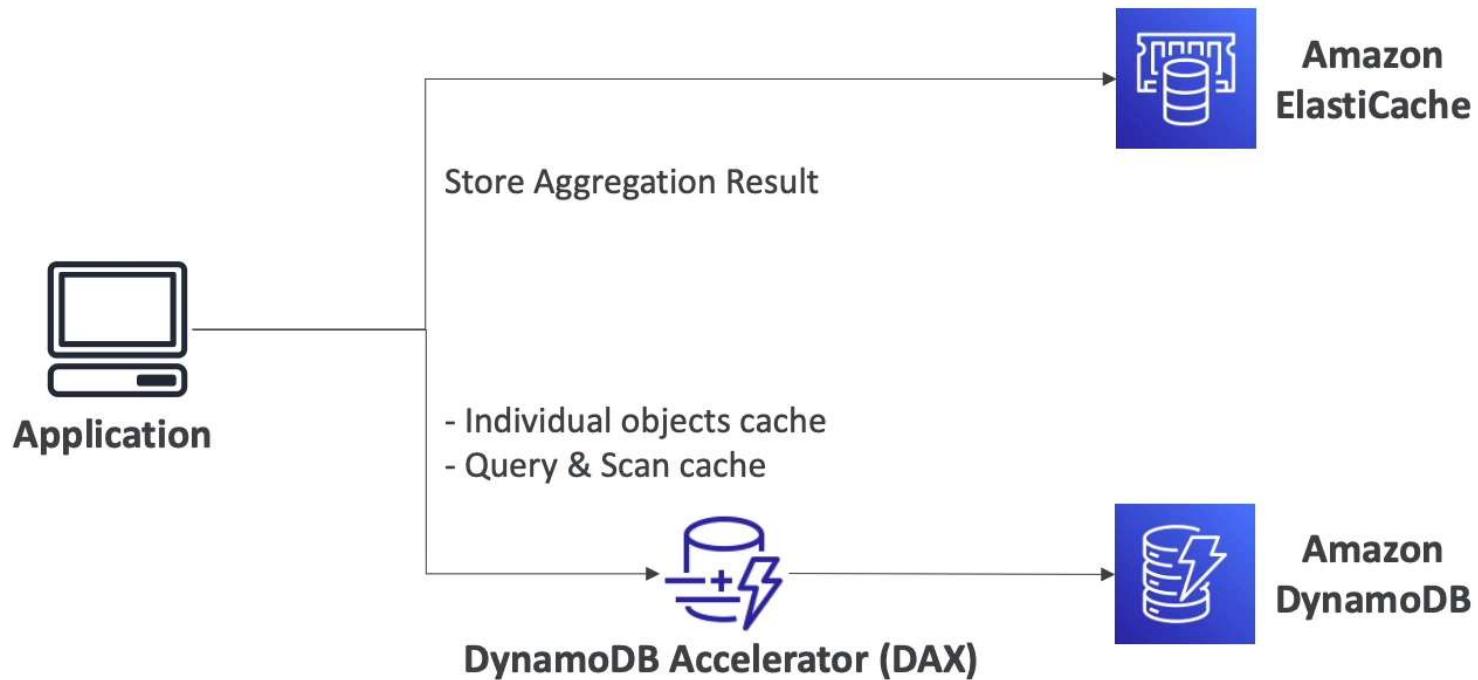
Feedback © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

DynamoDB Accelerator (DAX)

- Fully-managed, highly available, seamless in-memory cache for DynamoDB
- Microseconds latency for cached reads & queries
- Doesn't require application logic modification (compatible with existing DynamoDB APIs)
- Solves the "Hot Key" problem (too many reads)
- 5 minutes TTL for cache (default)
- Up to 10 nodes in the cluster
- Multi-AZ (3 nodes minimum recommended for production)
- Secure (Encryption at rest with KMS, VPC, IAM, CloudTrail, ...)



DynamoDB Accelerator (DAX) vs. ElastiCache



Service | Amazon DynamoDB M. X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#service

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB X

Database

Amazon DynamoDB

A fast and flexible NoSQL database service for any scale

DynamoDB is a fully managed, key-value, and document database that delivers single-digit-millisecond performance at any scale.

How it works

 What is Amazon DynamoDB? ⋮

Get started

Create a new table to start exploring DynamoDB.

Create table

Pricing

DynamoDB charges for reading, writing, and storing data in your DynamoDB tables, along with any optional features you choose to enable. DynamoDB has on-demand capacity mode and provisioned capacity mode, and these modes have

Dashboard

Tables

Items New

PartiQL editor New

Backups

Exports to S3 New

Reserved capacity

DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

Feedback English (US) ▾

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

DAX Clusters | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-clusters

Services ▾

aws

Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB X

Clusters (0)

View details Delete Create cluster

Find clusters

Cluster name Status Node type Nodes Availability Zones Endpoint

No clusters

No clusters to display

Create cluster

DAX

Clusters

Subnet groups Parameter groups Events

Tell us what you think

Return to the previous console

This screenshot shows the AWS DynamoDB DAX Clusters management interface. The left sidebar has sections for Dashboard, Tables, Items (with a 'New' link), PartiQL editor (with a 'New' link), Backups, Exports to S3 (with a 'New' link), Reserved capacity, and DAX (with sub-sections for Clusters, Subnet groups, Parameter groups, and Events). The main content area is titled 'Clusters (0)' and contains a search bar with placeholder 'Find clusters'. It has a header with columns: Cluster name, Status, Node type, Nodes, Availability Zones, and Endpoint. Below this, it says 'No clusters' and 'No clusters to display'. A large 'Create cluster' button is centered at the bottom. The top navigation bar includes the AWS logo, a search bar with placeholder 'Search for services, features, marketplace products, and docs [Option+S]', and user information like 'stephane-aws', 'Ireland', and 'Support'. The URL in the address bar is 'https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-clusters'.

Create DAX Cluster | Amazon DAX

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster-create

DynamoDB Services Search for services, features, marketplace products, and docs [Option+S]

stephane-aws Ireland Support

DAX > Clusters > Create Cluster

Step 1 Choose cluster nodes

Step 2 Configure networks

Step 3 Configure security

Step 4 - optional Verify advanced settings

Step 5 Review and create

Choose cluster nodes

Cluster name

Cluster name
Provide a meaningful name that uniquely identifies your DAX cluster.

DemoDA

Must be between 1 and 20 characters; begin with a letter; contain only ASCII letters, digits, and hyphens; and not end with a hyphen or contain two consecutive hyphens.

Cluster description - optional

Enter description

Maximum 255 characters.

Node families

Choose the type of nodes to run in your clusters. All nodes in each cluster must be of the same type. You cannot modify the node types for a running DAX cluster.

Tell us what you think

Return to the previous console

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

Create DAX Cluster | Amazon DAX

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster-create

DynamoDB

Dashboard

Tables

Items [New](#)

PartiQL editor [New](#)

Backups

Exports to S3 [New](#)

Reserved capacity

DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

Services ▾

Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

r-type family
Each node is allocated with fixed resources, for always-ready capacity.

Node types (1/23)

Find node types

< 1 2 3 4 5 > ⚙

Node type	vCPU	Memory (GiB)	Network performance
dax.r5.large	2	16.00	Moderate
dax.r5.xlarge	4	32.00	Moderate
dax.r5.2xlarge	8	64.00	High
dax.r5.4xlarge	16	128.00	High
dax.r5.8xlarge	32	256.00	10 Gigabit

Cluster size

Feedback English (US) ▾

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create DAX Cluster | Amazon DAX

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster-create

DynamoDB Services Search for services, features, marketplace products, and docs [Option+S]

stephane-aws Ireland Support

DAX > Clusters > Create Cluster

Step 1 Choose cluster nodes

Step 2 Configure networks

Step 3 Configure security

Step 4 - optional Verify advanced settings

Step 5 Review and create

Configure networks

Subnets

Subnet group
DAX will assign network addresses to your cluster nodes from the subnets included in this group. Subnets also determine the Availability Zones (AZs).

Choose existing
 Create new

New subnet group

Subnet group name
Enter subnet group name

Must be between 1 and 255 characters; begin with a letter; contain only ASCII letters, digits, and hyphens; and not end with a hyphen or contain two consecutive hyphens.

Subnet group description - optional
Enter subnet group description

Tell us what you think
Return to the previous console

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create DAX Cluster | Amazon DAX

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster-create

DynamoDB

Services ▾

Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

Dashboard

Tables

Items [New](#)

PartiQL editor [New](#)

Backups

Exports to S3 [New](#)

Reserved capacity

▼ DAX

Clusters

Subnet groups

Parameter groups

Events

Tell us what you think

Return to the previous console

Security Group

A security group acts as a firewall that controls network access to your DAX cluster.

default (vpc-586cce21) [View in EC2 console](#)

To access the DAX cluster from your application, you must enable inbound access on port 8111 for this security group, or port 9111 if encrypted in transit. For detailed instructions, see [Configure Security Group Inbound Rules](#)

Availability Zones (AZ)

AZ allocation

An Availability Zone is one or more discrete data centers with redundant power, networking, and connectivity in an AWS Region. Your cluster nodes can be deployed to several zones to increase the availability of your cluster.

Automatic
We will spread your nodes evenly across AZs for best availability.

Specify manually
Distribute your nodes over the AZs you choose.

Cancel Previous Next

Feedback English (US) ▾

© 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create DAX Cluster | Amazon DAX

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster-create

DynamoDB Services Search for services, features, marketplace products, and docs [Option+S]

stephane-aws Ireland Support

DAX > Clusters > Create Cluster

Step 1 Choose cluster nodes

Step 2 Configure networks

Step 3 Configure security

Step 4 - optional Verify advanced settings

Step 5 Review and create

Configure security

IAM permissions

IAM Service role for DynamoDB access

Choose the IAM service role that your cluster nodes will assume when accessing your DynamoDB tables. The policy on this role controls which tables they can access, and which operations they can run.

Choose existing

Create new

Create new IAM role

IAM role name

DAXtoDynamoDB

Use alphanumeric and +=,.@-_ characters. Maximum 64 characters.

Create policy

Create a new IAM policy and attach it to this IAM role.

IAM role policy

Choose policy permissions to attach to this role.

Tell us what you think

Return to the previous console

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create DAX Cluster | Amazon DAX

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster-create

DynamoDB Services Search for services, features, marketplace products, and docs [Option+S]

stephane-aws Ireland Support

DAX > Clusters > Create Cluster

Step 1 Choose cluster nodes

Step 2 Configure networks

Step 3 Configure security

Step 4 - optional Verify advanced settings

Step 5 Review and create

Verify advanced settings - *optional*

Parameter group

Parameter group Parameter groups are sets of configurations that apply to all the nodes in your cluster.

Choose existing
 Create new

default.dax1.0

Details of the chosen group

Group description	Item time-to-live (TTL)
Default parameter group for dax1.0	5 minutes
Query time-to-live (TTL)	5 minutes

Edit parameter group

Tell us what you think

Return to the previous console

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

View cluster | Amazon DynamoDB X DAX parameter groups | Amazon X + https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster?name=demodax Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

demodax

General information

Description - Status Available No active alarms

Cluster endpoint daxs://demodax.Oiwjft.dax-clusters.eu-west-1.amazonaws.com Amazon Resource Name (ARN) <arn:aws:dax:eu-west-1:211442049068:cache/demodax>

Nodes

Node type	vCPU per node	Memory per node
dax.t2.small	1	2 GiB

Nodes (1) C Reboot Delete Add nodes

Search nodes

This screenshot shows the AWS DynamoDB DAX Cluster configuration page for a cluster named 'demodax'. The top navigation bar includes links for 'View cluster' and 'DAX parameter groups'. The main content area has a search bar and navigation buttons. The 'General information' section displays the cluster's status as 'Available' with no active alarms. It also shows the cluster endpoint and ARN. The 'Nodes' section lists one node of type 'dax.t2.small' with 1 vCPU and 2 GiB memory. There are buttons for rebooting, deleting, or adding more nodes.

View cluster | Amazon DynamoDB X DAX parameter groups | Amazon X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster?name=demodax

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

Description	Status
-	Available No active alarms
Cluster endpoint	Amazon Resource Name (ARN)
<input type="checkbox"/> dax://demodax.0iwjft.dax-clusters.eu-west-1.amazonaws.com	<input type="checkbox"/> arn:aws:dax:eu-west-1:211442049068:cache/demodax

Nodes

Node type dax.t2.small	vCPU per node 1	Memory per node 2 GiB			
Nodes (1) ⟳ Reboot Delete Add nodes					
<input type="text"/> Search nodes					
<input type="checkbox"/>	Node ID	Status	Availability Zone	Created time	Parameter group status
<input type="checkbox"/>	demodax-a	Available	eu-west-1c	September 16, 2021	in-sync

View cluster | Amazon DynamoDB X DAX parameter groups | Amazon X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster?name=demodax

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

Description Status

- Available
No active alarms

Add nodes

Number of nodes to add Clusters can have up to 11 nodes.

1

AZ allocation An Availability Zone is one or more discrete data centers with redundant power, networking, and connectivity in an AWS Region. Your cluster nodes can be deployed to several zones to increase the availability of your cluster.

Automatic We will spread your nodes evenly across AZs for best availability.

Specify manually Distribute your nodes over the AZs you choose.

Cancel Add nodes

demodax-a Available eu-west-1c September 16, 2021 in-sync

Add nodes

View cluster | Amazon DynamoDB X DAX parameter groups | Amazon X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#dax-cluster?name=demodax&tab=monitor

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws Ireland Support

Search clusters < 1 > 🔍 demodax

Overview Monitor Events Settings

▶ Alarms In alarm (0)

Metrics View all in CloudWatch

1h 3h 12h 1d 3d 1w C

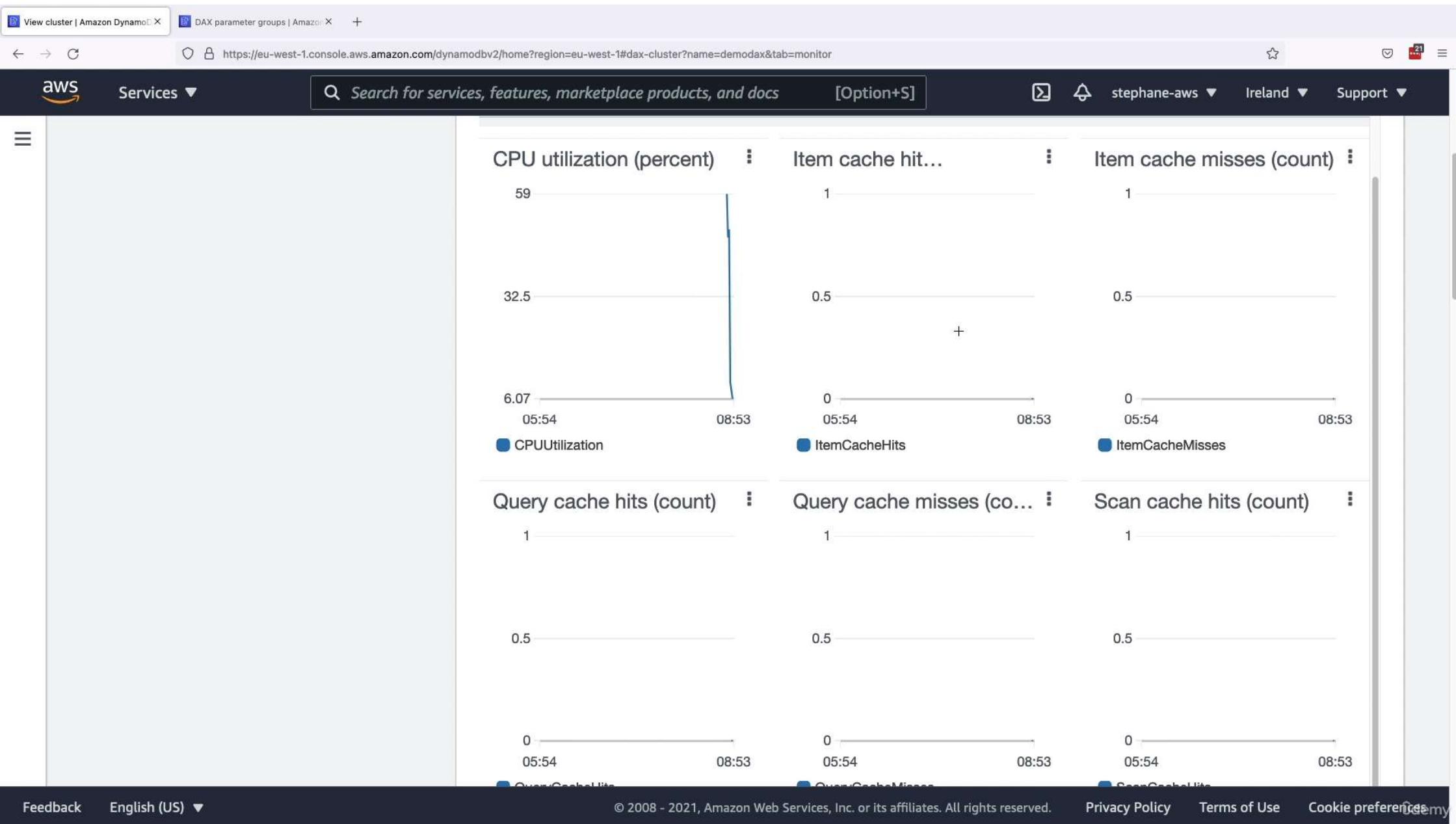
CPU utilization (percent) Item cache hits (count) Item cache misses (count)

0 0.5 1 0 0.5 1 0 0.5 1

05:54 08:53 05:54 08:53 05:54 08:53

CPUUtilization ItemCacheHits ItemCacheMisses

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences Academy

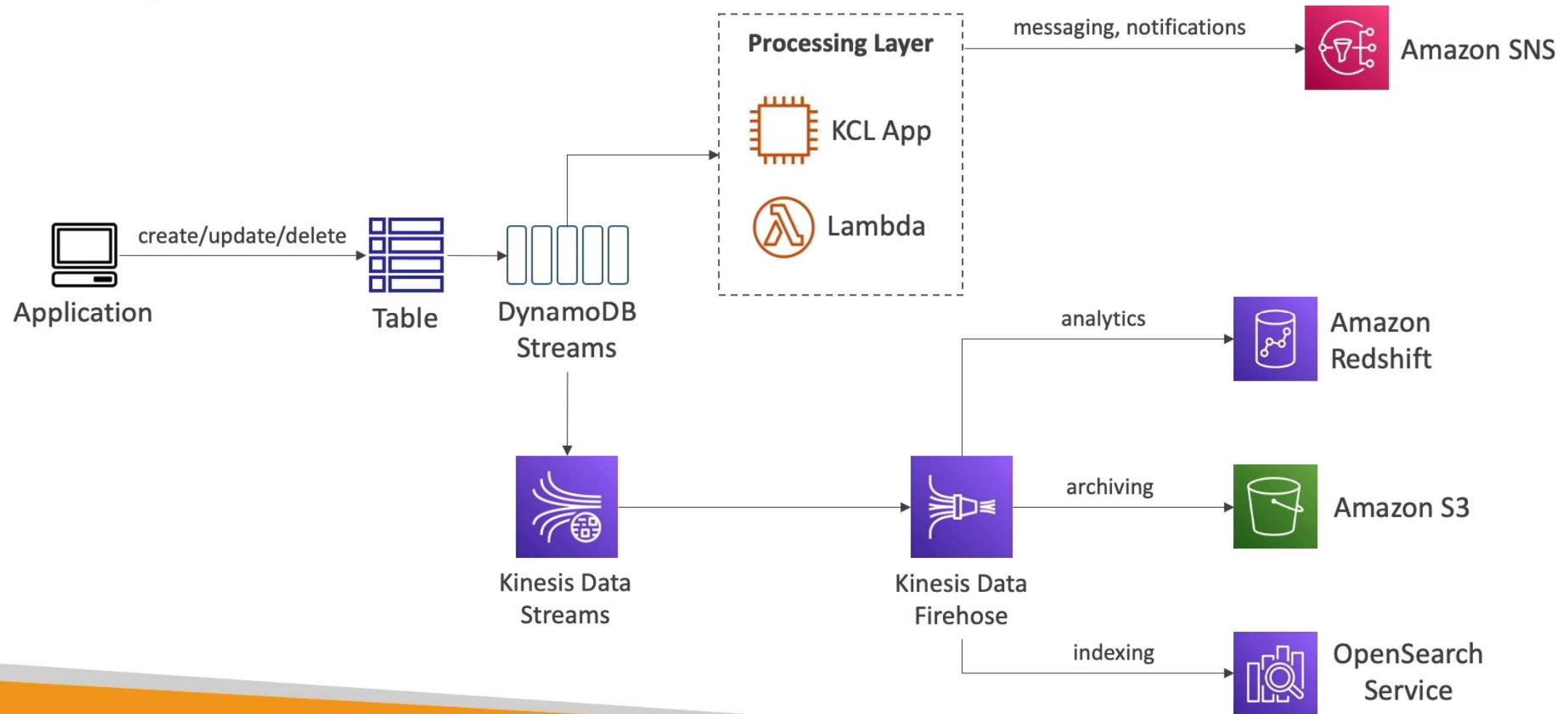




DynamoDB Streams

- Ordered stream of item-level modifications (create/update/delete) in a table
- Stream records can be:
 - Sent to Kinesis Data Streams
 - Read by AWS Lambda
 - Read by Kinesis Client Library applications
- Data Retention for up to 24 hours
- Use cases:
 - react to changes in real-time (welcome email to users)
 - Analytics
 - Insert into derivative tables
 - Insert into OpenSearch Service
 - Implement cross-region replication

DynamoDB Streams

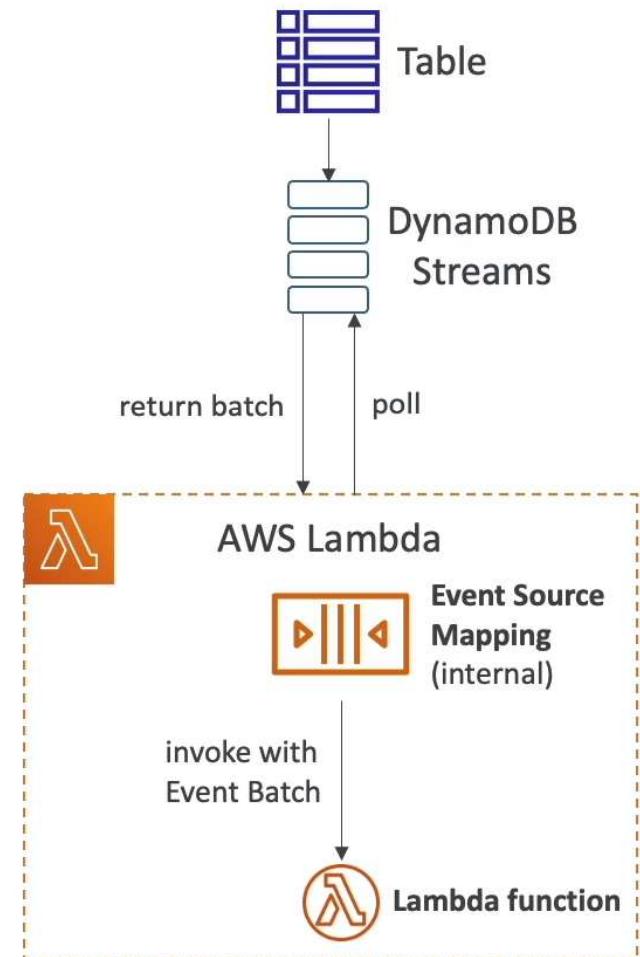


DynamoDB Streams

- Ability to choose the information that will be written to the stream:
 - **KEYS_ONLY** – only the key attributes of the modified item
 - **NEW_IMAGE** – the entire item, as it appears after it was modified
 - **OLD_IMAGE** – the entire item, as it appeared before it was modified
 - **NEW_AND_OLD_IMAGES** – both the new and the old images of the item
- DynamoDB Streams are made of shards, just like Kinesis Data Streams
- You don't provision shards, this is automated by AWS

DynamoDB Streams & AWS Lambda

- You need to define an Event Source Mapping to read from a DynamoDB Streams
- You need to ensure the Lambda function has the appropriate permissions
- Your Lambda function is invoked synchronously



View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=UserPosts&initialTableGroup=%23all

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Tables > UserPosts

UserPosts

Actions ▾ View items

Overview Indexes Monitor Global tables Backups Exports and streams Ac >

General information

Partition key user_id (String)	Sort key post_ts (String)	Capacity mode Provisioned	Table status Active No active alarms
Indexes 0 globals, 0 locals	DynamoDB stream Disabled	Point-in-time recovery (PITR) Disabled	Time to Live (TTL) Info Disabled
Replication Regions 0 Regions	Encryption Owned by Amazon	Date created September 16, 2021, 08:16:36 (UTC+01:00)	
Amazon Resource Name (ARN)			

Tables (3) C X

Tag Any table tag

Find tables by name

< 1 > ⚙️

UserPosts

Users

demo_indexes

[View table | Amazon DynamoDB X](#) +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=UserPosts&tab=streams

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

demo_indexes

No exports

Export to S3

Amazon Kinesis data stream details

Amazon Kinesis Data Streams for DynamoDB captures item-level changes in your table, and replicates the changes to a Kinesis data stream. You then can consume and manage the change information from Kinesis. Charges apply.

Enable

Status
Disabled

DynamoDB stream details

Capture item-level changes in your table, and push the changes to a DynamoDB stream. You then can access the change information through the DynamoDB Streams API.

Enable

Stream status
Disabled

Enable DynamoDB stream | Amazon AWS

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=UserPosts&tab=streams

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Tables > UserPosts > Enable DynamoDB stream

Enable DynamoDB stream

DynamoDB stream details

Capture item-level changes in your table, and push the changes to a DynamoDB stream. You then can access the change information through the DynamoDB Streams API.

View type

Choose which versions of the changed items you would like to push to the DynamoDB stream.

- Key attributes only**
Only the key attributes of the changed item.
- New image**
The entire item as it appears after it was changed.
- Old image**
The entire item as it appears before it was changed.
- New and old images**
Both the new and old images of the changed item.

Cancel **Enable stream**

[View table | Amazon DynamoDB X](#) +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=UserPosts&tab=streams

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

Status
Disabled

DynamoDB stream details

Capture item-level changes in your table, and push the changes to a DynamoDB stream. You then can access the change information through the DynamoDB Streams API.

[Disable](#)

Stream status <input checked="" type="radio"/> Enabled	View type New and old images	Latest stream ARN arn:aws:dynamodb:eu-west-1:211442049068:table/User Posts/stream/2021-09-16T10:36:59.654
---	---------------------------------	--

▼ Trigger (0)

Use triggers to invoke an AWS Lambda function every time an item is changed, and then your DynamoDB stream is updated.

Trigger (0) [C](#) [Configure](#) [Delete](#) [Create trigger](#)

View table | Amazon DynamoDB X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=UserPosts&tab=streams

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

Enabled New and old images arn:aws:dynamodb:eu-west-1:211442049068:table/User Posts/stream /2021-09-16T10:36:59.654

Trigger (0)

Use triggers to invoke an AWS Lambda function every time an item is changed, and then your DynamoDB stream is updated.

Trigger (0)	Configure	Delete	Create trigger
No triggers			Create trigger

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create a trigger | Amazon DynamoDB Lambda + https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1# create/function?f0=true&intent=blueprints&n0=false&op=and&v0=dynamodb Services Search for services, features, marketplace products, and docs [Option+S] stephane-aws Ireland Support

Choose one of the following options to create your function.

Author from scratch Start with a simple Hello World example.

Use a blueprint Build a Lambda application from sample code and configuration presets for common use cases.

Container image Select a container image to deploy for your function.

Browse serverless app repository Deploy a sample Lambda application from the AWS Serverless Application Repository.

Blueprints Info Export Filter by tags and attributes or search by keyword 2 matches < 1 >

"dynamodb" X Clear filters

dynamodb-process-stream An Amazon DynamoDB trigger that logs the updates made to a table. nodejs · dynamodb

dynamodb-process-stream-python An Amazon DynamoDB trigger that logs the updates made to a table. python3.7 · dynamodb

Cancel Configure

Create a trigger | Amazon DynamoDB Lambda + https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1# create/function/configure/blueprint?blueprint=dynamodb-process-stream-python Services Search for services, features, marketplace products, and docs [Option+S] stephane-aws Ireland Support

Lambda > Functions > Create function > Configure blueprint dynamodb-process-stream-python

Basic information Info

Function name

Execution role
Choose a role that defines the permissions of your function. To create a custom role, go to the [IAM console](#).

Create a new role with basic Lambda permissions
 Use an existing role
 Create a new role from AWS policy templates

ⓘ Role creation might take a few minutes. Please do not delete the role or edit the trust or permissions policies in this role.

Lambda will create an execution role named lambda-demo-dynamodb-stream-role-b98p2a6f, with permission to upload logs to Amazon CloudWatch Logs.

DynamoDB trigger

Remove

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Create a trigger | Amazon DynamoDB X Lambda + https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1# create/function/configure/blueprint?blueprint=dynamodb-process-stream-python

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

Lambda will create an execution role named lambda-demo-dynamodb-stream-role-9opzdd01, with permission to upload logs to Amazon CloudWatch Logs.

DynamoDB trigger

Remove

DynamoDB table
Choose or enter the ARN of a DynamoDB table.

UserPosts 

Users

demo_indexes

Batch window - optional
The maximum amount of time to gather records before invoking the function, in seconds.

▾

Starting position
The position in the stream to start reading from. For more information, see [ShardIteratorType](#) in the Amazon DynamoDB Streams API Reference.

Latest 

▶ Additional settings

Create a trigger | Amazon DynamoDB X Lambda + https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1# create/function/configure/blueprint?blueprint=dynamodb-process-stream-python

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

Lambda will create an execution role named lambda-demo-dynamodb-stream-role-9opzdd01, with permission to upload logs to Amazon CloudWatch Logs.

DynamoDB trigger

Remove

DynamoDB table
Choose or enter the ARN of a DynamoDB table.

arn:aws:dynamodb:eu-west-1:211442049068:table/UserPosts X C

Batch size
The largest number of records that will be read from your table's update stream at once.

100 ▲ ▼

Batch window - optional
The maximum amount of time to gather records before invoking the function, in seconds.

▼

Starting position
The position in the stream to start reading from. For more information, see **ShardIteratorType** in the Amazon DynamoDB Streams API Reference.

Latest ▼

► Additional settings

Create a trigger | Amazon DynamoDB Lambda + https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1# create/function/configure/blueprint?blueprint=dynamodb-process-stream-python Services Search for services, features, marketplace products, and docs [Option+S] stephane-aws Ireland Support

Batch size
The largest number of records that will be read from your table's update stream at once.
100

Batch window - optional
The maximum amount of time to gather records before invoking the function, in seconds.

Starting position
The position in the stream to start reading from. For more information, see **ShardIteratorType** in the Amazon DynamoDB Streams API Reference.
Latest

▶ Additional settings

In order to read from the DynamoDB trigger, your execution role must have proper permissions.

Enable trigger
Enable the trigger now, or create it in a disabled state for testing (recommended).

Lambda function code
Code is preconfigured by the chosen blueprint. You can configure it after you create the function. [Learn more](#) about deploying Lambda functions.

Create a trigger | Amazon DynamoDB X Lambda + https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1# create/function/configure/blueprint?blueprint=dynamodb-process-stream-python Services Search for services, features, marketplace products, and docs [Option+S] stephane-aws Ireland Support

Lambda function code

Code is preconfigured by the chosen blueprint. You can configure it after you create the function. [Learn more](#) about deploying Lambda functions.

Runtime
Python 3.7

```
1 import json
2
3 print('Loading function')
4
5
6 def lambda_handler(event, context):
7     #print("Received event: " + json.dumps(event, indent=2))
8     for record in event['Records']:
9         print(record['eventID'])
10        print(record['eventName'])
11        print("DynamoDB Record: " + json.dumps(record['dynamodb'], indent=2))
12    return 'Successfully processed {} records.'.format(len(event['Records']))
```

Create a trigger | Amazon DynamoDB X lambda-demo-dynamodb-stream X IAM Management Console X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-trigger?table=UserPosts

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Tables > UserPosts > Create a trigger

Create a trigger

AWS Lambda function details

Use triggers to invoke an AWS Lambda function every time an item is changed, and then your DynamoDB stream is updated.

Lambda function

Choose an AWS Lambda function you want to trigger every time an item is changed.

X Create new C

Batch size

The number of records Lambda reads at once before invoking the function.

▼

Between 1 and 10,000.

Enable trigger

Specify whether the trigger should be enabled when you create it. You can disable it later from the Lambda console.

Cancel Create trigger

View table | Amazon DynamoDB X λ lambda-demo-dynamodb-stream X IAM Management Console X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?name=UserPosts&tab=streams

Services ▾ Search for services, features, marketplace products, and docs [Option+S] Stephane AWS Ireland Support

Disable

Stream status: **Enabled** View type: New and old images Latest stream ARN: arn:aws:dynamodb:eu-west-1:211442049068:table/UserPosts/stream/2021-09-16T10:36:59.654

▼ Trigger (1)

Use triggers to invoke an AWS Lambda function every time an item is changed, and then your DynamoDB stream is updated.

Trigger (1)		Configure	Delete	Create trigger
	< 1 >			
Function name	State	Last processing result		
lambda-demo-dynamodb-stream	Enabled	No records processed		

View table | Amazon DynamoDB X lambda-demo-dynamodb-stream X IAM Management Console X + https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1#functions/lambda-demo-dynamodb-stream?newFunction=true&tab=configure ☆ 21

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

Lambda Functions lambda-demo-dynamodb-stream

lambda-demo-dynamodb-stream

Throttle Copy ARN Actions ▾

▼ Function overview Info

 **lambda-demo-dynamodb-stream**

 Layers (0) + Add destination

 **DynamoDB**

+ Add trigger

Description
An Amazon DynamoDB trigger that logs the updates made to a table.

Last modified
2 minutes ago

Function ARN
 <arn:aws:lambda:eu-west-1:211442049068:function:lambda-demo-dynamodb-stream>

Code Test Monitor Configuration Aliases Versions

General configuration Triggers (1)

C Enable Disable Fix errors Delete Add trigger

🔍 DynamoDB X 1 match < 1 >

Items | Amazon DynamoDB Man X lambda-demo-dynamodb-stream X IAM Management Console X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=UserPosts&autoScanAttribute

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

Table or index UserPosts

Filters

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (3)

Actions ▾ Create item

	user_id	post_ts	content
<input type="checkbox"/>	john123	2021-10-09T12:34:09Z	Hello world, this is my first blog!
<input type="checkbox"/>	john123	2021-11-04T14:53:00Z	Second post yay!
<input type="checkbox"/>	alice456	2021-08-09T05:07:00Z	Alice blog edited

Edit item | Amazon DynamoDB | X lambda-demo-dynamodb-streams | X IAM Management Console X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#edit-item?table=UserPosts&itemMode=2&pk=john123&sk=2021-11-04T14%3A53%3A00Z&ref=%23item-explorer%3Ftable%3DU

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB > Items: UserPosts > Item editor

Item editor

Form JSON

Attributes		
Attribute name	Value	Type
user_id - Partition key	john123	New String
post_ts - Sort key	2021-11-04T14:53:00Z	New String
content	Second post yay!	String Remove

Add new attribute ▼

Cancel Save changes

Items | Amazon DynamoDB Man X lambda-demo-dynamodb-stream X IAM Management Console X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?table=UserPosts&autoScanAttribute

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

Table or index UserPosts

Find tables by name UserPosts

< 1 > Filters

UserPosts Run Reset

Actions ▾ Create item

Delete item X

Delete 1 item from the UserPosts table? This action cannot be reversed.

Cancel Delete

<input type="checkbox"/>	john123	2021-10-09T12:34:09Z	Hello world, this is my first blog!
<input type="checkbox"/>	john123	2021-11-04T14:53:00Z	Second post yay! (edit)
<input type="checkbox"/>	alice456	2021-08-09T05:07:00Z	Alice blog edited

Items | Amazon DynamoDB Man X lambda-demo-dynamodb-stream X IAM Management Console X

https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1#functions/lambda-demo-dynamodb-stream?newFunction=true&tab=configure

Services ▾ [Option+S]

aws stephane-aws ▾ Ireland ▾ Support ▾

Lambda > Functions > lambda-demo-dynamodb-stream

lambda-demo-dynamodb-stream

Throttle Copy ARN Actions ▾

▼ Function overview [Info](#)

 **lambda-demo-dynamodb-stream**
 Layers (0)

 **DynamoDB**
+ Add trigger

+ Add destination

Description
An Amazon DynamoDB trigger that logs the updates made to a table.

Last modified
3 minutes ago

Function ARN
 arn:aws:lambda:eu-west-1:211442049068:function:lambda-demo-dynamodb-stream

Code Test Monitor Configuration Aliases Versions

General configuration Triggers (1) C Enable Disable Fix errors Delete Add trigger

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Items | Amazon DynamoDB Man X lambda-demo-dynamodb-stream X IAM Management Console X

https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1#functions/lambda-demo-dynamodb-stream?newFunction=true&tab=code

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

Code source Info Upload from ▾

File Edit Find View Go Tools Window Test Deploy Changes deployed

Go to Anything (% P)

Environment

lambda_function x

```
1 import json
2
3 print('Loading function')
4
5
6 def lambda_handler(event, context):
7     #print("Received event: " + json.dumps(event, indent=2))
8     for record in event['Records']:
9         print(record['eventID'])
10        print(record['eventName'])
11        print("DynamoDB Record: " + json.dumps(record['dynamodb'], indent=2))
12    return 'Successfully processed {} records.'.format(len(event['Records']))
```

Items | Amazon DynamoDB Man X lambda-demo-dynamodb-stream X IAM Management Console X

https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1#/functions/lambda-demo-dynamodb-stream?newFunction=true&tab=code

Services ▾ [Option+S]

aws stephane-aws Ireland Support

Lambda > Functions > lambda-demo-dynamodb-stream

lambda-demo-dynamodb-stream

Throttle Copy ARN Actions ▾

▼ Function overview [Info](#)

 **lambda-demo-dynamodb-stream**

 Layers (0)

 **DynamoDB**

+ Add trigger

+ Add destination

Description
An Amazon DynamoDB trigger that logs the updates made to a table.

Last modified
3 minutes ago

Function ARN
 arn:aws:lambda:eu-west-1:211442049068:function:lambda-demo-dynamodb-stream

Code Test Monitor Configuration Aliases Versions

Code source [Info](#) Upload from ▾

Items | Amazon DynamoDB Man X lambda-demo-dynamodb-stream X CloudWatch Management Cons X IAM Management Console X +

https://eu-west-1.console.aws.amazon.com/cloudwatch/home?region=eu-west-1#logsV2:log-groups/log-group/\$252Faws\$252Flambda\$252Flambda-demo-dynamodb-stream

Services ▾

CloudWatch X

New menu experience

Favorites

Dashboards

Alarms ⚠ 2 ✓ 6 ○ 0

Logs

Log groups Log groups

Logs Insights

Metrics

Events

Application monitoring New

Insights

Settings

Getting Started

Search for services, features, marketplace products, and docs [Option+S]

/aws/lambda/lambda-demo-dynamodb-stream

Actions ▾ View in Logs Insights Search log group

▼ Log group details

Retention	Creation time	Stored bytes	ARN
Never expire	Now	-	arn:aws:logs:eu-west-1:211442049068:log-group:/aws/lambda/lambda-demo-dynamodb-stream:*
KMS key ID	Metric filters	Subscription filters	Contributor Insights rules
-	0	0	-

Log streams Metric filters Subscription filters Contributor Insights Tags

Log streams (1)

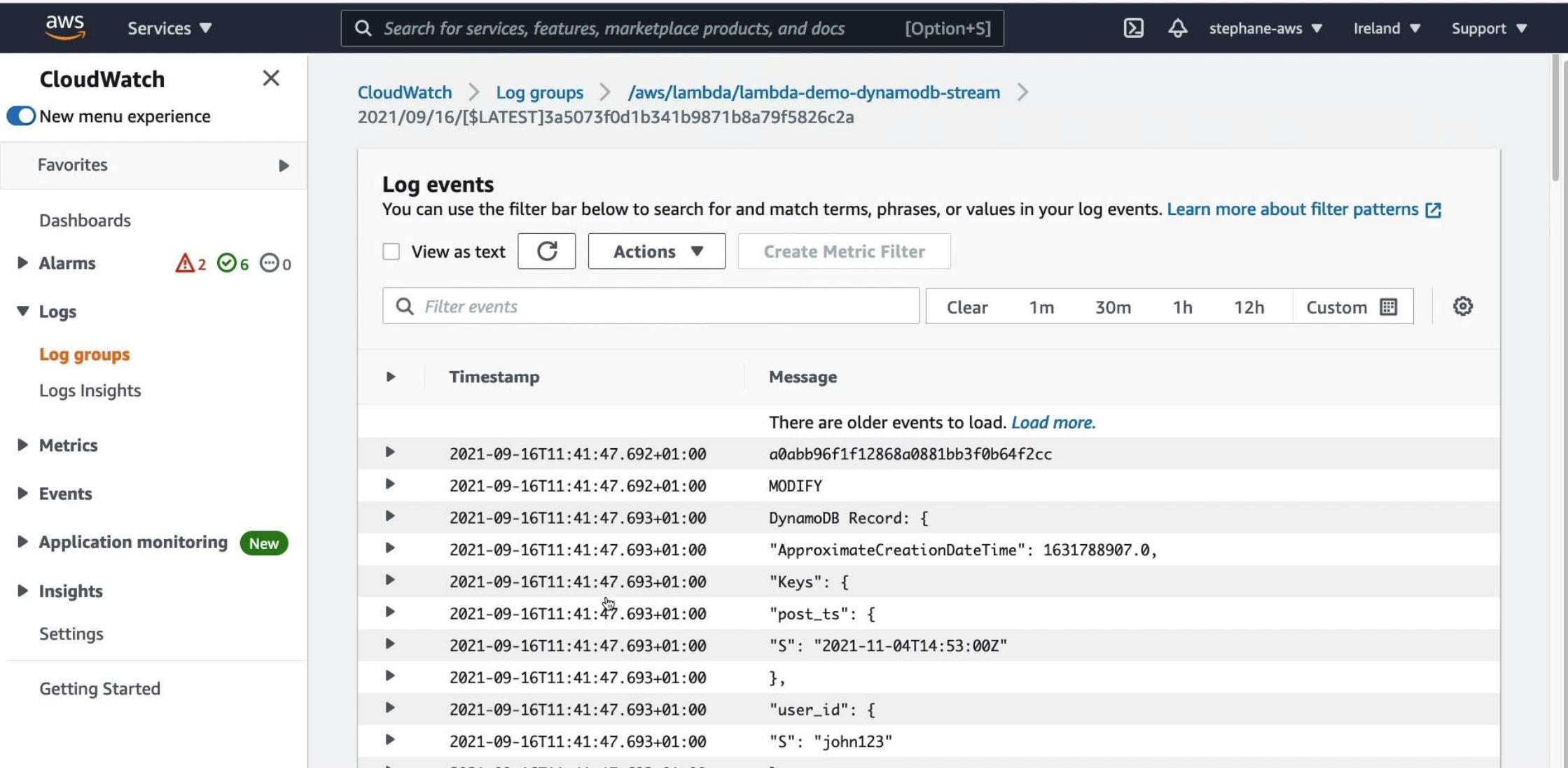
C Delete Create log stream Search all

Filter log streams or try prefix search

< 1 > ⚙

<input type="checkbox"/>	Log stream	Last event time
--------------------------	------------	-----------------

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences



Items | Amazon DynamoDB Man X lambda-demo-dynamodb-stream X CloudWatch Management Cons X IAM Management Console X +

https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1#/functions/lambda-demo-dynamodb-stream?newFunction=true&tab=configure

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws ▾ Ireland ▾ Support ▾

An Amazon DynamoDB trigger that logs the updates

DynamoDB

+ Add trigger

Disable triggers

You have disabled the following triggers:

DynamoDB: UserPosts

Close

Code Test Monitor Configuration Aliases Versions

General configuration Triggers (1) Enable Disable Fix errors Delete Add trigger

DynamoDB

Trigger

DynamoDB: UserPosts (Disabling)

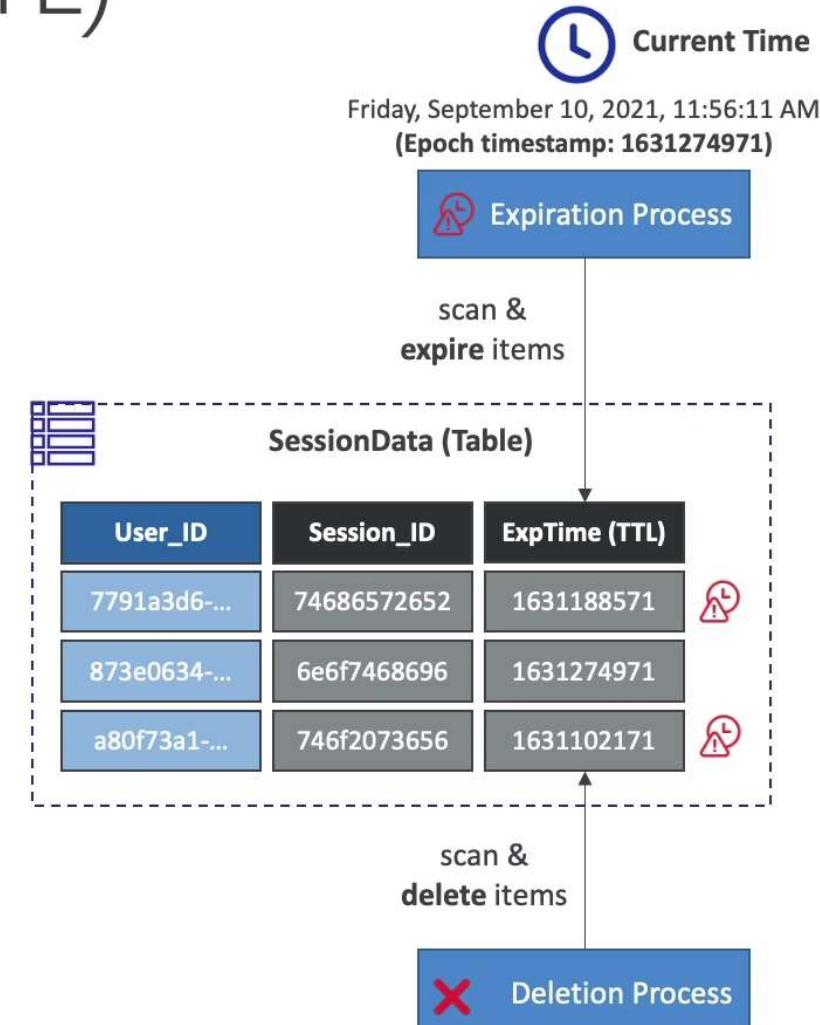
am:aws:dynamodb:eu-west-1:211442049068:table/UserPosts/stream/2021-09-16T10:36:59.654

Details

Feedback English (US) © 2008 – 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

DynamoDB – Time To Live (TTL)

- Automatically delete items after an expiry timestamp
- Doesn't consume any WCUs (i.e., no extra cost)
- The TTL attribute must be a "Number" data type with "Unix Epoch timestamp" value
- Expired items deleted within 48 hours of expiration
- Expired items, that haven't been deleted, appears in reads/queries/scans (if you don't want them, filter them out)
- Expired items are deleted from both LSIs and GSIs
- A delete operation for each expired item enters the DynamoDB Streams (can help recover expired items)
- Use cases: reduce stored data by keeping only current items, adhere to regulatory obligations, ...



Create table | Amazon DynamoDB +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#create-table

Services ▾ [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table.

Table name
This will be used to identify your table.

Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.).

Partition key
The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.
 String
1 to 255 characters and case sensitive.

Sort key - optional
You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.
 String
1 to 255 characters and case sensitive.

Settings

Default settings Customize settings

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Edit item | Amazon DynamoDB | X Epoch Converter - Unix Timestamp X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#edit-item?table=DemoTTL&ref=%23item-explorer%3Ftable%3DDemoTTL&route=ROUTE_ITEM_EXPLORER&itemMode=1

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws Ireland Support

DynamoDB > Items: DemoTTL > Item editor

Create item

Form JSON

Attributes		
Attribute name	Value	Type
user_id - Partition key	john_123	String
name	John	String
expire_on	1631957386	Number

Add new attribute ▼

Cancel ↻ Create item

The current Unix epoch time is **1631957125**

Convert epoch to human-readable date and vice versa

1631957086 [Timestamp to Human date](#) [batch convert]

Supports Unix timestamps in seconds, milliseconds, microseconds and nanoseconds.

Yr Mon Day Hr Min Sec
2021 - 9 - 18 9 : 29 : 46 AM ▾ GMT ▾ [Human date to Timestamp](#)

Epoch timestamp: 1631957386
Timestamp in milliseconds: 1631957386000
Date and time (GMT): Saturday, September 18, 2021 9:29:46 AM
Date and time (your time zone): Saturday, September 18, 2021 10:29:46 AM GMT+01:00

Pages

Home • Preferences Toggle theme ☰

Tools ^

- Epoch converter
- Batch converter
- Time zone converter
- Timestamp list
- LDAP converter
- WebKit/Chrome timestamp
- Unix hex timestamp
- Cocoa Core Data timestamp
- Mac HFS+ timestamp
- SAS timestamp
- Seconds/days since year 0
- Bin/Oct/Hex converter
- Countdown in seconds
- Epoch clock

Date and Time ^

Week numbers

This website uses cookies to ensure you get the best experience on our website. [Learn more](#)

Got it! udemy

The current Unix epoch time is 1631957130

Convert epoch to human-readable date and vice versa

1631957086 | Timestamp to Human date [batch convert]

Supports Unix timestamps in seconds, milliseconds, microseconds and nanoseconds.

Yr **Mon** **Day** **Hr** **Min** **Sec**

2021	-	9	-	18	10	:	29	:	46	AM	▼	GMT	▼	Human date to Timestamp
------	---	---	---	----	----	---	----	---	----	----	---	-----	---	-------------------------

Epoch timestamp: 1631960985

Timestamp in milliseconds: 1631960986000

Date and time (GMT): Saturday, September 18, 2021 10:29:46 AM

Date and time (your time zone): Saturday, September 18, 2021 11:29:46 AM GMT+01:00

Pages

Home •
Preferences
Toggle theme ☰

Tools ^

- Epoch converter
- Batch converter
- Time zone converter
- Timestamp list
- LDAP converter
- WebKit/Chrome timestamp
- Unix hex timestamp
- Cocoa Core Data timestamp
- Mac HFS+ timestamp
- SAS timestamp
- Seconds/days since year 0
- Bin/Oct/Hex converter
- Countdown in seconds
- Epoch clock

Date and Time ^

Week numbers

Edit item | Amazon DynamoDB | X Epoch Converter - Unix Timestamp X + https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#edit-item?table=DemoTTL&ref=%23item-explorer%3Ftable%3DDemoTTL&route=ROUTE_ITEM_EXPLORER&itemMode=1 star 21

Services ▾ Search for services, features, marketplace products, and docs [Option+S] stephane-aws Ireland Support

The item has been saved successfully.

DynamoDB > Items: DemoTTL > Item editor

Create item

Form JSON

Attributes		
Attribute name	Value	Type
user_id - Partition key	alice_456	String
name	Alice	String
expire_on	1631960986	Number

Add new attribute ▼

Cancel Create item

This screenshot shows the AWS DynamoDB Item Editor interface. At the top, there's a success message: "The item has been saved successfully." Below that, the navigation path is "DynamoDB > Items: DemoTTL > Item editor". The main title is "Create item" with "Form" and "JSON" tabs. The "Attributes" section contains a table with three rows: "user_id - Partition key" with value "alice_456" (Type String), "name" with value "Alice" (Type String), and "expire_on" with value "1631960986" (Type Number). There are "Remove" buttons next to each string attribute. At the bottom, there are "Cancel" and "Create item" buttons.

Items | Amazon DynamoDB Man X Epoch Converter - Unix Times... X + https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#item-explorer?initialTagKey=&table=DemoTTL

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

aws Services ▾ stephane-aws ▾ Ireland ▾ Support ▾

Find tables by name < 1 > 🔍

DemoTTL

Filters

Attribute name	Type	Condition	Value
null	Number	Exists	

Add filter Remove

Run Reset

Completed Read capacity units consumed: 0.5

Items returned (2)

Actions ▾ Create item

Find items < 1 > 🔍

	user_id	expire_on	name
<input type="checkbox"/>	alice_456	1631960986	Alice
<input type="checkbox"/>	john_123	1631957386	John

View table | Amazon DynamoDB X Epoch Converter - Unix Timestamp X + https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?initialTagKey=&name=DemoTTL&tab=overview Services Search for services, features, marketplace products, and docs [Option+S] stephane-aws Ireland Support

The item has been saved successfully.

DynamoDB > Tables > DemoTTL

Tables (4)

Tag: Any table tag

Find tables by name

< 1 >

DemoTTL UserPosts Users demo_indexes

DemoTTL

Actions

Overview Indexes Monitor Global tables Backups Exports and streams

General information

Partition key user_id (String)	Sort key -	Capacity mode Provisioned	Table status Active No active alarms
Indexes 0 globals, 0 locals	DynamoDB stream Disabled	Point-in-time recovery (PITR) Disabled	Time to Live (TTL) <input type="button" value="Info"/> Disabled
Replication Regions 0 Regions	Encryption Owned by Amazon	Date created September 18, 2021, 10:23:46 (UTC+01:00)	

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

View table | Amazon DynamoDB X Epoch Converter - Unix Timestamp X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?initialTagKey=&name=DemoTTL&tab=settings

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

The item has been saved successfully.

DynamoDB > Tables > DemoTTL

Tables (4) Actions ▾ View items

Tag Any table tag Find tables by name

< 1 > ⚙

DemoTTL UserPosts Users demo_indexes

DemoTTL

< Indexes Monitor Global tables Backups Exports and streams Additional settings >

Read/write capacity

The read/write capacity mode controls how you are charged for read and write throughput and how you manage capacity.

Edit

Capacity mode Provisioned

Table capacity

Read capacity auto scaling Off	Write capacity auto scaling Off
Provisioned read capacity units 1	Provisioned write capacity units 1

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Enable Time to Live (TTL) | Amazon DynamoDB Epoch Converter - Unix Timestamps

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#enable-ttl?table=DemoTTL

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

TTL settings

TTL attribute name
The name of the attribute that will be stored in the TTL timestamp.

Enter attribute name

Between 1 and 255 characters.

Preview

Confirm that your TTL attribute and values are working properly by specifying a date and time, and reviewing a sample of the items that will be deleted by then. Note that preview may show only some of the relevant items.

Simulated date and time
Specify the date and time to simulate which items would be expired.

Epoch time value ▾ 1632043595 September 19, 2021, 10:26:35 (UTC+01:00) Run preview

i Enabling TTL can take up to one hour to be applied across all partitions. You will not be able to make additional TTL changes until this update is complete.

Cancel Enable TTL

Enable Time to Live (TTL) | Amazon AWS Epoch Converter - Unix Timestamps

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#enable-ttl?table=DemoTTL

aws Services Search for services, features, marketplace products, and docs [Option+S] stephane-aws Ireland Support

The item has been saved successfully.

DynamoDB > Tables > DemoTTL > Enable Time to Live (TTL)

Enable Time to Live (TTL) Info

TTL settings

TTL attribute name
The name of the attribute that will be stored in the TTL timestamp.
 Between 1 and 255 characters.

Preview
Confirm that your TTL attribute and values are working properly by specifying a date and time, and reviewing a sample of the items that will be deleted by then. Note that preview may show only some of the relevant items.

Simulated date and time
Specify the date and time to simulate which items would be expired.

Epoch time value 1632043595 September 19, 2021, 10:26:35 (UTC+01:00)

Feedback English (US) © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

Enable Time to Live (TTL) | About X Epoch Converter - Unix Timestamp X +

https://www.epochconverter.com

The current Unix epoch time is **1631957229**

Convert epoch to human-readable date and vice versa

1631957086 [Timestamp to Human date](#) [batch convert]

Supports Unix timestamps in seconds, milliseconds, microseconds and nanoseconds.

Yr	Mon	Day	Hr	Min	Sec
2021	- 9	- 18	10	: 10	: 46
			AM ▾	GMT	▼
Human date to Timestamp					

Epoch timestamp: 1631959846
Timestamp in milliseconds: 1631959846000
Date and time (GMT): Saturday, September 18, 2021 10:10:46 AM
Date and time (your time zone): Saturday, September 18, 2021 11:10:46 AM GMT+01:00

Pages

Home • Preferences Toggle theme ☰

Tools ^

- [Epoch converter](#)
- [Batch converter](#)
- [Time zone converter](#)
- [Timestamp list](#)
- [LDAP converter](#)
- [WebKit/Chrome timestamp](#)
- [Unix hex timestamp](#)
- [Cocoa Core Data timestamp](#)
- [Mac HFS+ timestamp](#)
- [SAS timestamp](#)
- [Seconds/days since year 0](#)
- [Bin/Oct/Hex converter](#)
- [Countdown in seconds](#)
- [Epoch clock](#)

Date and Time ^

- [Week numbers](#)

This website uses cookies to ensure you get the best experience on our website. [Learn more](#)

[Got it!](#) 

View table | Amazon DynamoDB X Epoch Converter - Unix Timestamp X +

https://eu-west-1.console.aws.amazon.com/dynamodbv2/home?region=eu-west-1#table?initialTagKey=&name=DemoTTL&tab=settings

Services ▾ Search for services, features, marketplace products, and docs [Option+S]

stephane-aws ▾ Ireland ▾ Support ▾

Find events < 1 > ⓘ

Start time	End time	Target	Description	Capacity unit
No auto scaling activities found				
There are no auto scaling activities for the table or its global secondary indexes.				

Time to Live (TTL) ⓘ Run preview Disable

Automatically delete expired items from a table.

TTL status TTL attribute Items deleted in the last 24 hours

Enabled expire_on View items ↗ 0 View graph

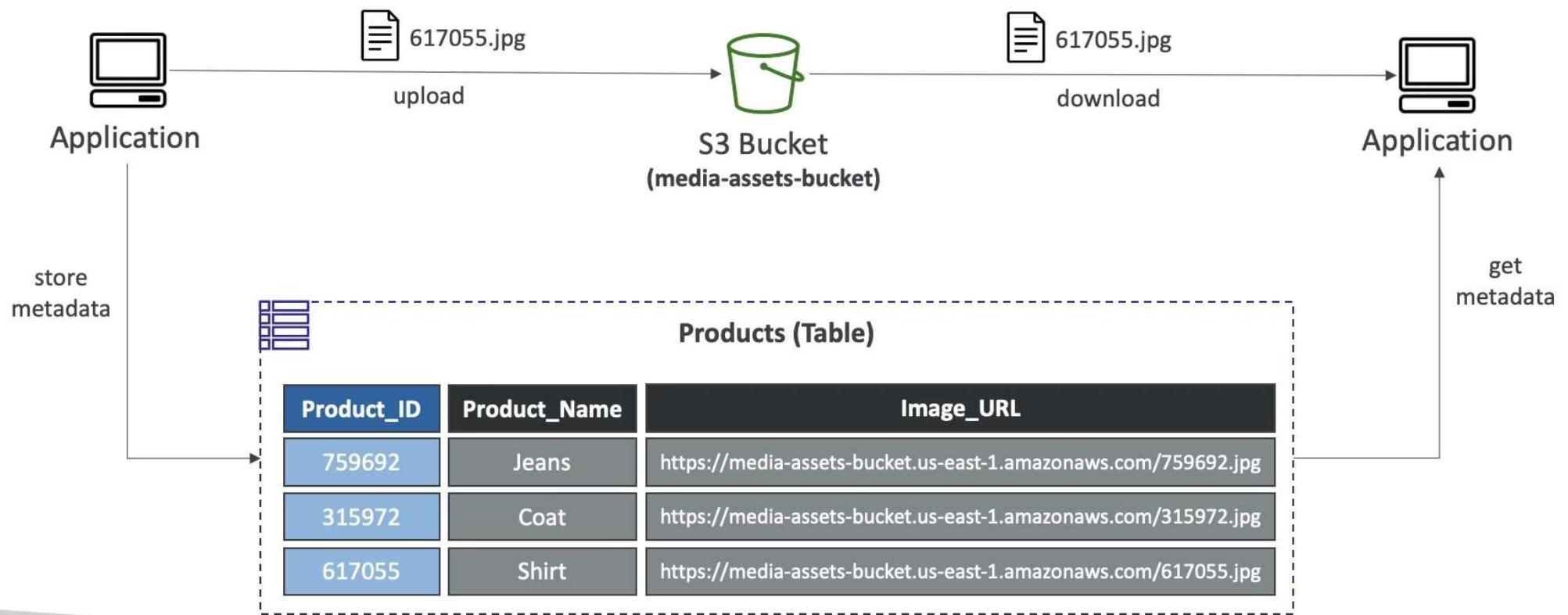
Encryption ⓘ

Provides enhanced security by encrypting all your data at rest using encryption keys stored in AWS Key Management Service.

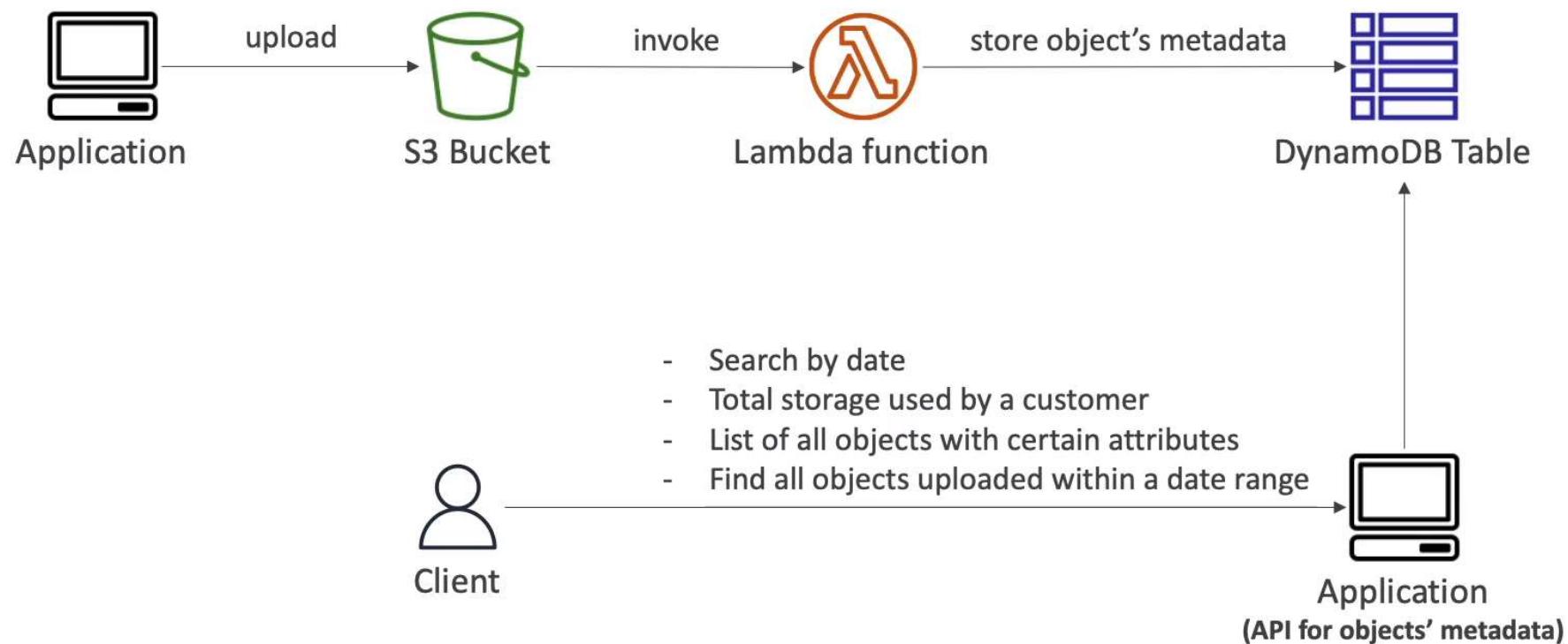
Manage encryption

Key management

DynamoDB – Large Objects Pattern



DynamoDB – Indexing S3 Objects Metadata



DynamoDB – Security & Other Features

- Security:
 - VPC Endpoints available to access DynamoDB without internet
 - Access fully controlled by IAM
 - Encryption at rest using KMS
 - Encryption in transit using SSL / TLS
- Backup and Restore feature available
 - Point in time restore like RDS
 - No performance impact
- Global Tables
 - Multi region, fully replicated, high performance
- Amazon Database Migration Service (DMS) can be used to migrate to DynamoDB (from Mongo, Oracle, MySQL, S3, etc...)
- You can launch a local DynamoDB on your computer for development purposes

Identity and Access Management

Perform any actions on a table

- {
- "Version": "2012-10-17",
- "Statement": [
- {
- "Sid": "AllAPIActionsOnBooks",
- "Effect": "Allow",
- "Action": "dynamodb:*",
- "Resource": "arn:aws:dynamodb:us-west-2:123456789012:table/Books"
- }
-]
- }

Read-only access on items

```
• {  
•     "Version": "2012-10-17",  
•     "Statement": [  
•         {  
•             "Sid": "ReadOnlyAPIActionsOnBooks",  
•             "Effect": "Allow",  
•             "Action": [  
•                 "dynamodb:GetItem",  
•                 "dynamodb:BatchGetItem",  
•                 "dynamodb:Scan",  
•                 "dynamodb:Query",  
•                 "dynamodb:ConditionCheckItem"  
•             ],  
•             "Resource": "arn:aws:dynamodb:us-west-2:123456789012:table/Books"  
•         }  
•     ]  
• }
```

Access to a specific table and its indexes

```
• {  
•     "Version": "2012-10-17",  
•     "Statement": [  
•         {  
•             "Sid": "AccessTableAllIndexesOnBooks",  
•             "Effect": "Allow",  
•             "Action": [  
•                 "dynamodb:PutItem",  
•                 "dynamodb:UpdateItem",  
•                 "dynamodb:DeleteItem",  
•                 "dynamodb:BatchWriteItem",  
•                 "dynamodb:GetItem",  
•                 "dynamodb:BatchGetItem",  
•                 "dynamodb:Scan",  
•                 "dynamodb:Query",  
•                 "dynamodb:ConditionCheckItem"  
•             ],  
•             "Resource": [  
•                 "arn:aws:dynamodb:us-west-2:123456789012:table/Books",  
•                 "arn:aws:dynamodb:us-west-2:123456789012:table/Books/index/*"  
•             ]  
•         }  
•     ]  
• }
```

Resilience and disaster recovery

Resilience and disaster recovery

- With Availability Zones, you can design and operate applications and databases that automatically fail over between Availability Zones without interruption
- If you need to replicate your data or applications over greater geographic distances, use AWS Local Regions
- In addition to the AWS global infrastructure, Amazon DynamoDB offers several features to help support your data resiliency and backup needs.

On-demand backup and restore

- DynamoDB provides on-demand backup capability
- It allows you to create full backups of your tables for long-term retention and archival.

Create backup

Backup settings Info

Source table
Music

Backup name
This will be used to identify your backup.
 MusicBackup

Between 3 and 255 characters in length. Only A-Z, a-z, 0-9, underscore characters, hyphens, and periods are allowed.

Cancel **Create backup**

Point-in-time recovery

- Helps to protect DynamoDB tables from accidental write or delete operations.

VerySuperImportantTable [Close](#)

Overview Items Metrics Alarms Capacity Indexes Global Tables **Backups** Triggers Access control Tags

Point-in-time Recovery

DynamoDB maintains continuous backups of your table for the last 35 days. [Learn more](#)

Status	ENABLED	Disable
Earliest restore date	March 18, 2018 at 4:06:35 AM UTC-7	
Latest restore date	March 18, 2018 at 5:10:52 AM UTC-7	

[Restore to point-in-time](#)

DynamoDB global table

- Comprised of multiple replica tables
- Each replica table exists in a different Region
- All replicas have the same name and primary key
- When data is written to any replica table, DynamoDB automatically replicates that data to all other replica tables in the global table .

DynamoDB global table - Benefits

- Read and write locally, access your data globally
- Performance
- Easy to set up and operate
- Availability, durability, and multi-Region fault tolerance
- Consistency and conflict resolution
 - Amazon DynamoDB global tables use a last-writer-wins reconciliation between concurrent updates

Using AWS Backup with DynamoDB

Using AWS Backup with DynamoDB

- AWS Backup is a fully managed data protection service
- Makes it easy to centralize and automate backups
 - Across AWS services
 - In the cloud
 - On premises
- Enhanced backup features available through AWS Backup include:
 - Scheduled backups
 - Cross-account and cross-Region copying

Using write sharding to distribute workloads evenly

- Sharding using random suffixes
 - One strategy for distributing loads more evenly across a partition key space is to add a random number to the end of the partition key values
 - Then you randomize the writes across the larger space.
- Sharding using calculated suffixes
 - Can calculate based upon something that you want to query on.

Best practices for designing and architecting with DynamoDB

NoSQL design for DynamoDB

- Data size
 - Knowing how much data will be stored and requested at one time will help determine the most effective way to partition the data.
- Data shape
 - NoSQL database organizes data so that its shape in the database corresponds with what will be queried
 - This is a key factor in increasing speed and scalability.
- Data velocity
 - Knowing in advance what the peak query loads will be might help determine how to partition data to best use I/O capacity.
- Keep related data together
 - "locality of reference" was the single most important factor in speeding up response time
- Use sort order
- Distribute queries
- Use global secondary indexes

Using deletion protection to protect your table

- Deletion protection can keep your table from being accidentally deleted
- For all active production tables, the best practice is to turn on the deletion protection setting and protect these tables from accidental deletion

Using the DynamoDB Well-Architected Lens

- A collection of design principles and guidance for designing well-architected DynamoDB workloads.
- Helps cloud architects build secure, high-performing, resilient, and efficient infrastructure for a variety of applications and workloads.
- Extend the guidance offered by AWS Well-Architected to specific industry and technology domains
- <https://aws.amazon.com/architecture/well-architected/>

Designing and using partition keys effectively

- Should design your application for uniform activity across all logical partition keys in the table and its secondary indexes
- Using burst capacity effectively

Using sort keys to organize data

- The primary key can be composed not only of a partition key, but also of a sort key.
- They gather related information together in one place where it can be queried efficiently.

Using secondary indexes in DynamoDB

- Are often essential to support the query patterns that your application requires
- At the same time, overusing secondary indexes can add cost and reduce performance unnecessarily.
- Keep the number of indexes to a minimum.
- Optimize frequent queries to avoid fetches
 - To get the fastest queries with the lowest possible latency, project all the attributes that you expect those queries to return
 - If you query a local secondary index for attributes that are not projected, DynamoDB automatically fetches those attributes from the table, which requires reading the entire item from the table
 - This introduces latency and additional I/O operations that you can avoid.

Storing large items and attributes

- Amazon DynamoDB currently limits the size of each item that you store in a table
- Can also store the item as an object in S3 and store the Amazon S3 object identifier in your DynamoDB item.
- Compressing large attribute values
 - Reduce your storage costs

Best practices for modeling relational data in DynamoDB

- For new applications, review user stories about activities and objectives.
- Document the various use cases you identify, and analyze the access patterns that they require.
- For existing applications, analyze query logs to find out how people are currently using the system and what the key access patterns are.

Best practices for modeling relational data in DynamoDB

Most Common/Import Access Patterns in Our Organization	
1	Look up employee details by employee ID
2	Query employee details by employee name
3	Find an employee's phone number(s)
4	Find a customer's phone number(s)
5	Get orders for a given customer within a given date range
6	Show all open orders within a given date range across all customers
7	See all employees hired recently
8	Find all employees working in a given warehouse
9	Get all items on order for a given product
10	Get current inventories for a given product at all warehouses
11	Get customers by account representative
12	Get orders by account representative and date
13	Get all employees with a given job title
14	Get inventory by product and warehouse
15	Get total product inventory
16	Get account representatives ranked by order total and sales period

Best practices for modeling relational data in DynamoDB

- In DynamoDB, this means using

- Composite sort keys
- Global secondary indexes
- Partitioned tables/indexes

Querying and scanning data

- Scan operations are less efficient than other operations in DynamoDB.
- Always scans the entire table
- For faster response times, design your tables and indexes so that your applications can use Query instead of Scan
- Taking advantage of parallel scans
 - Multiple worker threads in a background "sweeper" process could scan a table at a low priority without affecting production traffic.
 - A parallel scan can be the right choice if the following conditions are met:
 - The table size is 20 GB or larger.
 - The table's provisioned read throughput is not being fully used.
 - Sequential Scan operations are too slow.

DynamoDB table design

- General design principles in Amazon DynamoDB recommend that you keep the number of tables you use to a minimum
 - The per account limit cannot be increased above 10,000 tables per account

DynamoDB global table design

- A multi-Region DynamoDB table has a 99.999% availability SLA
- Global tables can help create an architecture that is resilient and resists Regional failures.
- Global tables employ an active-active replication model.
- Lower-latency readsLower-latency writes
- Increased resiliency and disaster recovery

Managing the control plane in DynamoDB

- Control plane operations let you manage
 - DynamoDB tables
 - Indexes
- You may need to take actions and use data returned by control plane calls as part of your business logic
- For example, you might need to know the value of ProvisionedThroughput returned by `DescribeTable`
- In these circumstances, follow these best practices:
 - Do not excessively query the DynamoDB control plane
 - Do not mix control plane calls and data plane calls within the same code
 - Handle throttles on control plane requests and retry with a backoff
 - Invoke and track changes to a particular resource from a single client
 - Instead of retrieving data for the same table multiple times at short intervals, cache the data for processing

Security and compliance

AWS managed policies

- **DynamoDBReplicationServiceRolePolicy**
 - Can't attach to your IAM entities
 - Is attached to a service-linked role that allows DynamoDB to perform actions on your behalf.
 - This policy grants permissions that allow the service-linked role to perform data replication between global table replicas.
 - Also grants administrative permissions to manage global table replicas on your behalf.

Data protection in DynamoDB

- Protects
 - User data stored at rest
 - Also data in transit
- Data protection in DynamoDB Accelerator

Configuration and vulnerability analysis

- AWS handles basic security tasks like
 - Guest operating system (OS) and database patching
 - Firewall configuration
 - Disaster recovery

Preventative security best practices

- Encryption at rest
- Use IAM roles to authenticate access to DynamoDB
- Use IAM policies for DynamoDB base authorization
- Use IAM policy conditions for fine-grained access control
- Consider client-side encryption

Detective security best practices

- Use AWS CloudTrail to monitor AWS managed KMS key usage
 - Usage of this key is logged into AWS CloudTrail
 - Use CloudTrail to audit key usage
- Monitor DynamoDB operations using CloudTrail
 - Both control plane events and data plane events
- Tag your DynamoDB resources for identification and automation

Logging and monitoring

Monitoring tools

- Amazon CloudWatch Alarms
 - Watch a single metric over a time period and perform one or more actions
- Amazon CloudWatch Logs
 - Monitor, store, and access your log files from AWS CloudTrail
- Amazon CloudWatch Events
 - Match events and route them to one or more target functions or streams

Manual monitoring tools

- DynamoDB dashboard shows
 - Recent alerts
 - Total capacity
 - Service health
- CloudWatch home page shows
 - Current alarms and status
 - Graphs of alarms and resources
 - Service health status

Monitoring with Amazon CloudWatch

How can I?	Relevant metrics
How can I monitor the rate of TTL deletions on my table?	You can monitor <code>TimeToLiveDeletedItemCount</code> over the specified time period, to track the rate of TTL deletions on your table.
How can I determine how much of my provisioned throughput is being used?	You can monitor <code>ConsumedReadCapacityUnits</code> or <code>ConsumedWriteCapacityUnits</code> over the specified time period, to track how much of your provisioned throughput is being used.

Thanks