AWS DynamoDB Global Tables: Multi Region, Multi Master Database

A global table is a collection of one or more replica tables, all owned by a single AWS account. A replica table (or replica, for short) is a single DynamoDB table that functions as a part of a global table. Each replica stores the same set of data items. Any given global table can only have one replica table per region.

The following is a conceptual overview of how a global table is created.

Create an ordinary DynamoDB table, with DynamoDB Streams enabled, in an AWS region.

Region 1 - Singapore

Region 2 - Virginia

Region 3 - Ireland

Repeat step 1 for every other AWS region where you want to replicate your data.

Define a DynamoDB global table, based upon the tables that you have created.

Create a new table (Music) in Singapore, with DynamoDB Streams enabled (NEW\_AND\_OLD\_IMAGES):

aws dynamodb create-table \

--table-name Music \

--attribute-definitions \

AttributeName=Artist,AttributeType=S \

AttributeName=SongTitle,AttributeType=S \

--key-schema \

AttributeName=Artist,KeyType=HASH \

AttributeName=SongTitle,KeyType=RANGE \

--provisioned-throughput \

ReadCapacityUnits=1,WriteCapacityUnits=1 \

--stream-specification StreamEnabled=true,StreamViewType=NEW\_AND\_OLD\_IMAGES \

--region ap-southeast-1

Create an identical Music table in US East (N. Virginia):

aws dynamodb create-table \

--table-name Music \

--attribute-definitions \

AttributeName=Artist,AttributeType=S \

AttributeName=SongTitle,AttributeType=S \

--key-schema \

AttributeName=Artist,KeyType=HASH \

AttributeName=SongTitle,KeyType=RANGE \

--provisioned-throughput \

ReadCapacityUnits=1,WriteCapacityUnits=1 \

--stream-specification StreamEnabled=true,StreamViewType=NEW\_AND\_OLD\_IMAGES \

--region us-east-1

Create a global table (Music) consisting of replica tables in the ap-southeast-1 and us-east-1 regions.

aws dynamodb create-global-table \

--global-table-name Music \

--replication-group RegionName=ap-southeast-1 RegionName=us-east-1 \

--region ap-southeast-1

Create another table in EU (Ireland), with the same settings as those you created in Step 1 and Step 2:

aws dynamodb create-table \

--table-name Music \

--attribute-definitions \

AttributeName=Artist,AttributeType=S \

AttributeName=SongTitle,AttributeType=S \

--key-schema \

AttributeName=Artist,KeyType=HASH \

AttributeName=SongTitle,KeyType=RANGE \

--provisioned-throughput \

ReadCapacityUnits=1,WriteCapacityUnits=1 \

--stream-specification StreamEnabled=true,StreamViewType=NEW\_AND\_OLD\_IMAGES \

--region eu-west-1

After you have done this, add this new table to the Music global table:

aws dynamodb update-global-table \

--global-table-name Music \

--replica-updates 'Create={RegionName=eu-west-1}' \

--region ap-southeast-1

Verify Global Replication

To verify that replication is working, add a new item to the Music table in Singapore:

aws dynamodb put-item \

--table-name Music \

--item '{"Artist": {"S":"item\_1"},"SongTitle": {"S":"Song Value 1"}}' \

--region ap-southeast-1

Wait for a few seconds, and then check to see if the item has been successfully replicated to US East (N. Virginia) and EU (Ireland):

aws dynamodb get-item \

--table-name Music \

--key '{"Artist": {"S":"item\_1"},"SongTitle": {"S":"Song Value 1"}}' \

--region us-east-1

aws dynamodb get-item \

--table-name Music \

--key '{"Artist": {"S":"item\_1"},"SongTitle": {"S":"Song Value 1"}}' \

--region eu-west-1

Timing Your Insert/Read Queries

Lets do some crude inserts and time their replication

for i in {2..10}

do

val=${RANDOM}

t=2

# Insert Items

echo -e "\n\n-=-=- Inserting Item:item\_${i} and Retrieving after ${t} Seconds -=-=-"

aws dynamodb put-item --table-name Music --item '{"Artist": {"S":"item\_'${i}'"},"SongTitle": {"S":"Song Value '${val}'"}}' --region ap-southeast-1

sleep ${t}

# Read Items

time aws dynamodb get-item --table-name Music --key '{"Artist": {"S":"item\_'${i}'"},"SongTitle": {"S":"Song Value '${val}'"}}' --region eu-west-1

done