

DYNAMO DB

DYNAMODB IS A HOSTED NOSQL DATABASE OFFERED BY AMAZON WEB SERVICES (AWS). IT OFFERS:

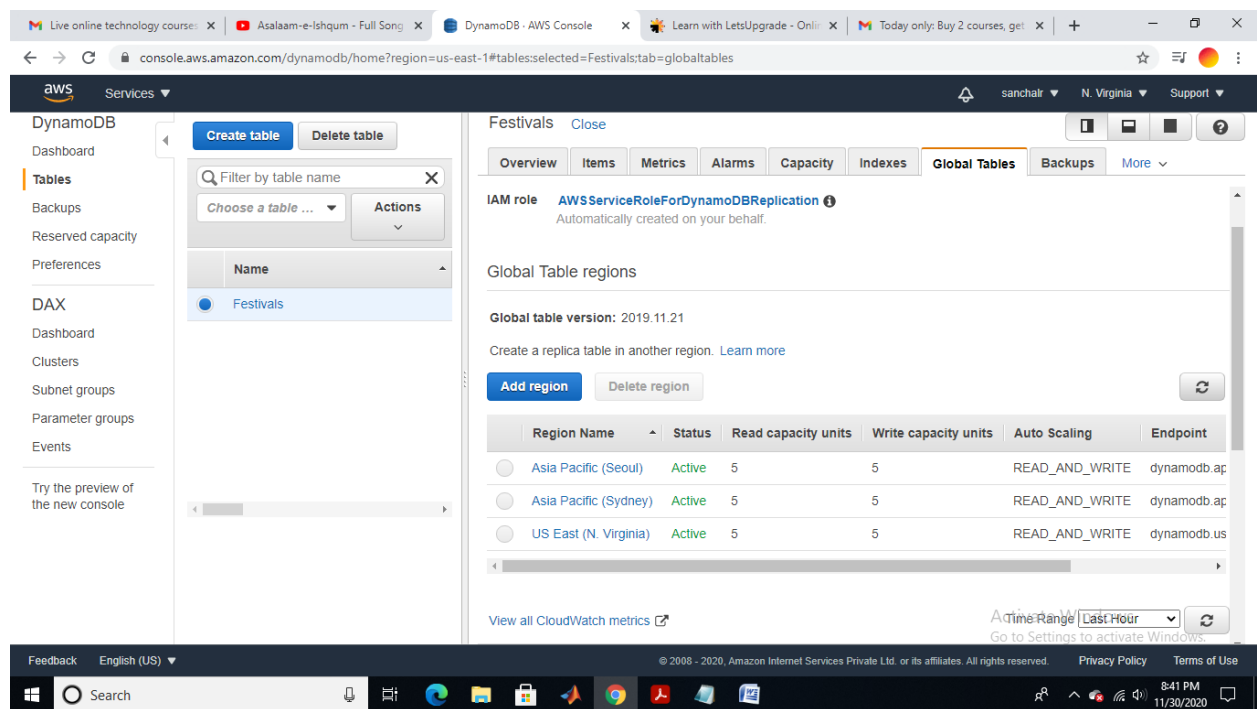
- RELIABLE PERFORMANCE EVEN AS IT SCALES.
- A MANAGED EXPERIENCE, SO YOU WON'T BE SSH-ING INTO SERVERS TO UPGRADE THE CRYPTO LIBRARIES.
- A SMALL, SIMPLE API ALLOWING FOR SIMPLE KEY-VALUE ACCESS AS WELL AS MORE ADVANCED QUERY PATTERNS.

DYNAMODB IS A PARTICULARLY GOOD FIT FOR THE FOLLOWING USE CASES. THEY ARE,

- APPLICATIONS WITH LARGE AMOUNTS OF DATA AND STRICT LATENCY REQUIREMENTS.
- SERVERLESS APPLICATIONS USING AWS LAMBDA.
- DATA SETS WITH SIMPLE, KNOWN ACCESS PATTERNS.

TASK 1: CREATE A DYNAMO DB TABLE WITH MINIMUM TWO DISASTER RECOVERY ZONES AND VERIFY REPLICATION.

TABLE NAMED FESTIVALS IS CREATED.



ABOVE SCREENSHOT SHOWS THE BASE REGION IS N.VIRGINIA.

DISASTER RECOVERY:

DISASTER RECOVERY (DR) IS AN AREA OF SECURITY PLANNING THAT AIMS TO PROTECT AN ORGANIZATION FROM THE EFFECTS OF SIGNIFICANT NEGATIVE EVENTS. HAVING A DISASTER

RECOVERY STRATEGY IN PLACE ENABLES AN ORGANIZATION TO MAINTAIN OR QUICKLY RESUME MISSION-CRITICAL FUNCTIONS FOLLOWING A DISRUPTION.

The screenshot shows the AWS Management Console for the 'Festivals' table in the us-east-1 region. The table is active and has a primary partition key of 'Sweets (String)' and a primary sort key of 'No_Of_Days (String)'. It is configured with a provisioned read/write capacity of 5 units each, enabled auto scaling, and a time-to-live attribute of 6 hours. The table was created on November 30, 2020, at 8:26:16 PM UTC+5:30. The region is US East (N. Virginia) and the Amazon Resource Name (ARN) is arn:aws:dynamodb:us-east-1:618543464581:table/Festivals.

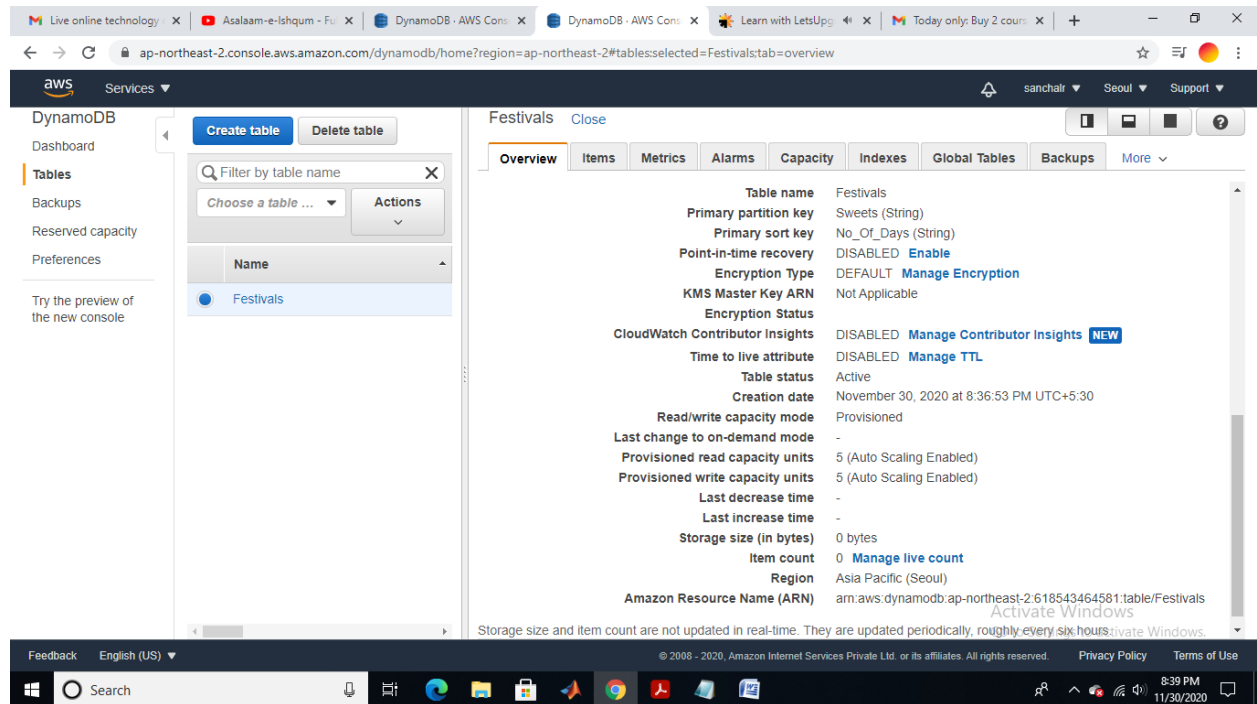
Property	Value
Table name	Festivals
Primary partition key	Sweets (String)
Primary sort key	No_Of_Days (String)
Point-in-time recovery	DISABLED Enable
Encryption Type	DEFAULT Manage Encryption
KMS Master Key ARN	Not Applicable
Encryption Status	DISABLED Manage Contributor Insights NEW
Time to live attribute	DISABLED Manage TTL
Table status	Active
Creation date	November 30, 2020 at 8:26:16 PM UTC+5:30
Read/write capacity mode	Provisioned
Last change to on-demand mode	-
Provisioned read capacity units	5 (Auto Scaling Enabled)
Provisioned write capacity units	5 (Auto Scaling Enabled)
Last decrease time	-
Last increase time	-
Storage size (in bytes)	0 bytes
Item count	0 Manage live count
Region	US East (N. Virginia)
Amazon Resource Name (ARN)	arn:aws:dynamodb:us-east-1:618543464581:table/Festivals

THE FIRST DISASTER RECOVERY REGION IS LOCATED IN SYDNEY.

The screenshot shows the AWS Management Console for the 'Festivals' table in the ap-southeast-2 region. The table is active and has a primary partition key of 'Sweets (String)' and a primary sort key of 'No_Of_Days (String)'. It is configured with a provisioned read/write capacity of 5 units each, enabled auto scaling, and a time-to-live attribute of 6 hours. The table was created on November 30, 2020, at 8:31:44 PM UTC+5:30. The region is Asia Pacific (Sydney) and the Amazon Resource Name (ARN) is arn:aws:dynamodb:ap-southeast-2:618543464581:table/Festivals.

Property	Value
Table name	Festivals
Primary partition key	Sweets (String)
Primary sort key	No_Of_Days (String)
Point-in-time recovery	DISABLED Enable
Encryption Type	DEFAULT Manage Encryption
KMS Master Key ARN	Not Applicable
Encryption Status	DISABLED Manage Contributor Insights NEW
Time to live attribute	DISABLED Manage TTL
Table status	Active
Creation date	November 30, 2020 at 8:31:44 PM UTC+5:30
Read/write capacity mode	Provisioned
Last change to on-demand mode	-
Provisioned read capacity units	5 (Auto Scaling Enabled)
Provisioned write capacity units	5 (Auto Scaling Enabled)
Last decrease time	-
Last increase time	-
Storage size (in bytes)	0 bytes
Item count	0 Manage live count
Region	Asia Pacific (Sydney)
Amazon Resource Name (ARN)	arn:aws:dynamodb:ap-southeast-2:618543464581:table/Festivals

THE SECOND DISASTER RECOVERY REGION IS LOCATED IN SEOUL.



DISASTER RECOVERY (DR):

A STRATEGIC SECURITY PLANNING MODEL THAT SEEKS TO PROTECT AN ENTERPRISE FROM THE EFFECTS OF NATURAL OR HUMAN-INDUCED DISASTER, SUCH AS A TORNADO OR CYBER ATTACK. A DR PLAN AIMS TO MAINTAIN CRITICAL FUNCTIONS BEFORE, DURING, AND AFTER A DISASTER EVENT, THEREBY CAUSING MINIMAL DISRUPTION TO BUSINESS CONTINUITY.

BACKUP:

THE COPYING OF DATA INTO A SECONDARY FORM (I.E. ARCHIVE FILE), WHICH CAN BE USED TO RESTORE THE ORIGINAL FILE IN THE EVENT OF A DISASTER EVENT

BELOW SCREENSHOT SHOWS THE ADDING OF ITEMS IN TABLE:

THE ALLOWED DATA TYPES OF ITEMS ARE STRING, BOOLEAN, BYTE, DATE, CALENDAR, LONG, INTEGER, DOUBLE, FLOAT, BIGDECIMAL, BIGINTEGER.

KEYS

THE PRIMARY KEYS SERVE AS THE MEANS OF UNIQUE IDENTIFICATION FOR TABLE ITEMS, AND SECONDARY INDEXES PROVIDE QUERY FLEXIBILITY. DYNAMODB STREAMS RECORD EVENTS BY MODIFYING THE TABLE DATA.

THE TABLE CREATION REQUIRES NOT ONLY SETTING A NAME, BUT ALSO THE PRIMARY KEY; WHICH IDENTIFIES TABLE ITEMS. NO TWO ITEMS SHARE A KEY. DYNAMODB USES TWO TYPES OF PRIMARY KEYS –

- **PARTITION KEY** – THIS SIMPLE PRIMARY KEY CONSISTS OF A SINGLE ATTRIBUTE REFERRED TO AS THE “PARTITION KEY.” INTERNALLY, DYNAMODB USES THE KEY VALUE AS INPUT FOR A HASH FUNCTION TO DETERMINE STORAGE.
- **PARTITION KEY AND SORT KEY** – THIS KEY, KNOWN AS THE “COMPOSITE PRIMARY KEY”, CONSISTS OF TWO ATTRIBUTES.
 - THE PARTITION KEY AND
 - THE SORT KEY.

DYNAMODB APPLIES THE FIRST ATTRIBUTE TO A HASH FUNCTION, AND STORES ITEMS WITH THE SAME PARTITION KEY TOGETHER; WITH THEIR ORDER DETERMINED BY THE SORT KEY. ITEMS CAN SHARE PARTITION KEYS, BUT NOT SORT KEYS.

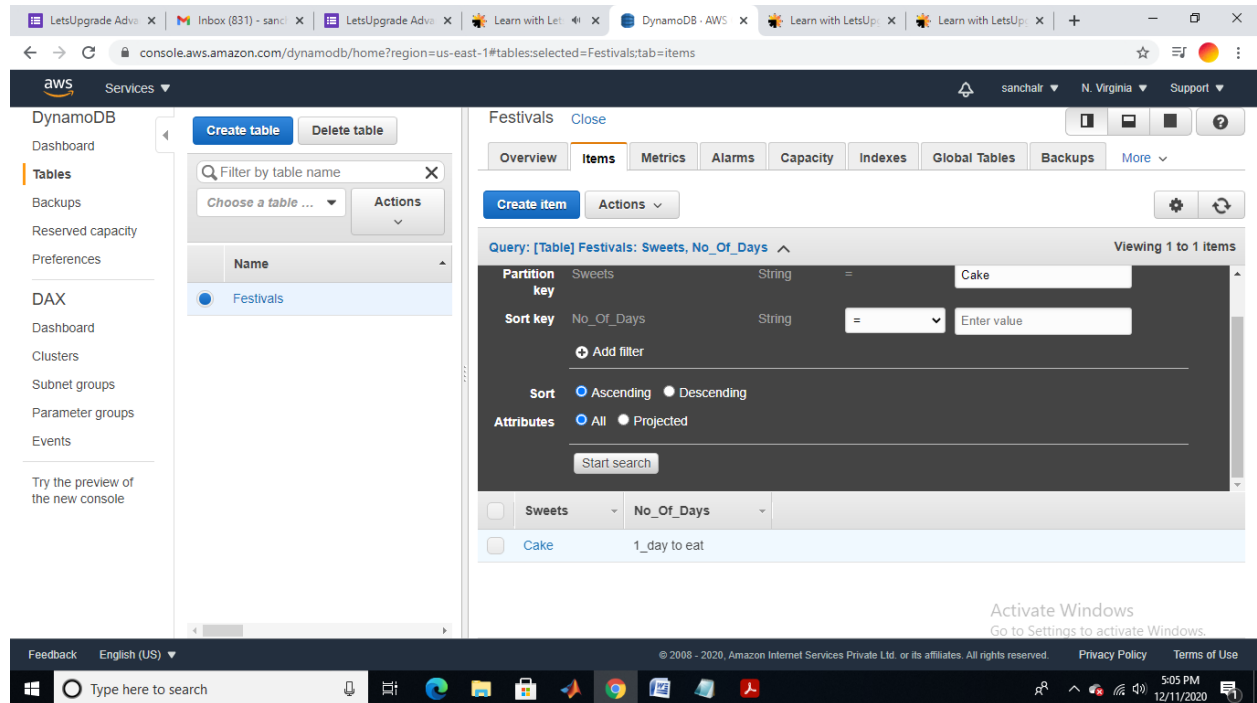
THE PRIMARY KEY ATTRIBUTES ONLY ALLOW SCALAR (SINGLE) VALUES; AND STRING, NUMBER, OR BINARY DATA TYPES. THE NON-KEY ATTRIBUTES DO NOT HAVE THESE CONSTRAINTS.

CAKE, LADDOO, MODAK ARE SWEETS(PARTITION KEY) AND NO_OF_DAYS IS THE SORT KEY.

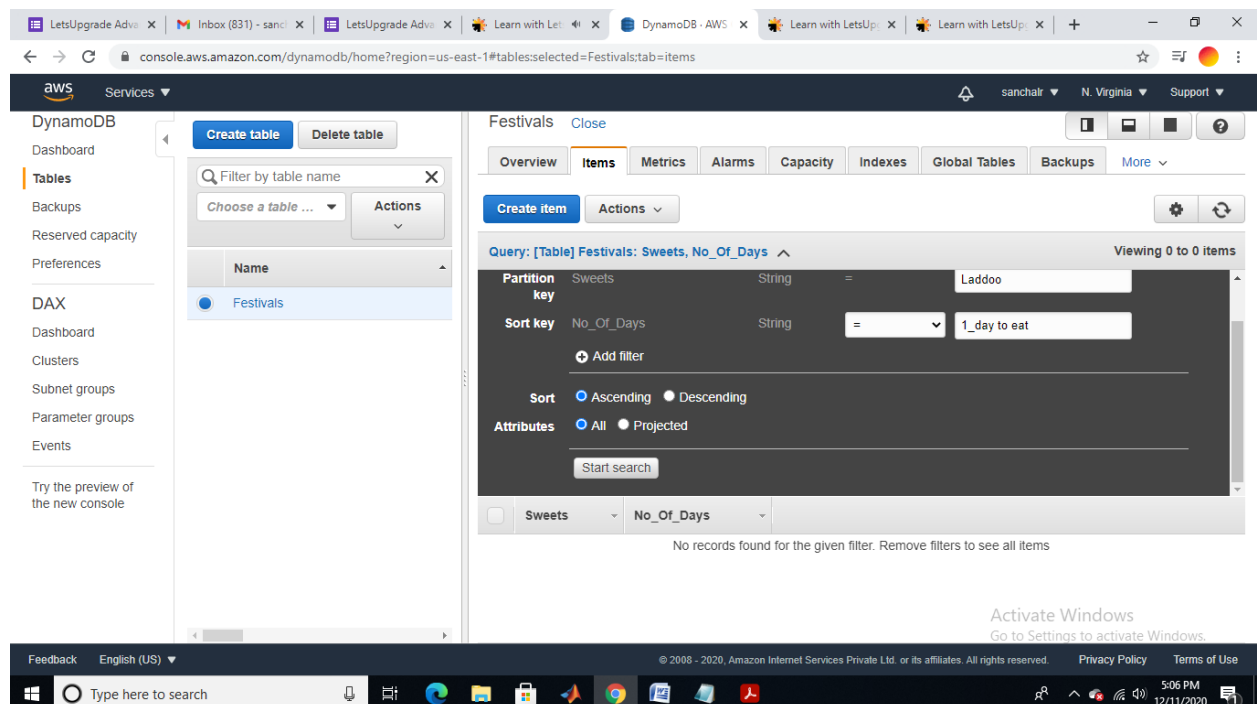
The screenshot shows the AWS DynamoDB console interface. On the left, the 'DynamoDB' sidebar is visible with options like 'Dashboard', 'Tables', 'Backups', etc. The main area displays the 'Festivals' table. The 'Items' tab is selected, showing a list of items. The table's primary key is defined as 'Sweets' (partition key) and 'No_Of_Days' (sort key). The items listed are:

Item	No_Of_Days
Cake	1_day to eat
Laddoo	10_days to eat
Modak	2_days to eat

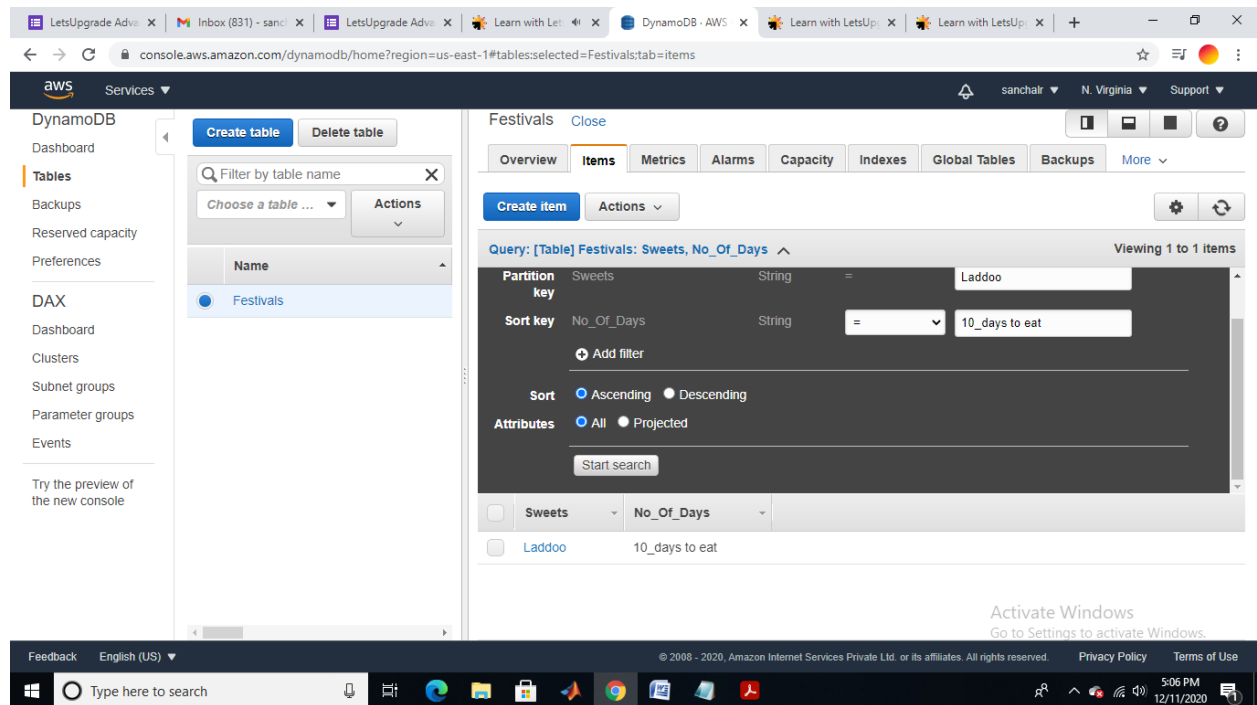
The bottom of the screenshot shows the Windows taskbar with the date 12/11/2020 and time 5:03 PM.



BELOW SCREENSHOT SHOWS THE QUERY SEARCH OF ITEM BY PARTITION KEY AND SORT KEY. BOTH DETAILS SHOULD MATCH IN ORDER TO GET THE DESIRED RESULT.



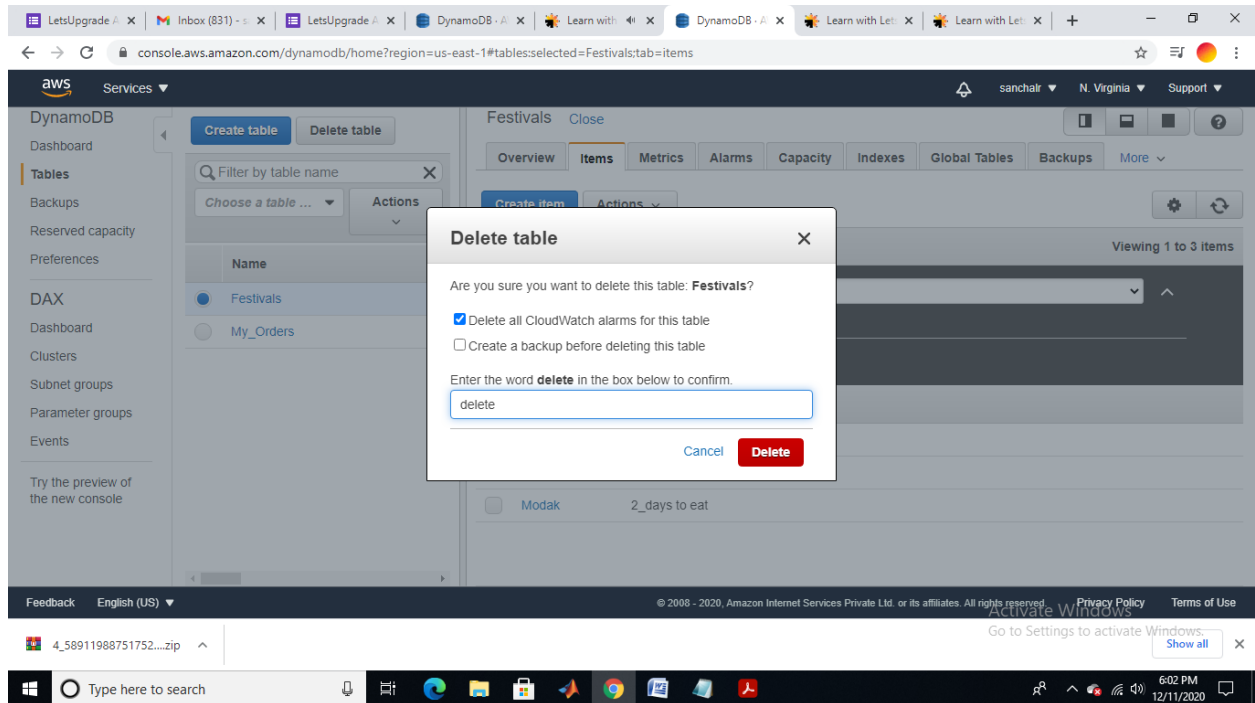
BELOW SCREENSHOT HAS THE APPROPRIATE DETAILS MATCHED AND HENCE THE RESULTS IS DISPLAYED ACCORDINGLY.



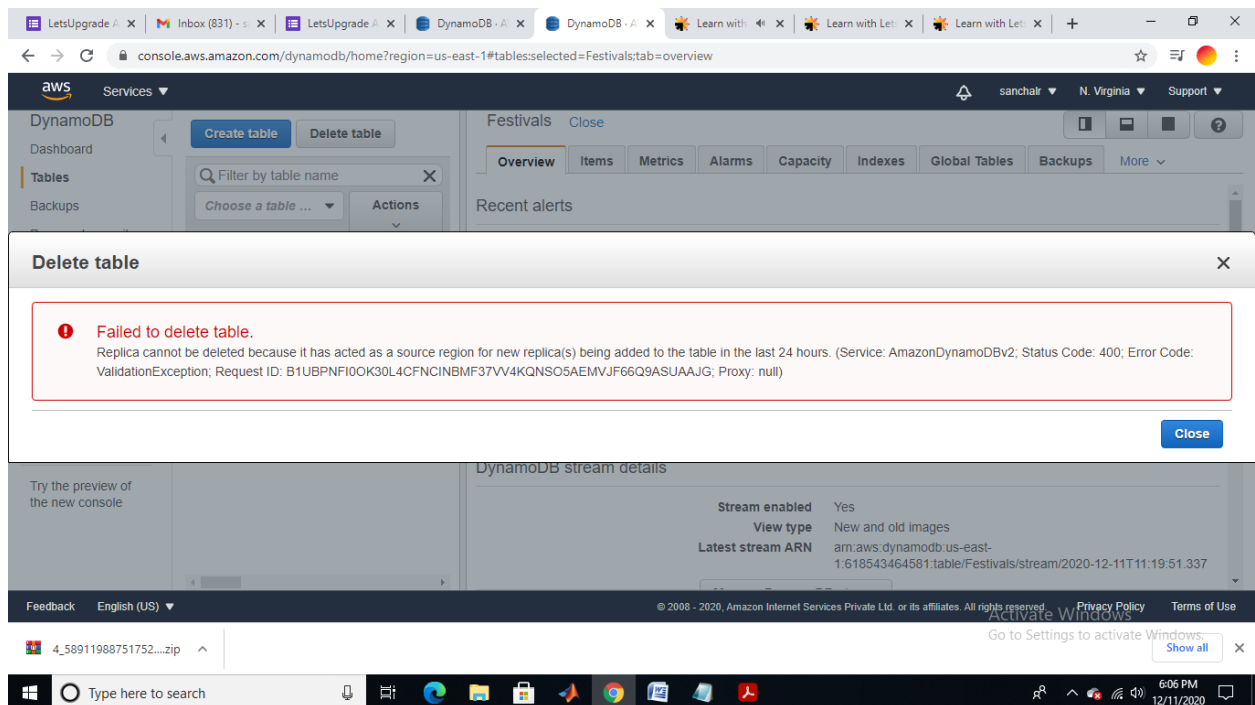
DURING DELETION OF TABLE, IF REPLICAS ARE CREATED OF TABLES IN DIFFERENT REGIONS AND IF THE BASE TABLE IS TO BE DELETED, IT WILL SHOW AN ERROR AS REPLICAS ARE CREATED FROM BASE REGION. AND HENCE, BASE TABLE IN BASE REGION WILL BE CREATED WITHIN 24 HOURS.

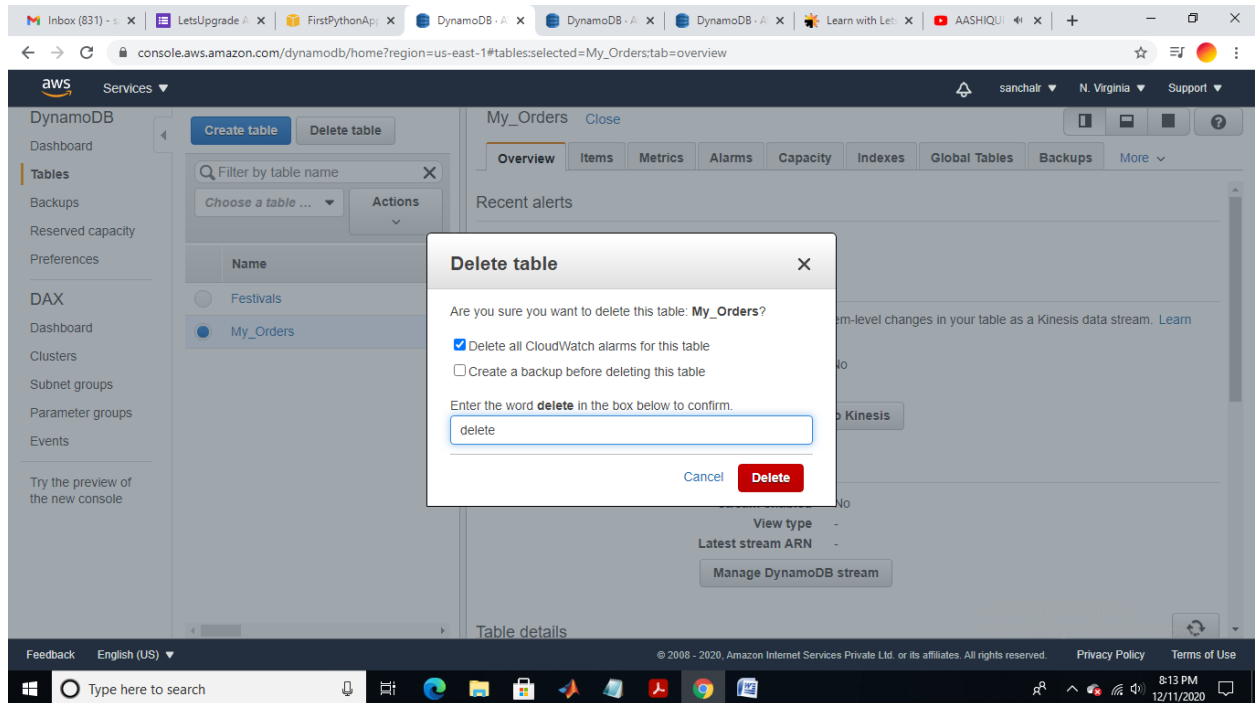
AND THE REPLICAS AND DATA WILL REMAIN EVEN AFTER BASE REGION TABLE IS DELETED.

IF ALL REPLICAS ARE DELETED FIRST AND THEN THE BASE REGION IS DELETED, THE BASE REGION TABLE WILL GET DELETED.

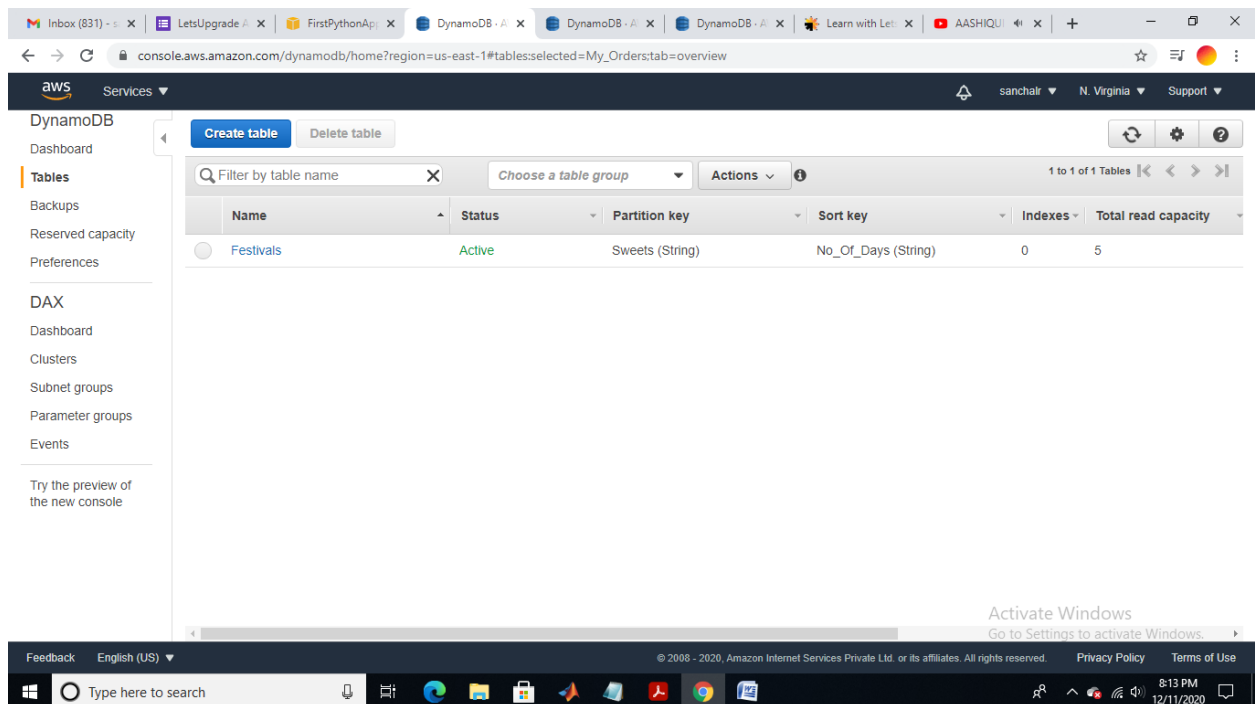


BASE REGION IS NOT DELETED DUE TO REPLICAS.



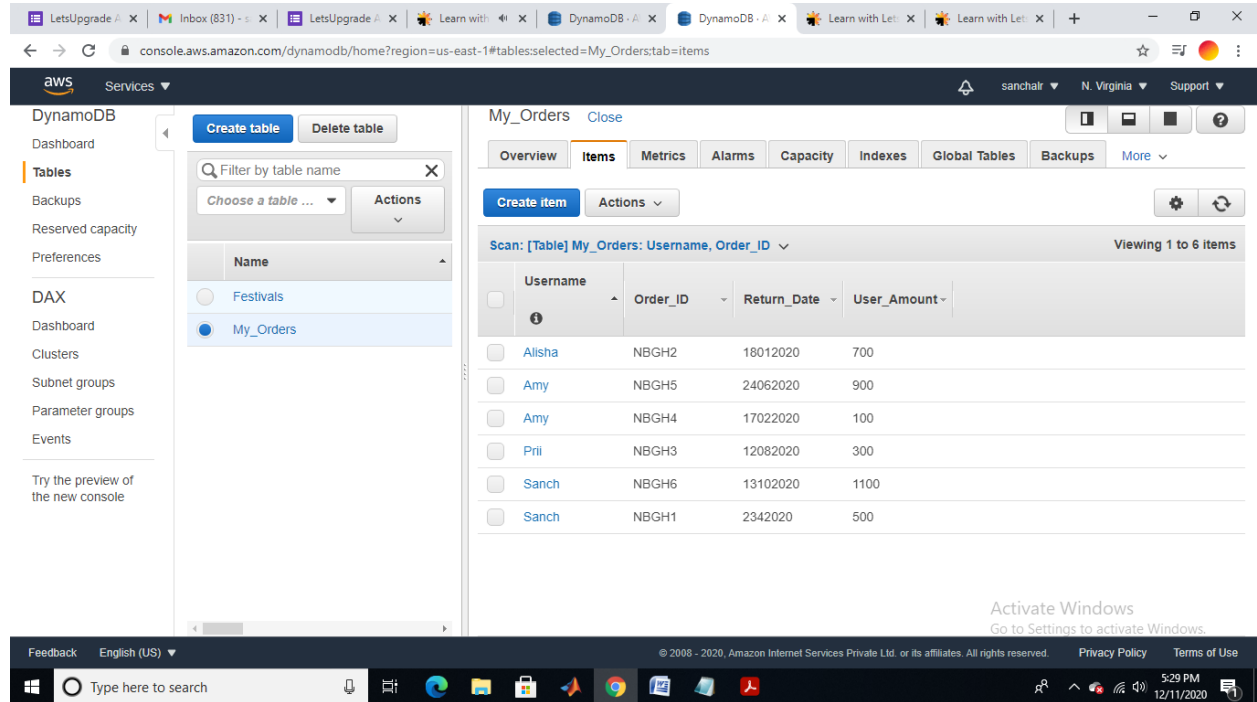


MY-ORDERS TABLE HAS NO REPLICA AND HENCE GETS DELETED IMMEDIATELY AFTER DELETION OPERATION.



TASK 2: CREATING A DYNAMO DB TABLE WITH GLOBAL SECONDARY INDEXES AND FETCHING DATA USING GLOBAL SECONDARY INDEXES.

TABLE NAMED MY_ORDERS IS CREATED WITH 6 ITEMS.



SECONDARY INDEXES

THESE INDEXES ALLOW YOU TO QUERY TABLE DATA WITH AN ALTERNATE KEY. THOUGH DYNAMODB DOES NOT FORCE THEIR USE, THEY OPTIMIZE QUERYING.

DYNAMODB USES TWO TYPES OF SECONDARY INDEXES –

- **GLOBAL SECONDARY INDEX – THIS INDEX POSSESSES PARTITION AND SORT KEYS, WHICH CAN DIFFER FROM TABLE KEYS.**
- **LOCAL SECONDARY INDEX – THIS INDEX POSSESSES A PARTITION KEY IDENTICAL TO THE TABLE , HOWEVER, ITS SORT KEY DIFFERS.**

EACH TABLE IN DYNAMODB CAN HAVE UP TO 20 GLOBAL SECONDARY INDEXES (DEFAULT QUOTA) AND 5 LOCAL SECONDARY INDEXES.

The screenshot shows the AWS Management Console for DynamoDB. The left sidebar lists various services, with 'DynamoDB' selected. The main panel displays the 'My_Orders' table. The 'Indexes' tab is active, showing a table with the following data:

Name	Status	Type	Partition key	Sort key	Attributes	Read capacity
Return_Date-User_Amount	Active	GSI	Return_Date (String)	User_Amount (String)	ALL	5

The bottom of the screen shows the Windows taskbar with the date and time as 5:29 PM on 12/11/2020.

BY USING SCAN FUNCTION, USE PARTITION KEY AND SORT KEY TO FETCH DESIRED RESULT.

The screenshot shows the AWS Management Console for DynamoDB. The left sidebar lists various services, with 'DynamoDB' selected. The main panel displays the 'My_Orders' table. The 'Items' tab is active, showing a scan filter applied to the 'Return_Date-User_Amount-index: Return_D...'. The filter is set to 'Return_Date' (String) 'Between' '12122019' and '18012018'. The results show 4 items:

Username	Order_ID	Return_Date	User_Amount
Alisha	NBGH2	18012018	700
Amy	NBGH4	17022020	100
Prii	NBGH3	12122019	300
Sanch	NBGH6	13102020	1100

The bottom of the screen shows the Windows taskbar with the date and time as 5:39 PM on 12/11/2020.

The screenshot shows the AWS DynamoDB console interface. On the left, the 'Tables' section is active, showing a list of tables: 'Festivals' and 'My_Orders'. The 'My_Orders' table is selected. The main panel displays the 'Items' tab for the 'My_Orders' table. A query is entered: '[Index] Return_Date-User_Amount-Index: Return_Date, User_Amount'. The query parameters are: Partition key: Return_Date (String) = 13102020, Sort key: User_Amount (String) = 1100. The sort order is set to 'Ascending'. The results show one item: Sanch, NBGH6, 13102020, 1100.

Query: [Index] Return_Date-User_Amount-Index: Return_Date, User_Amount

Partition key: Return_Date (String) = 13102020

Sort key: User_Amount (String) = 1100

Sort: Ascending

Username	Order_ID	Return_Date	User_Amount
Sanch	NBGH6	13102020	1100

BELOW SCREENSHOT SHOWS PARTITION KEY AND SORT KEY SELECTION AND RESULT.

The screenshot shows the AWS DynamoDB console interface. On the left, the 'Tables' section is active, showing a list of tables: 'Festivals' and 'My_Orders'. The 'My_Orders' table is selected. The main panel displays the 'Items' tab for the 'My_Orders' table. A query is entered: '[Index] Return_Date-User_Amount-Index: Return_Date, User_Amount'. The query parameters are: Partition key: Return_Date (String) = 18012018, Sort key: User_Amount (String) >= 700. The sort order is set to 'Ascending'. The results show one item: Alisha, NBGH2, 18012018, 700.

Query: [Index] Return_Date-User_Amount-Index: Return_Date, User_Amount

Partition key: Return_Date (String) = 18012018

Sort key: User_Amount (String) >= 700

Sort: Ascending

Username	Order_ID	Return_Date	User_Amount
Alisha	NBGH2	18012018	700

TASK 3: DEPLOYING A PYTHON APPLICATION IN ELASTIC BEANSTALK.

ELASTIC BEANSTALK MAKES IT EVEN EASIER FOR DEVELOPERS TO QUICKLY DEPLOY AND MANAGE APPLICATIONS IN THE AWS CLOUD. DEVELOPERS SIMPLY UPLOAD THEIR APPLICATION, AND ELASTIC BEANSTALK AUTOMATICALLY HANDLES THE DEPLOYMENT DETAILS OF CAPACITY PROVISIONING, LOAD BALANCING, AUTO-SCALING, AND APPLICATION HEALTH MONITORING.

ADVANTAGES ARE:

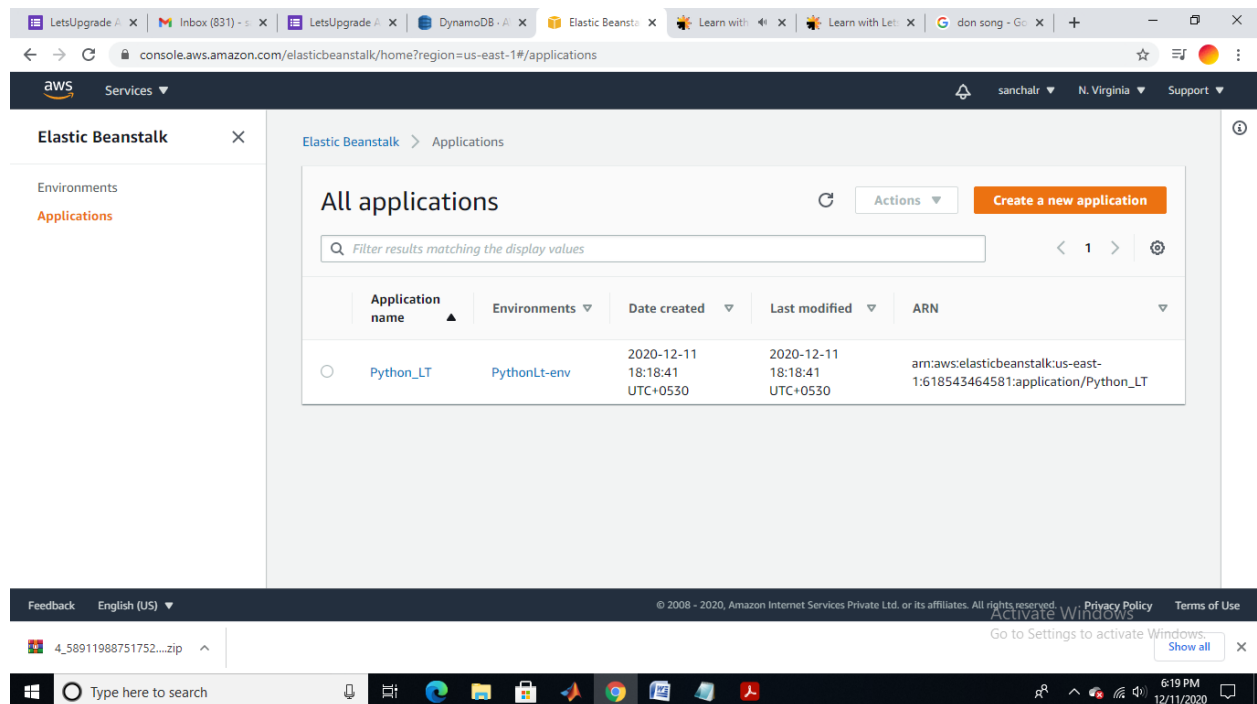
- LIGHTNING FAST CONFIGURATION WITH AUTOMATION.
- POWERFUL CUSTOMIZATION.
- PRICE AND FLEXIBILITY.

DRAWBACKS ARE:

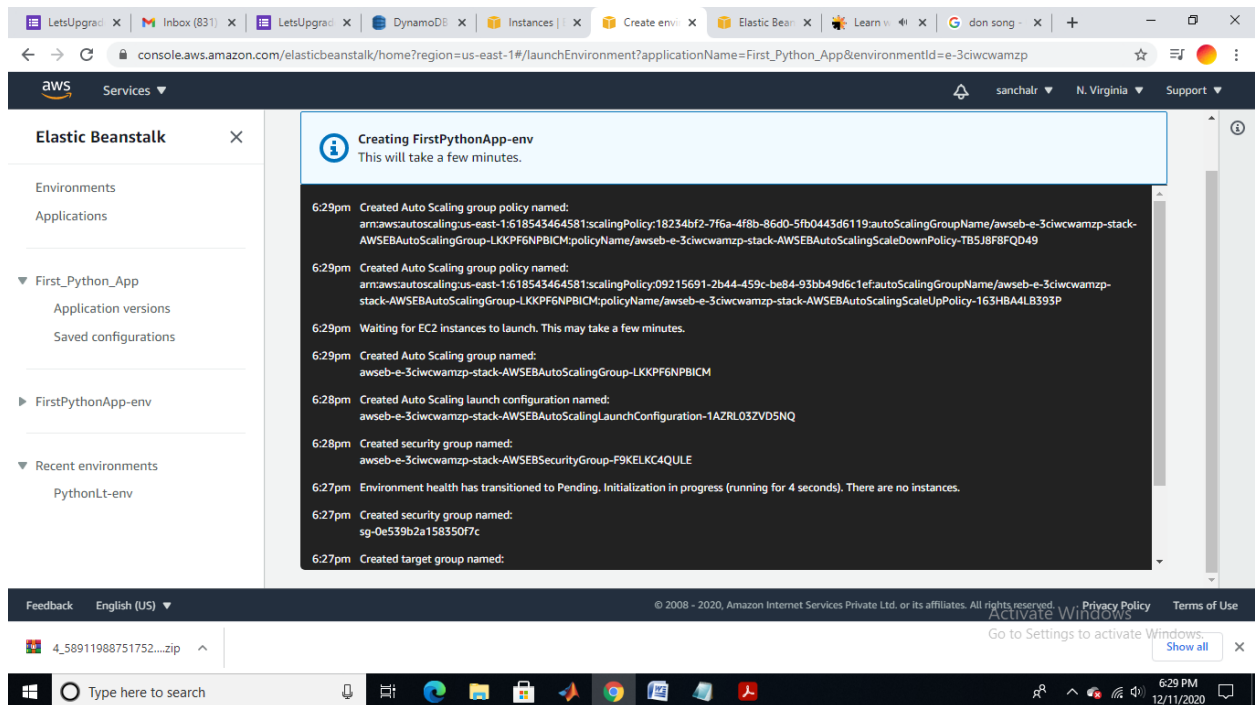
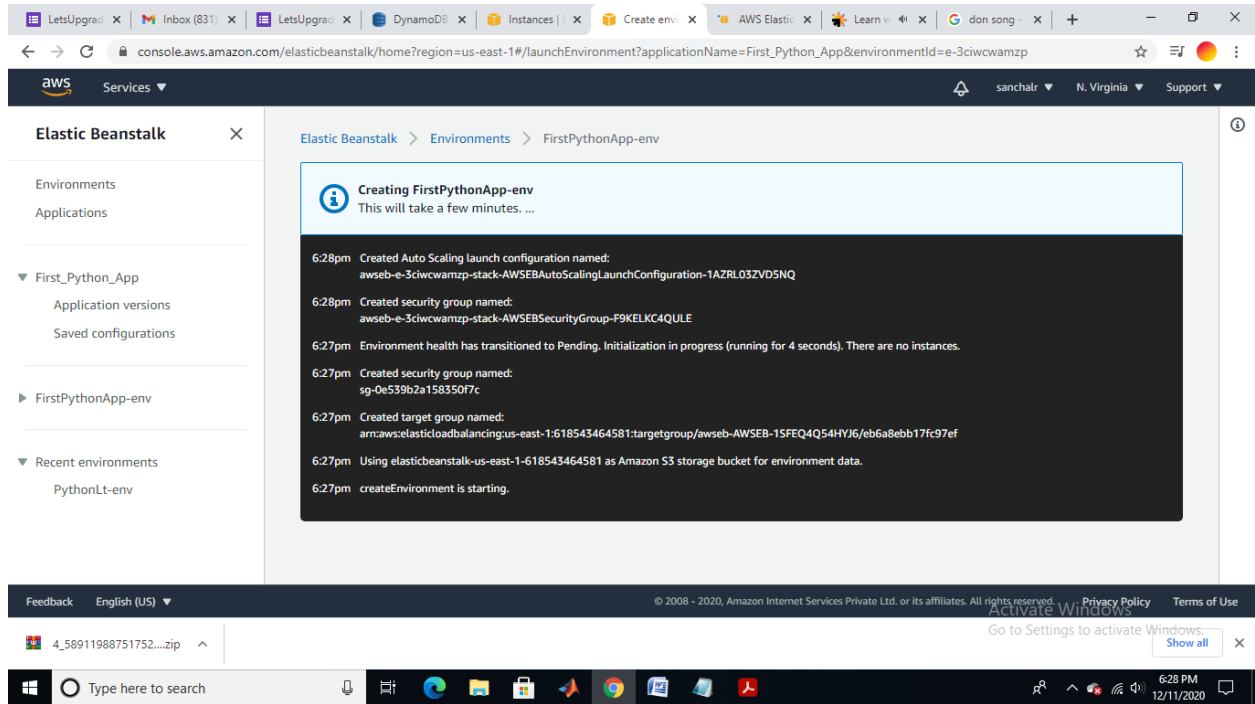
- UNRELIABLE DEPLOYMENT.
- DEPLOYMENT SPEED.
- STACK UPGRADES.

AN AWS ELASTIC BEANSTALK ENVIRONMENT IS A COLLECTION OF AWS RESOURCES RUNNING AN APPLICATION VERSION. YOU CAN DEPLOY MULTIPLE ENVIRONMENTS WHEN YOU NEED TO RUN MULTIPLE VERSIONS OF AN APPLICATION. FOR EXAMPLE, YOU MIGHT HAVE DEVELOPMENT, INTEGRATION, AND PRODUCTION ENVIRONMENTS.

PYTHON ENVIRONMENT IS CREATED NAMED PYTHON LT.



BELOW SCREENSHOT SHOWS THE CREATION ORDERS OF ALL SERVICES REQUIRED TO CREATE THESE ENVIRONMENTS.



Creating FirstPythonApp-env
This will take a few minutes. ..

arn:aws:autoscaling:us-east-1:618543464581:scalingPolicy:09215691-2b44-459c-be84-93bb49d6c1ef:autoScalingGroupName/awseb-e-3ciwcwamzp-stack-AWSEBAutoScalingGroup-LKKPF6NPBICM:policyName/awseb-e-3ciwcwamzp-stack-AWSEBAutoScalingScaleUpPolicy-163HBA4LB393P

6:29pm Waiting for EC2 instances to launch. This may take a few minutes.

6:29pm Created Auto Scaling group named:
awseb-e-3ciwcwamzp-stack-AWSEBAutoScalingGroup-LKKPF6NPBICM

6:28pm Created Auto Scaling launch configuration named:
awseb-e-3ciwcwamzp-stack-AWSEBAutoScalingLaunchConfiguration-1AZRL03ZVD5NQ

6:28pm Created security group named:
awseb-e-3ciwcwamzp-stack-AWSEBSecurityGroup-F9KELKC4QULE

6:27pm Environment health has transitioned to Pending. Initialization in progress (running for 4 seconds). There are no instances.

6:27pm Created security group named:
sg-0e539b2a158350f7c

6:27pm Created target group named:
arn:aws:elasticloadbalancing:us-east-1:618543464581:targetgroup/awseb-AWSEB-15FEQ4Q54HYJ6/eb6a8ebb17fc97ef

6:27pm Using elasticbeanstalk-us-east-1-618543464581 as Amazon S3 storage bucket for environment data.

6:27pm createEnvironment is starting.

ONE ENVIRONMENT HAS SAMPLE APPLICATION DEPLOYED.

PythonLt-env
PythonLt-env.eba-ypmbm398.us-east-1.elasticbeanstalk.com (e-mwugqdnes)
Application name: Python_LT

Health
Ok
Causes

Running version
Sample Application
Upload and deploy

Platform
Python 3.7 running on 64bit Amazon Linux 2/3.1.3
Change

Recent events
Show all

BELOW SCREENSHOT SHOWS 2 ENVIRONMENTS ARE CREATED.

The screenshot shows the AWS Elastic Beanstalk console. The left sidebar has a menu with 'Environments' and 'Applications'. The main content area is titled 'All environments' and contains a table with the following data:

Environment name	Health	Application name	Date created	Last modified	URL	Running versions
FirstPythonApp-env	OK	First_Python_App	2020-12-11 18:27:27 UTC+0530	2020-12-11 18:30:11 UTC+0530	domain123.us-east-1.elasticbeanstalk.com	first_python_source
PythonLt-env	OK	Python_LT	2020-12-11 18:18:49 UTC+0530	2020-12-11 18:22:17 UTC+0530	PythonLt-env.eba-ypmbm398.us-east-1.elasticbeanstalk.com	Sample Application

The bottom of the screenshot shows a Windows taskbar with the system clock at 6:30 PM on 12/11/2020.

HEALTH CHECK OF ENVIRONMENT IS REQUIRED AS THE OUTPUT OR ERRORS CAN BE RECTIFIED AND SOLVED THEREAFTER.

The screenshot shows the AWS Elastic Beanstalk console for a specific environment named 'FirstPythonApp-env'. The left sidebar has a menu with 'Environments' and 'Applications'. The main content area shows the environment details:

- Health:** A green checkmark icon with the text 'Ok' and a 'Causes' button.
- Running version:** 'uploaded_one-1' with an 'Upload and deploy' button.
- Platform:** 'Python 3.7 running on 64bit Amazon Linux 2/3.1.3' with a 'Change' button.
- Recent events:** A section with a 'Show all' button and a table with columns 'Time', 'Type', and 'Details'.

The bottom of the screenshot shows a Windows taskbar with the system clock at 8:11 PM on 12/11/2020.

AFTER SUCCESSFUL UPLOAD AND DEPLOY, THE DEPLOYED APPLICATION IS DISPLAYED VIA DNS NAME OF ELASTIC BEANSTALK SELECTED ENVIRONMENT.

