

Challenge 1

Real Time Analytics Using Synapse and Cosmos DB

This document will provide a step-by-step guide to configure and run the entire solution. For the ease of navigation, the guide is divided into 6 different key steps.

1. Prerequisites
2. Deploying and configuring Cosmos Db
3. Deploying and configuring Synapse analytics
4. Connecting and configuring PowerBI
5. Creating visuals
6. End to End test

There is also an advanced section at the end of the challenge which will allow you to stream real time transactions using powershell.

p.s. In certain steps you will need to use exact names or settings as provided in the guide, these are highlighted in the **red** in the guide.



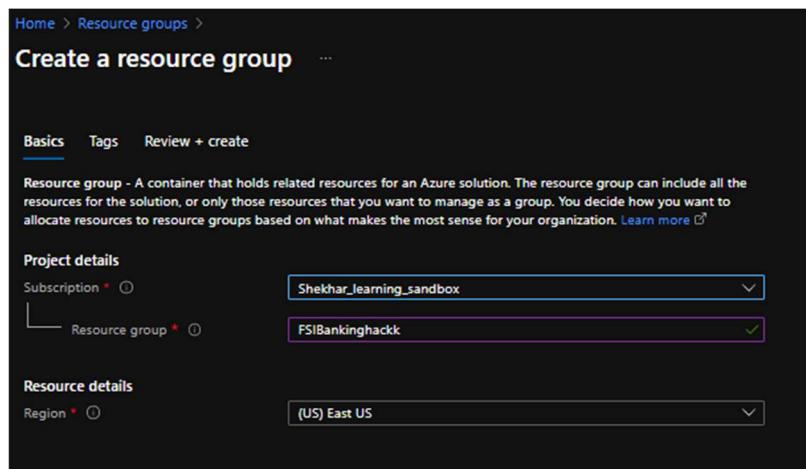
Step 0 - Before you start (Pre-requisites)

These are the key pre-requisites to deploy this solution:

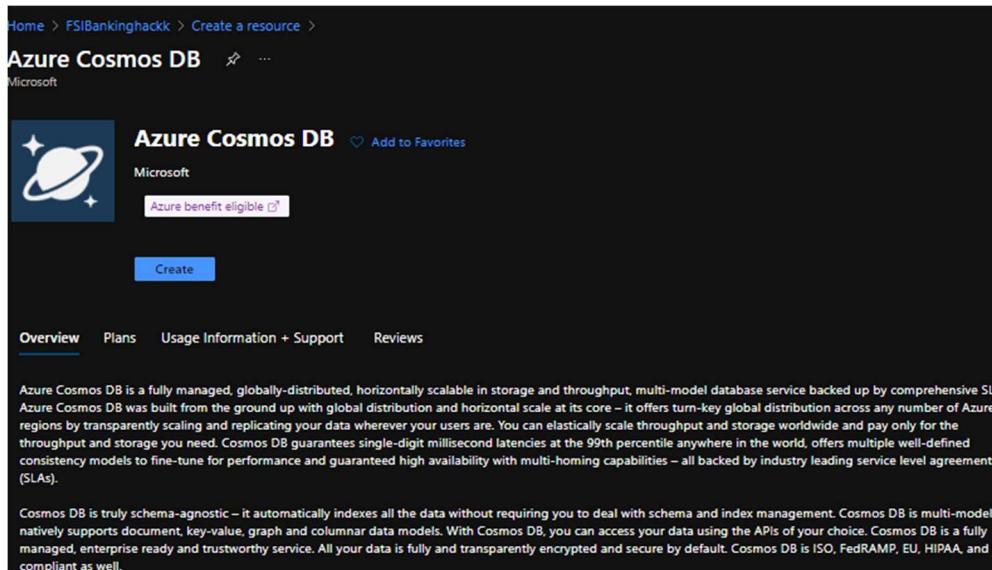
- You need a Microsoft Azure account to create the services used in this solution. You can create a [free account](#), use your MSDN account, or any other subscription where you have permission to create Azure services.
- Go to the github repo for the hack
<https://github.com/shkumar64/msbankinghack>
Click on code and download Zip. Create a folder on your PC and unzip the contents

Step 1 – Provision and Configure CosmosDb

- i. Log onto Azure portal with your credentials – ms.portal.azure.com
- ii. Create a resource group and name it FSIBankinghack (or any name of choice)

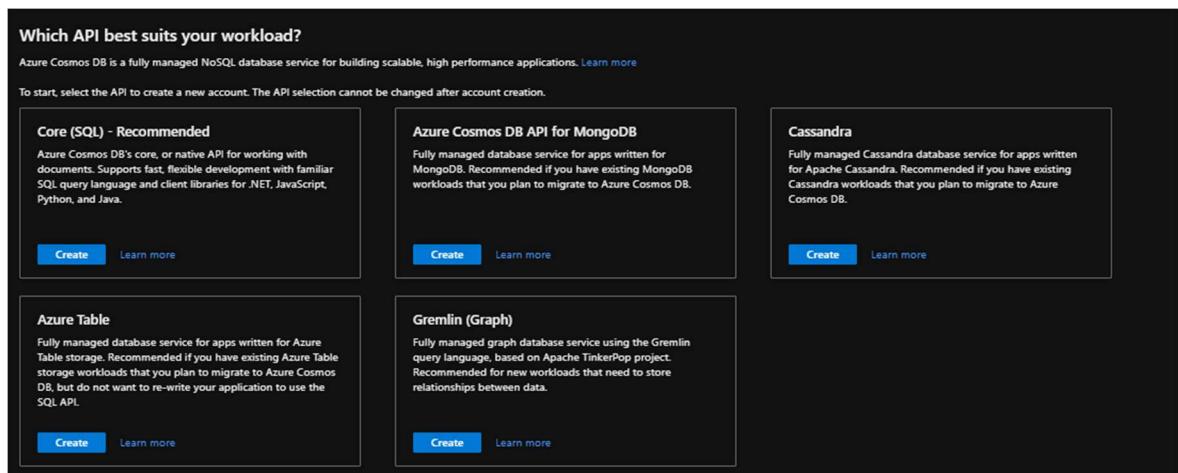


- iii. Click on the resource group and click on “create a resource” and search for cosmosDb on the search bar, select and then click on create



The screenshot shows the Azure Cosmos DB landing page. At the top, there's a navigation bar with 'Home > FSIBankinghackk > Create a resource >'. The main title is 'Azure Cosmos DB' with a Microsoft logo. Below the title is a large blue button labeled 'Create'. There are tabs for 'Overview', 'Plans', 'Usage Information + Support', and 'Reviews'. A section titled 'Azure Cosmos DB' describes it as a fully managed, globally-distributed, horizontally scalable database service. It mentions support for schema-agnostic indexing, multi-model data storage, and various compliance standards.

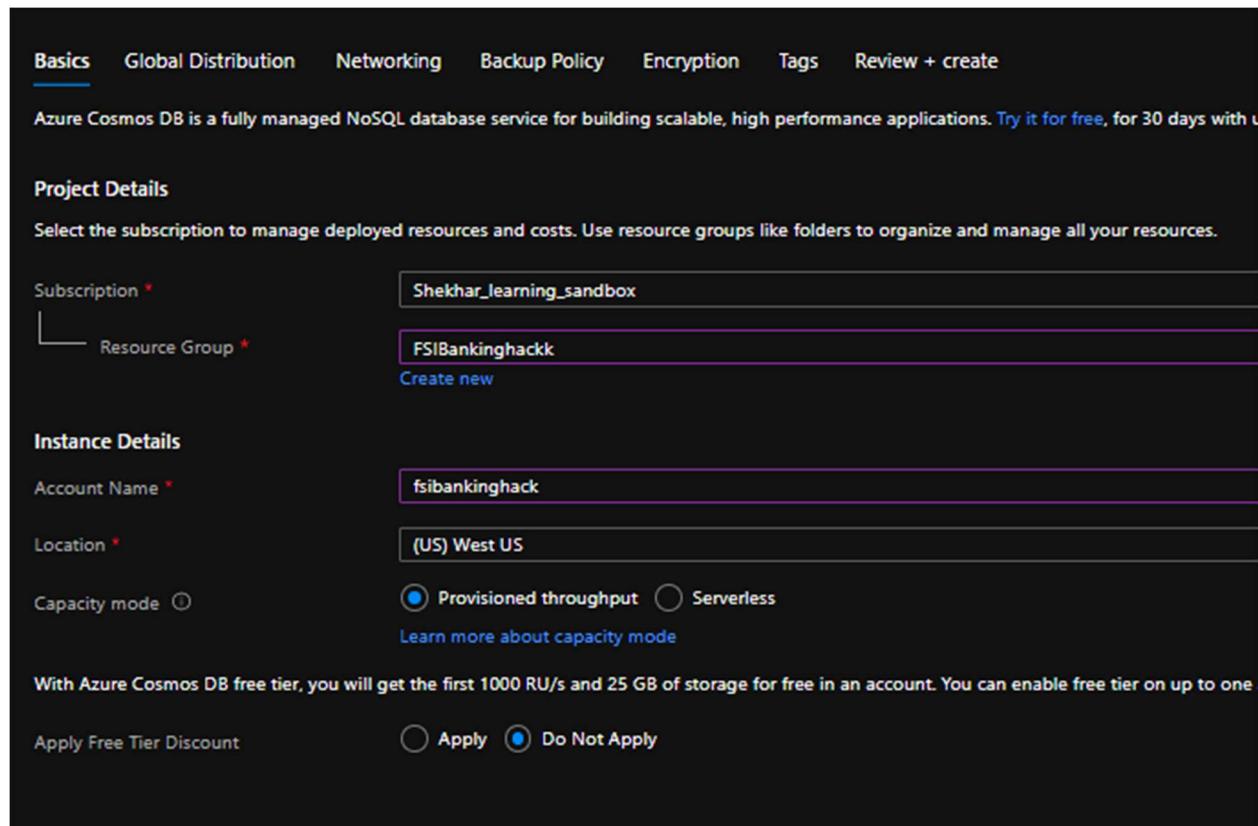
iv. Select the CoreSQL API from the list



The screenshot shows a selection interface for choosing an API. The heading is 'Which API best suits your workload?'. It says 'To start, select the API to create a new account. The API selection cannot be changed after account creation.' There are five options in boxes:

- Core (SQL) - Recommended**: 'Azure Cosmos DB's core, or native API for working with documents. Supports fast, flexible development with familiar SQL query language and client libraries for .NET, JavaScript, Python, and Java.' Includes 'Create' and 'Learn more' buttons.
- Azure Cosmos DB API for MongoDB**: 'Fully managed database service for apps written for MongoDB. Recommended if you have existing MongoDB workloads that you plan to migrate to Azure Cosmos DB.' Includes 'Create' and 'Learn more' buttons.
- Cassandra**: 'Fully managed Cassandra database service for apps written for Apache Cassandra. Recommended if you have existing Cassandra workloads that you plan to migrate to Azure Cosmos DB.' Includes 'Create' and 'Learn more' buttons.
- Azure Table**: 'Fully managed database service for apps written for Azure Table storage. Recommended if you have existing Azure Table storage workloads that you plan to migrate to Azure Cosmos DB, but do not want to re-write your application to use the SQL API.' Includes 'Create' and 'Learn more' buttons.
- Gremlin (Graph)**: 'Fully managed graph database service using the Gremlin query language, based on Apache TinkerPop project. Recommended for new workloads that need to store relationships between data.' Includes 'Create' and 'Learn more' buttons.

v. Choose a name and select provisioned throughput **do not select apply free tier discount**



Azure Cosmos DB is a fully managed NoSQL database service for building scalable, high performance applications. Try it for free, for 30 days with up to 1000 RU/s and 25 GB of storage.

Project Details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * Shekhar_learning_sandbox

Resource Group * FSIBankinghackk
Create new

Instance Details

Account Name * fsibankinghack

Location * (US) West US

Capacity mode Provisioned throughput Serverless
[Learn more about capacity mode](#)

With Azure Cosmos DB free tier, you will get the first 1000 RU/s and 25 GB of storage for free in an account. You can enable free tier on up to one account.

Apply Free Tier Discount Apply Do Not Apply

- vi. Select Review and Create and then select Create after validation is passed. This takes about 2 minutes.
- vii. After deployment is successful click on “go to resource” which will navigate you to menu page of the provisioned cosmosDb. Under settings go to “Features” . Enable the Synapse link feature. This will take 2-3 minutes.



The screenshot shows the Azure Cosmos DB Quick start page for the 'fsibankinghack' account. It displays two main steps:

- Step 1: Add a container**

In Azure Cosmos DB, data is stored in containers.

Create 'Items' container

Create 'Items' container with 400 Request Units per second (RU/s) throughput capacity, for up to 400 reads/sec. To see your container, go to Data Explorer.
- Step 2: Download and run your .NET app**

Once container is created, download a sample .NET app connected to it, extract, build and run.

Download

The screenshot shows the 'Features' section of the Azure Cosmos DB settings. The 'Azure Synapse Link' feature is listed with the status 'Off'. A callout box provides information about Azure Synapse Link:

Azure Synapse Link for Cosmos DB creates a tight integration between Azure Cosmos DB and Azure Synapse Analytics enabling customers to run near real-time analytics over their operational data with no-ETL and full performance isolation from their transactional workloads. By combining the distributed scale of Cosmos DB's transactional processing with built-in analytical store and the computing power of Azure Synapse Analytics, Azure Synapse Link enables Hybrid Transactional/Analytical Processing (HTAP) architectures for optimizing business processes. This integration eliminates ETL processes, enabling business analysts & data scientists to self-serve and run near real-time BI, analytics and ML pipelines over operational data.

Learn More

Enable **Close**

viii. On the cosmosDb Homepage click on Data Explorer and select New Container

The screenshot shows the 'Data Explorer' page for the 'fsibankinghack' account. The main area displays the 'Welcome to Cosmos DB' message: "Globally distributed, multi-model database service for any scale". It features two main buttons:

- Start with Sample**: Get started with a sample provided by Cosmos DB.
- New Container**: Create a new container for storage and throughput.

The left sidebar contains a navigation menu with the following items:

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Quick start
- Notifications
- Data Explorer** (selected)
- Settings
- Features
- Replicate data globally
- Default consistency
- Backup & Restore
- Firewall and virtual networks
- Private Endpoint Connections
- CORS
- Dedicated Gateway
- Keys
- Advisor Recommendations
- Add Azure Cognitive Search
- Add Azure Function
- Advanced security (preview)

ix. Use

- a. **DatabaseId - fsi-marketdata**
- b. **Throughput – Autoscale**
- c. **ContainerId – fintransactions**
- d. **PartitionKey - /TransactionType**
- e. **Analytical Store – On**

New Container

* Database id ⓘ
 Create new Use existing
fsi-marketdata

Share throughput across containers ⓘ

* Database throughput (autoscale) ⓘ
 Autoscale Manual
Estimate your required RU/s with [capacity calculator](#).

Database Max RU/s ⓘ
4000

Your database throughput will automatically scale from **400 RU/s (10% of max RU/s)** - **4000 RU/s** based on usage.
Estimated monthly cost (USD) ⓘ: \$35.04 - \$350.40 (1 region, 400 - 4000 RU/s, \$0.00012/RU)

* Container id ⓘ
fintransactions

* Partition key ⓘ
For small workloads, the item ID is a suitable choice for the partition key.
/TransactionType

Unique keys ⓘ
+ Add unique key

Analytical store ⓘ
 On Off
Advanced

OK

x. After the container is provisioned, we will seed transactional data to cosmos db. Open the container and click on upload item.



Directory: Microsoft

SQL API Items Settings

formsData fsi-marketdata

Scale fintransactions

Items Settings Stored Procedures User Defined Functions Triggers

id /Transact...
8da359c6-dff9... Cash
c3df2814-f816... ACH
4c131f15-ac3c... Check
84dec9ea-77c... WireTransfer
c554d2e2-e27... POS
8a6e234b-e82... Cash
ebe89061-1b5... Check
704c2e4d-a31... Cash
0e7a66e5-15d... Check
28a43a08-3b9... POS
75c1c57d-5ec... ACH
d063442a-12b... WireTransfer
7e7c6ef8-955f... Cash

Upload Items

Select JSON Files

Create new or work with existing document(s)

- xi. Navigate to challenge 1 folder downloaded from step 0. Find the file name fintransactions1.json and upload. Refresh the page and you should be able to see data created inside the container.

Directory: Microsoft

SQL API Items Settings

formsData fsi-marketdata

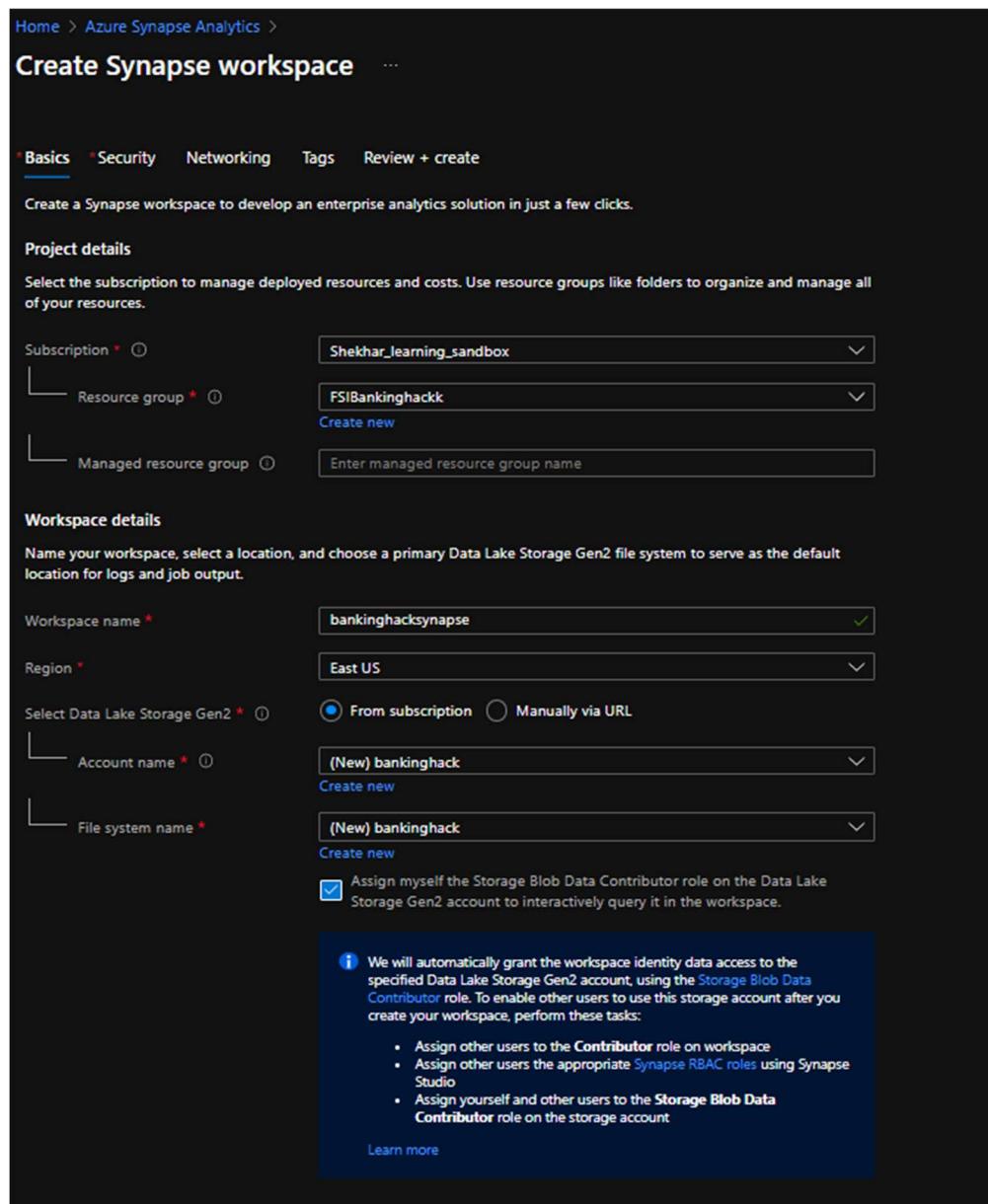
Scale fintransactions

Items Settings Stored Procedures User Defined Functions Triggers

id /Transact...
8da359c6-dff9... Cash
c3df2814-f816... ACH
4c131f15-ac3c... Check
84dec9ea-77c... WireTransfer
c554d2e2-e27... POS
8a6e234b-e82... Cash
ebe89061-1b5... Check
704c2e4d-a31... Cash
0e7a66e5-15d... Check
28a43a08-3b9... POS
75c1c57d-5ec... ACH
d063442a-12b... WireTransfer
7e7c6ef8-955f... Cash
7ef9252a-a2cf... Check
c4aaef94-a5f7... Check
8d11929f-ea1... ACH
8e91bc21-919... WireTransfer
580b0504-be0... Check
5201393e-352... WireTransfer
344095ea-2c7... ACH
b786da34-5eb... POS
243523f9-820... WireTransfer
a093f2e-811... Cash
bfef4746-d91... Cash
87656519-47a... POS

Step 3 – Provision and Configure Synapse Workspace

- i. Go to the resource group on Azure portal



Home > Azure Synapse Analytics >

Create Synapse workspace

[Basics](#) [Security](#) [Networking](#) [Tags](#) [Review + create](#)

Create a Synapse workspace to develop an enterprise analytics solution in just a few clicks.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all of your resources.

Subscription *

Resource group * [Create new](#)

Managed resource group

Workspace details

Name your workspace, select a location, and choose a primary Data Lake Storage Gen2 file system to serve as the default location for logs and job output.

Workspace name *

Region *

Select Data Lake Storage Gen2 * From subscription Manually via URL

Account name * [Create new](#)

File system name * [Create new](#)

Assign myself the Storage Blob Data Contributor role on the Data Lake Gen2 account to interactively query it in the workspace.

Note: We will automatically grant the workspace identity data access to the specified Data Lake Storage Gen2 account, using the [Storage Blob Data Contributor](#) role. To enable other users to use this storage account after you create your workspace, perform these tasks:

- Assign other users to the [Contributor](#) role on workspace
- Assign other users the appropriate [Synapse RBAC roles](#) using [Synapse Studio](#)
- Assign yourself and other users to the [Storage Blob Data Contributor](#) role on the storage account

[Learn more](#)



ii. Go to Security and choose a password .. recommended password P@ssw0rd

The screenshot shows the 'Create Synapse workspace' interface on the Microsoft Azure portal. The 'Security' tab is selected. The 'SQL administrator credentials' section contains fields for 'SQL Server admin login' (set to 'sqladminuser'), 'SQL Password' (redacted), and 'Confirm password' (redacted). Below this, the 'System assigned managed identity permission' section includes a checkbox for 'Allow pipelines (running as workspace's system assigned identity) to access SQL pools' (checked) and another for 'Allow network access to Data Lake Storage Gen2 account' (unchecked). A note states that the selected Data Lake Storage Gen2 account does not restrict network access using any network access rules, or you selected a storage account manually via URL under Basics tab. The 'Workspace encryption' section features a warning about double encryption configuration being不可变 (immutable) after creation. It also includes a note about encrypting all data at rest with a customer-managed key and a radio button for 'Disable' (selected).

iii. Select review and create and wait for workspace to provisioned, once ready go to synapse workspace and click on open Synapse studio



Screenshot of the Azure portal showing the overview of an Azure Synapse Analytics workspace named "FSIBankinghack".

Essentials

- Resource group (change) : FSIBankinghack
- Status : Succeeded
- Location : East US
- Subscription (change) : Shekhar_learning_sandbox
- Subscription ID : 4f560746-383b-4e4d-8ddb-ccc43ac78c01
- Managed virtual network : No
- Managed identity object ... : 883abf19-c8bf-4e4d-8ddb-ccc43ac78c0c
- Workspace web URL : https://web.azure-synapse.net?workspace=%2fsubscriptions%2f4f560746-38...
- Tags (change) : Click here to add tags

Getting started

- Open Synapse Studio : Start building your fully-integrated analytics solution and unlock new insights. [Open](#)
- Read documentation : Learn how to be productive quickly. Explore concepts, tutorials, and samples. [Learn more](#)

Analytics pools

Name	Type	Size
SQL pools	Serverless	Auto
Built-in	Serverless	Auto
Apache Spark pools		

- iv. On synapse studio jump to Data tab and click on the plus icon and create a new sql database. Select serverless and choose a name.

Screenshot of the Azure Synapse Studio Data tab.

The top navigation bar includes: Synapse live, Validate all, Publish all.

The main area shows the **Data** tab selected, with the **Workspace** section active.

A modal window is open under the **Linked** heading:

- SQL database
- Connect to external data
- Integration dataset
- Browse gallery



Create SQL database

Create database to organize your workload into databases and database objects.

Select SQL pool type *

Serverless i

Dedicated i

Database *

fsibankinghackk

- v. After the database is provisioned go to views and right click and select new sql script, new view



Microsoft Azure | Synapse Analytics > bankinghacksynapse

Search

Synapse live Validate all Publish all

Data

Workspace Linked

Filter resources by name

Databases 1

fsibankinghack (SQL)

- External resources
- External tables
- Schemas
- Security

Views

New SQL script New view Refresh

Select an item

Use the resource explorer to select or create a new item.

- vi. From the github folder copy contents of createview script and copy into the new script pane. Replace the cosmos account name and key with details of your cosmos account

```
CREATE VIEW [dbo].[finalreport]
AS SELECT * FROM
OPENROWSET(
'CosmosDB',
'Account=<yourcosmosaccountname>;
Database=<databasename>;Key=<Yourcosmosaccountkey>',
    fintransactions) with (TransactionAmount BIGINT, isFraud INT, OFACViolation INT, Sta
te VARCHAR(200), TransactionType VARCHAR(200) ) as rows
```

Copy your primary key



Dashboard > FSIBankinghackk > fsibankinghack

fsibankinghack | Keys

Azure Cosmos DB account

Directory: Microsoft

Search (Ctrl+ /)

- [Overview](#)
- [Activity log](#)
- [Access control \(IAM\)](#)
- [Tags](#)
- [Diagnose and solve problems](#)
- [Quick start](#)
- [Notifications](#)
- [Data Explorer](#)

Settings

- [Features](#)
- [Replicate data globally](#)
- [Default consistency](#)
- [Backup & Restore](#)
- [Firewall and virtual networks](#)
- [Private Endpoint Connections](#)
- [CORS](#)
- [Dedicated Gateway](#)

Keys

- [Advisor Recommendations](#)
- [Add Azure Cognitive Search](#)
- [Add Azure Function](#)
- [Advanced security \(preview\)](#)

Locks

Containers

Browse

Read-w

URI

<https://>

PRIMAR

[Swf9N](#)

SECOND

[Htcal](#)

PRIMAR

[Accou](#)

SECOND

[Accou](#)



vii. Execute the script and then refresh the view and the create view should appear

The screenshot shows the Object Explorer on the left with 'Views' selected. On the right, a code editor displays the following SQL script:

```
1 | CREATE VIEW |
2 | AS SELECT
3 | OPENROWSET(
4 | 'CosmosDB',
5 | 'Accounts',
6 | 'fintrac'
7 | ) AS [Results]
8 |
```

viii. On the view select new sql script Select top 100 rows

The screenshot shows the Object Explorer on the left with 'dbo.finalreport' selected under 'Views'. On the right, a context menu is open with the following options:

- New SQL script > Select TOP 100 rows
- Refresh



ix. Observe the content from Cosmos Db, you can also chart this data

SQL script 1

Run Undo Publish Query plan Connect to Built-in Use database fsibankinghack

```
1 SELECT TOP (100) [TransactionAmount]
2 ,[isFraud]
3 ,[OFACViolation]
4 ,[State]
5 ,[TransactionType]
6 ,[date]
7 ,[time]
8 | FROM [dbo].[finalreport]
```

Results Messages

View Table Chart Export results

Search

TransactionAmount	isFraud	OFACViolation	State	TransactionType	date	time
4116	0	0	Wyoming	Check	08/24/2021	08:59:43
995	0	0	Wyoming	Cash	08/24/2021	08:59:46
5072	0	1	Maryland	Check	08/24/2021	08:59:49
3056	0	1	Tennessee	POS	08/24/2021	08:59:53
3070	0	1	Missouri	ACH	08/24/2021	08:59:56
6699	0	0	Pennsylvania	WireTransfer	08/24/2021	09:00:00

Results Messages

View Table Chart Save as image

Chart type: Line

Category column: (none)

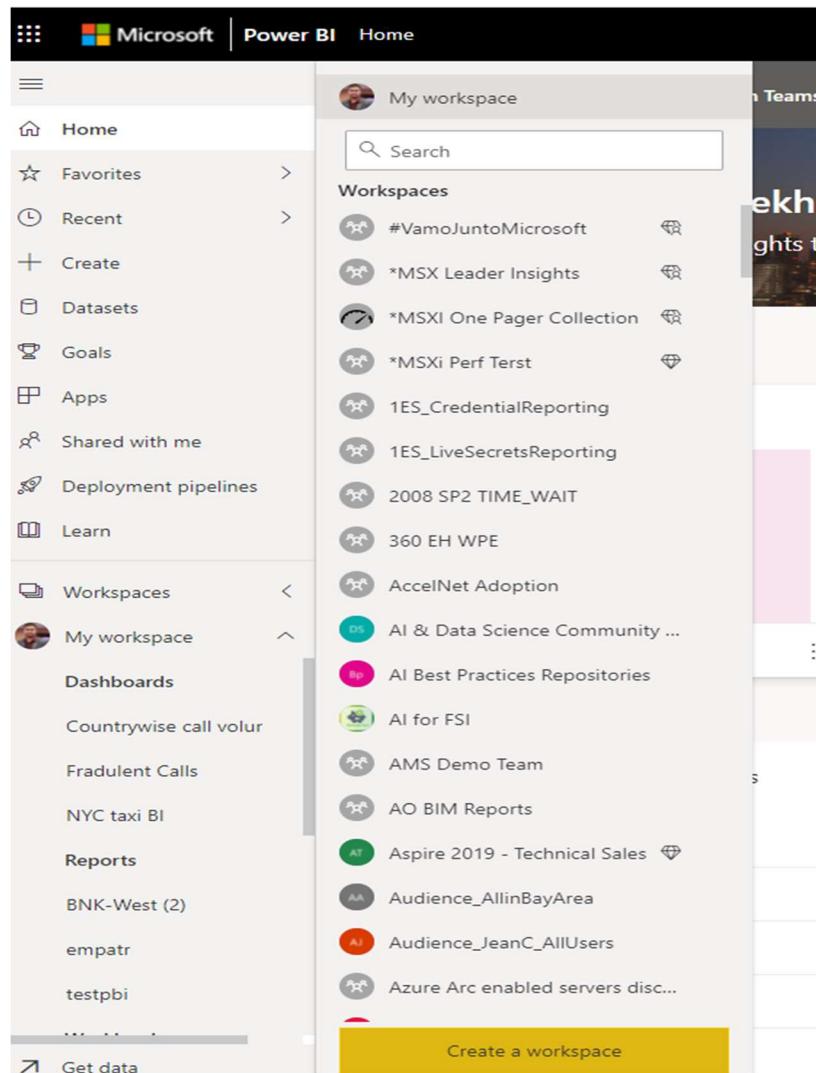
Legend (series) columns: TransactionAmount

Legend position: bottom - center

Legend (series) label:

Step 4 – Integrate with powerBI

- i. Go to app.powerbi.com and click on new workspace





Create a workspace



Upload

Delete

Workspace name

bnkhack

Available

Description

Describe this workspace

[Learn more about workspace settings](#)

Advanced ^

Contact list

- Workspace admins
- Specific users and groups

Enter users and groups

Workspace OneDrive

(Optional)

License mode ⓘ

- Pro



ii. Go to synapse workspace and to the manage tab and click on linked service

The screenshot shows the 'Linked services' blade in the Azure Synapse Analytics portal. The sidebar on the left includes options like Analytics pools, External connections, Integration, Security, and Source control. The main area displays two linked services:

Name	Type	Related
bankinghacksynapse-WorkspaceDefaultSqlServer	Azure Synapse Analytics	0
bankinghacksynapse-WorkspaceDefaultStorage	Azure Data Lake Storage Gen2	0

The screenshot shows the 'New linked service (Power BI)' dialog. The 'Name' field is set to 'PowerBIWorkspace1'. The 'Description' field is empty. The 'Tenant' dropdown is set to 'Microsoft (72f988bf-8ef1-41af-91ab-2d7cd011db47)'. The 'Workspace name' dropdown is set to 'lbnkhack (cc3cf5e-4915-4954-a665-bbf713abfbf)'. At the bottom, there are 'Create', 'Back', and 'Cancel' buttons.

ii.



Synapse live Validate all Publish all

Develop

Filter resources by name

SQL scripts 1

SQL script 1

Power BI 1

Bankhackpower

Power BI datasets ...

Power BI reports

SQL script 1

Power BI datasets

+ New Power BI dataset Refresh

Power BI datasets (Bankhackpower)

This is a read-only view of datasets existing in your linked Power BI workspace. Please go to Power BI to manage these datasets.

Showing 0 item

Name

iii. Click on New Power Bi dataset

Microsoft Azure | Synapse Analytics > bankinghacksynapse

Synapse live Validate all Publish all

Develop

Filter resources by name

SQL scripts 1

SQL script 1

Power BI 1

Bankhackpower

Power BI datasets ...

Power BI reports

SQL script 1

Power BI datasets

+ New Power BI dataset Refresh

Power BI datasets (Bankhackpower)

This is a read-only view of datasets existing in your linked Power BI workspace. Please go to Power BI to manage these datasets.

Showing 0 item

Name

Let's get started with Microsoft Power BI

Create a Power BI dataset from a data source and publish it to Power BI to build reports in Azure Synapse Studio.

To begin, you'll need Power BI Desktop installed on your local machine.

Install Power BI Desktop

No items to show

Create a Power BI dataset by following a few steps

- Select data source
- Download .pbix file
- Open and publish with Power BI Desktop

View documentation

Start Cancel

- iv. This should show us the database we created earlier containing the view.



Select a data source

Select a SQL pool below to use as a data source. You'll be able to select tables from this pool when creating your dataset.

Name

 fsibankinghack

[View documentation](#) 

Continue

Back

Cancel



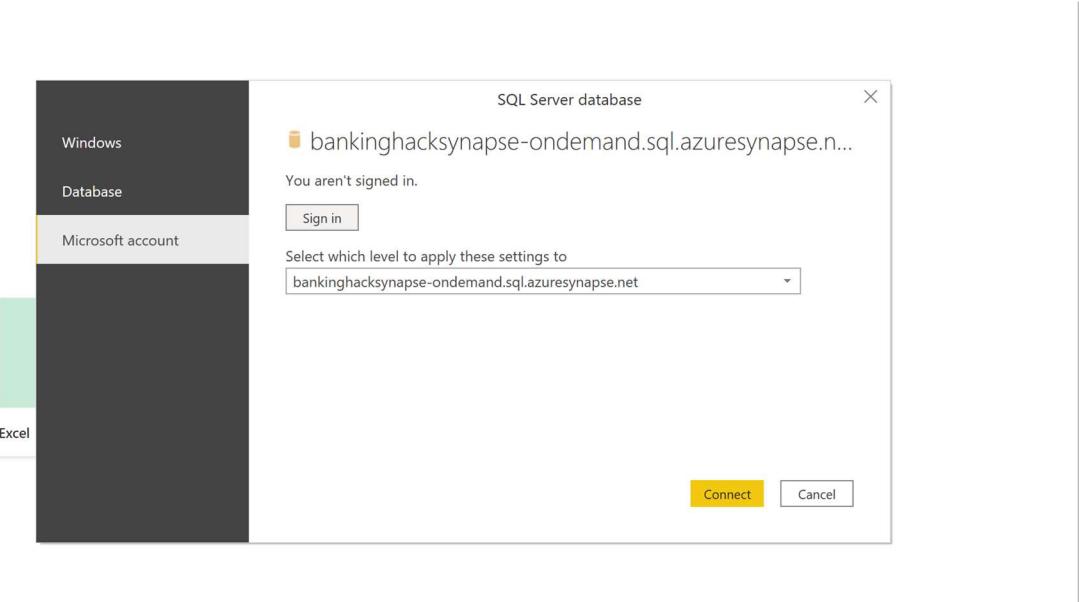
Download .pbids file

Download the .pbids file below and save it to your local drive.

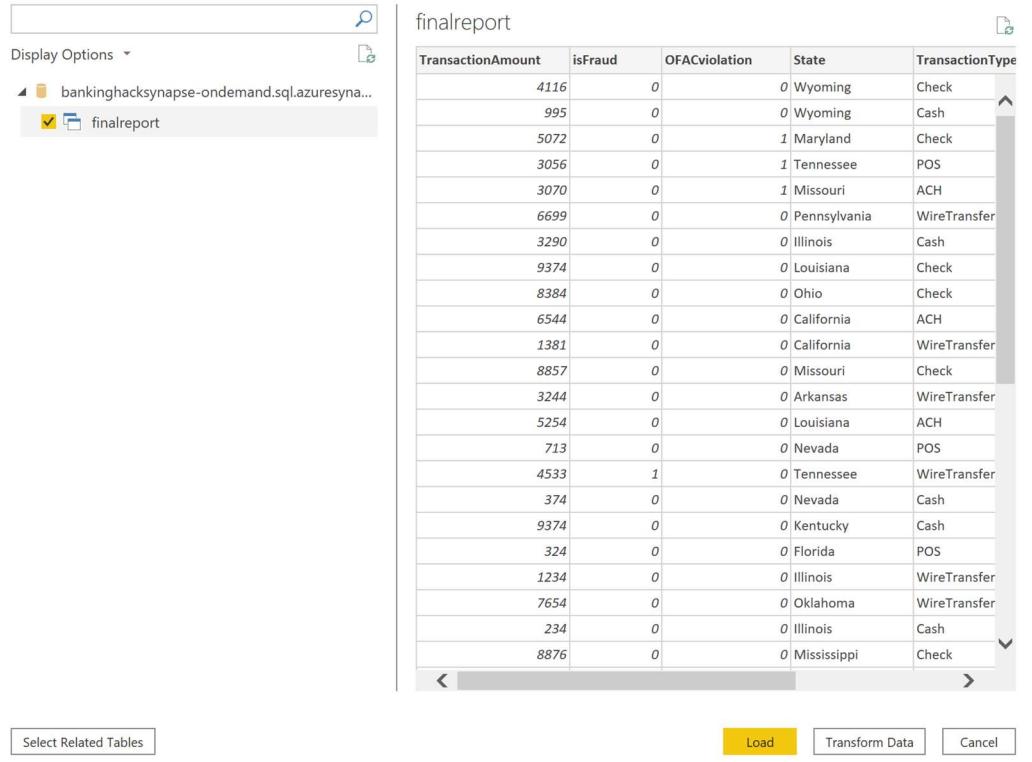
fsibankinghack.pbids

[Download](#)

- v. Open the pbids file using power Bi desktop and sign in using your Microsoft credentials and then load data from synapse.



Navigator

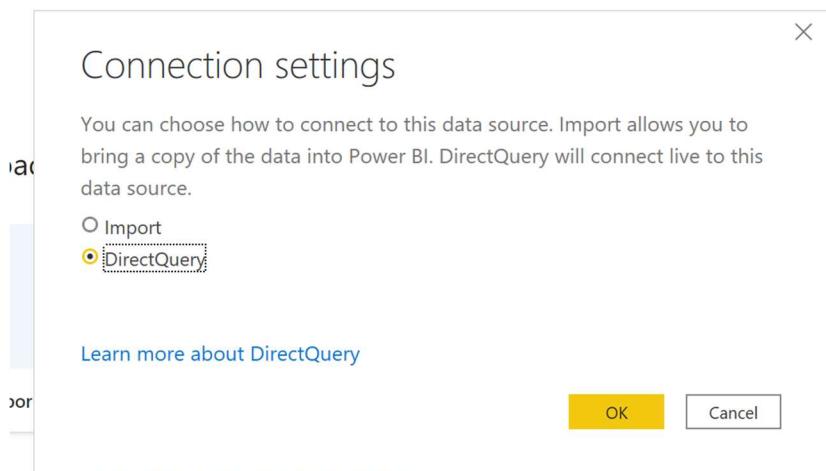


The screenshot shows the Power BI Navigator interface. On the left, there's a tree view under 'Display Options' with a single item selected: 'finalreport'. To the right is a preview of the 'finalreport' table, which contains the following data:

TransactionAmount	isFraud	OFACViolation	State	TransactionType
4116	0	0	Wyoming	Check
995	0	0	Wyoming	Cash
5072	0	1	Maryland	Check
3056	0	1	Tennessee	POS
3070	0	1	Missouri	ACH
6699	0	0	Pennsylvania	WireTransfer
3290	0	0	Illinois	Cash
9374	0	0	Louisiana	Check
8384	0	0	Ohio	Check
6544	0	0	California	ACH
1381	0	0	California	WireTransfer
8857	0	0	Missouri	Check
3244	0	0	Arkansas	WireTransfer
5254	0	0	Louisiana	ACH
713	0	0	Nevada	POS
4533	1	0	Tennessee	WireTransfer
374	0	0	Nevada	Cash
9374	0	0	Kentucky	Cash
324	0	0	Florida	POS
1234	0	0	Illinois	WireTransfer
7654	0	0	Oklahoma	WireTransfer
234	0	0	Illinois	Cash
8876	0	0	Mississippi	Check

At the bottom of the interface, there are buttons for 'Select Related Tables', 'Load' (highlighted in yellow), 'Transform Data', and 'Cancel'.

vi. Make sure to select **DirectQuery**



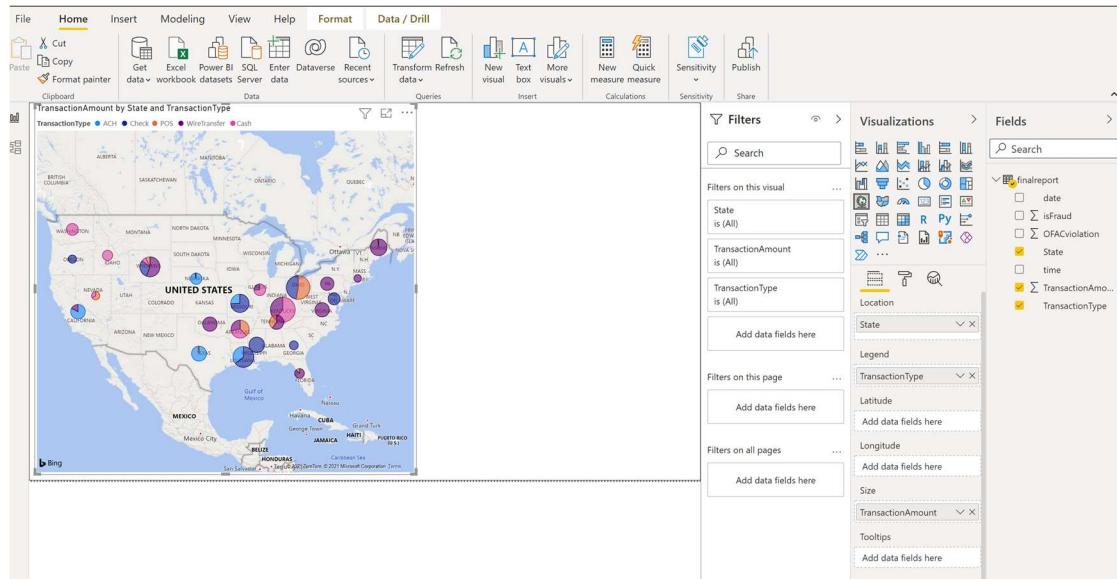
Step 5 – Create PowerBI visuals

Visual 1 : Location and transaction type and amount

- Drag the map visual to the chart pane

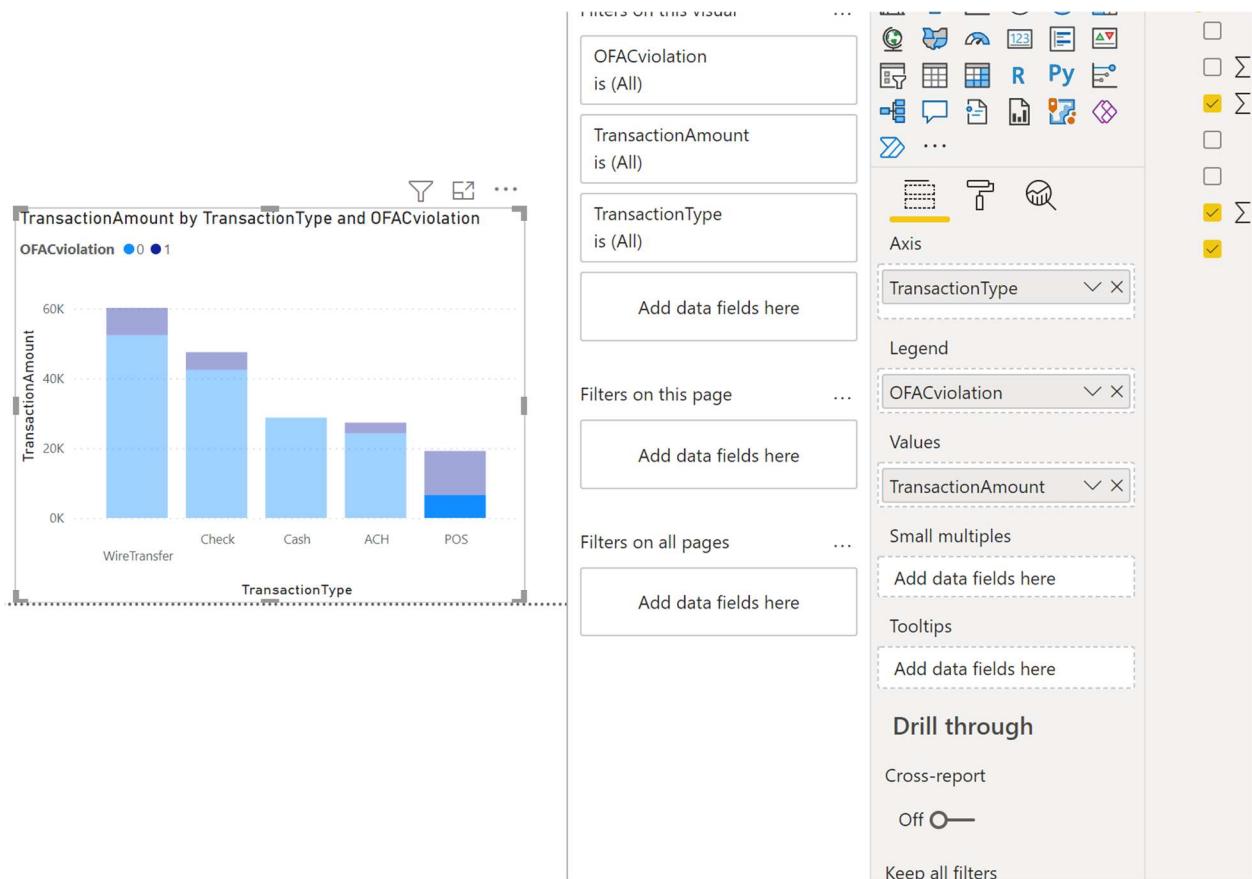


- Move the "State" variable from Fields pane to location, TransactionAmount to Size and TransactionType to Legends.

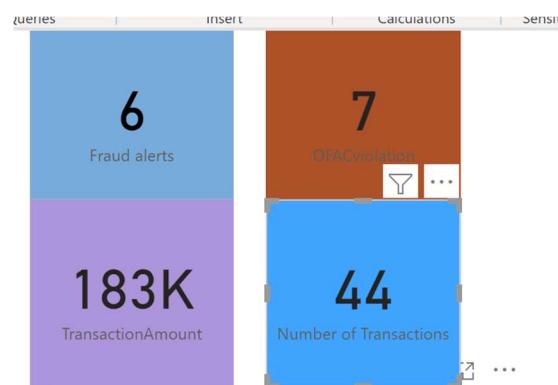


Visual 2 : Location and transaction type and amount

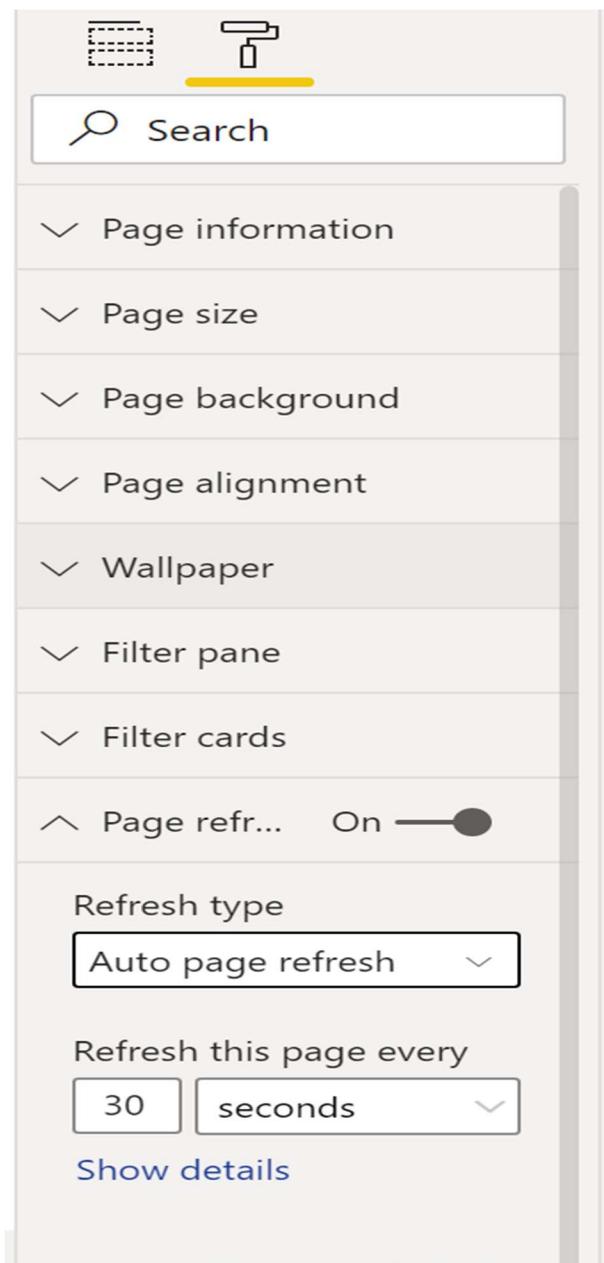
- Use the stack charts and use TransactionType, TransactionAmount and OFAC violation as suggested in the screenshot.



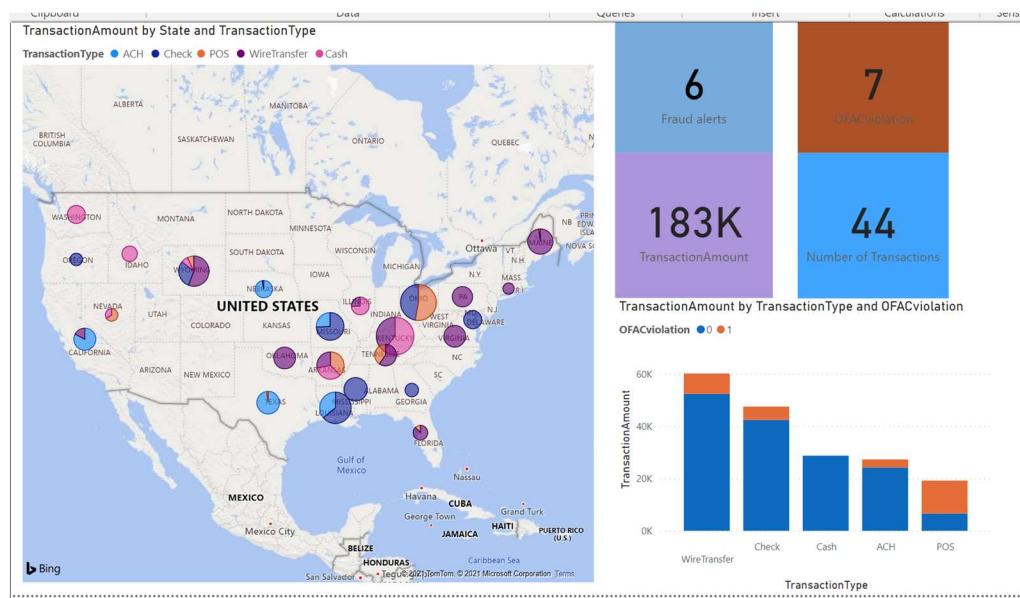
Visual 3: Number cards for metrics



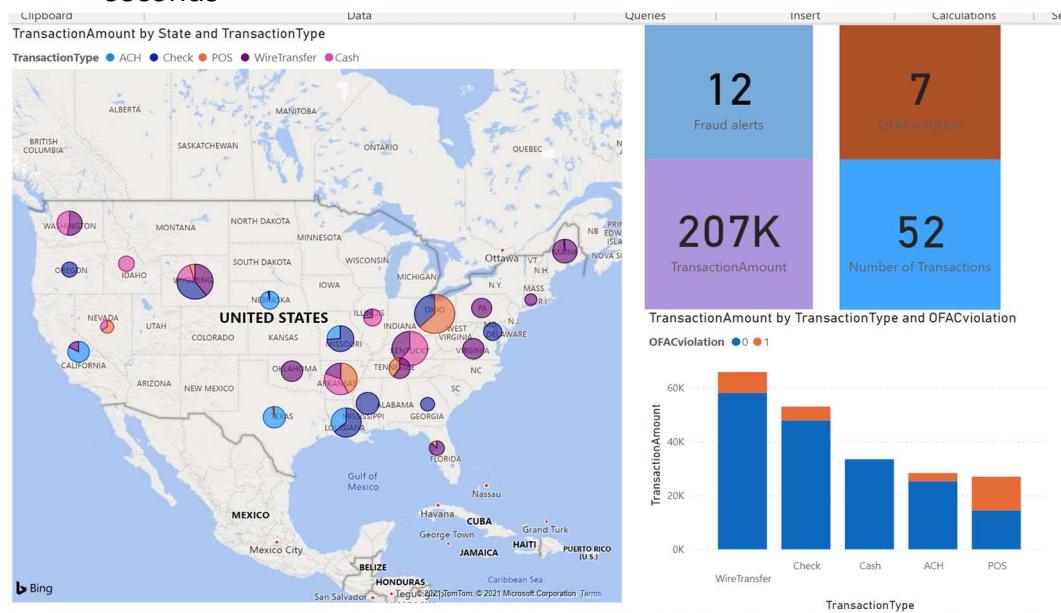
- i. Select number cards and use Fraud, OFAC violation total number of transactions and count of Transaction amount to create 4 different number cards.
- ii. Enable auto refresh feature – click out of all the visuals and use the format icon to get to the setting and make it 30 seconds.



Step 6 – End to End testing



- i. Now that we have our dashboard ready, we can do tests for near real time reporting solution.
 - ii. Navigate to the cosmos db. and select the fintransactions container and select upload item.
 - iii. Browse to challenge1 folder and select endtoendtest.json and upload.
 - iv. Go back to the powerBi dashboard to observe changesin ~90 seconds to 120 seconds



Advanced lab

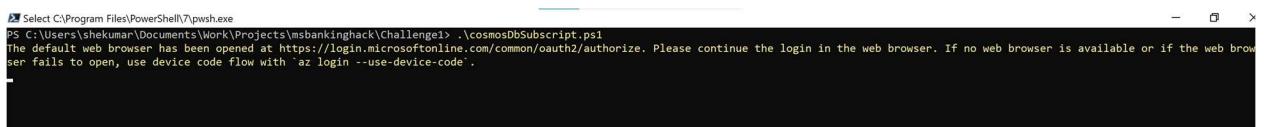
Step 7 – Simulate Realtime Transactional Data

Please install powershell and azure cli before advancing to next steps

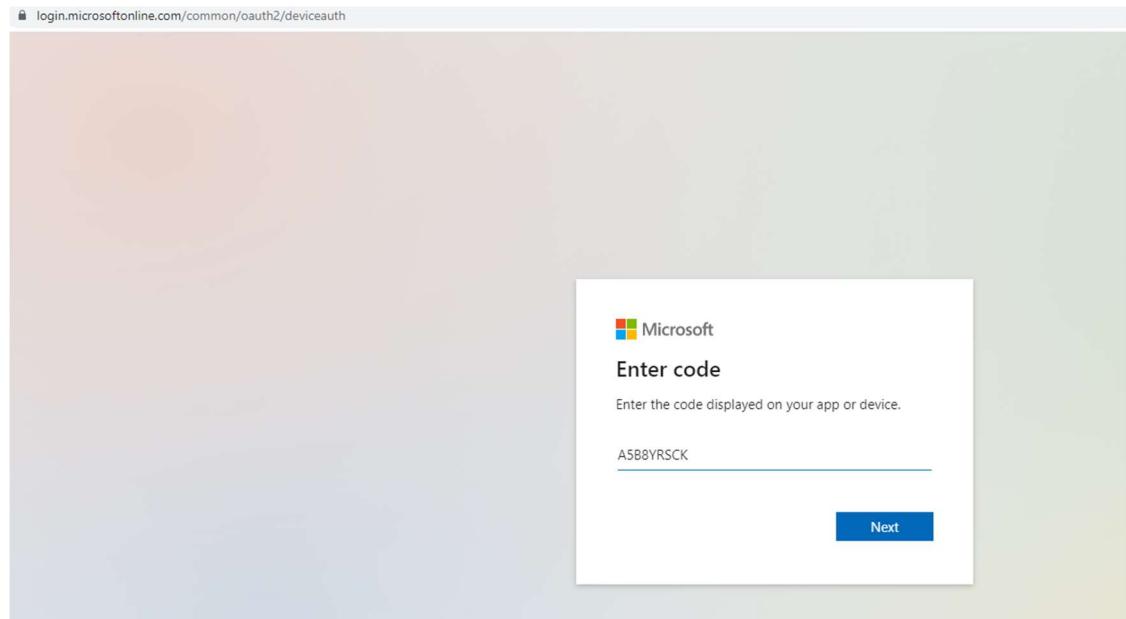
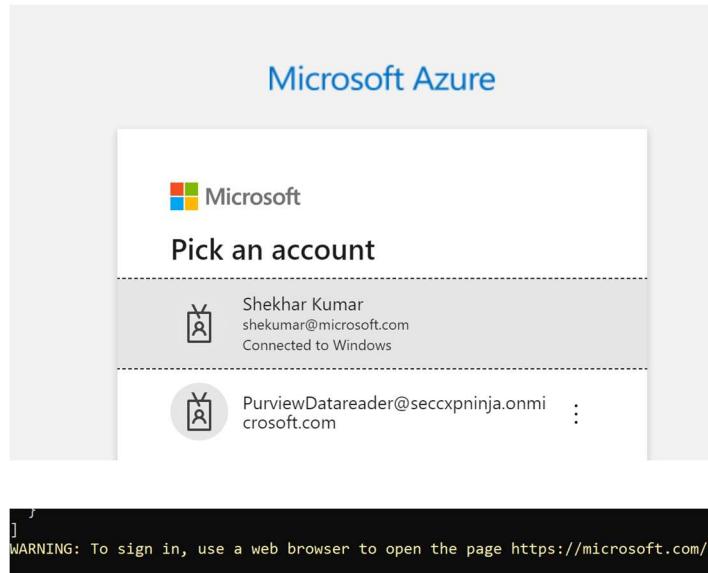
- i. We will use a powershell script to simulate ongoing transactions
- ii. Navigate to the github folder downloaded in step 0. Open Challenge1 folder and open cosmosDbSubscript on any text editor, and replace the \$cosmos_account_name with the name of your cosmos Db account. Save and close the script . \$rgName with your resource group name and \$cosmos_database_name with the name of the

```
33
34  #Change Script here
35  $rgName = "FSIBankinghack";
36  #$init = (Get-AzResourceGroup -Name $rgName).Tags["DeploymentId"]
37  #$random = (Get-AzResourceGroup -Name $rgName).Tags["UniqueId"]
38  #$concatString = "$random$init"
39  $cosmos_account_name = "bankinghackcosmos" #replaceMe
40  if($cosmos_account_name.length -gt 43 )
41  [
42  $cosmos_account_name = $cosmos_account_name.substring(0,43)
43  ]
44  $cosmos_database_name = "fsi-marketdata"
45
```

- iii. Open powershell as admin and navigate to Challenge1 Folder
- iv. Run .\cosmosDbSubscript.ps1 , it will ask you to authenticate twice.



```
# Select C:\Program Files\PowerShell\7\pwsh.exe
PS C:\Users\shekumar\Documents\Work\Projects\msbankinghack\Challenge1> .\cosmosDbSubscript.ps1
The default web browser has been opened at https://login.microsoftonline.com/common/oauth2/authorize. Please continue the login in the web browser. If no web browser is available or if the web browser fails to open, use device code flow with `az login --use-device-code`.
```



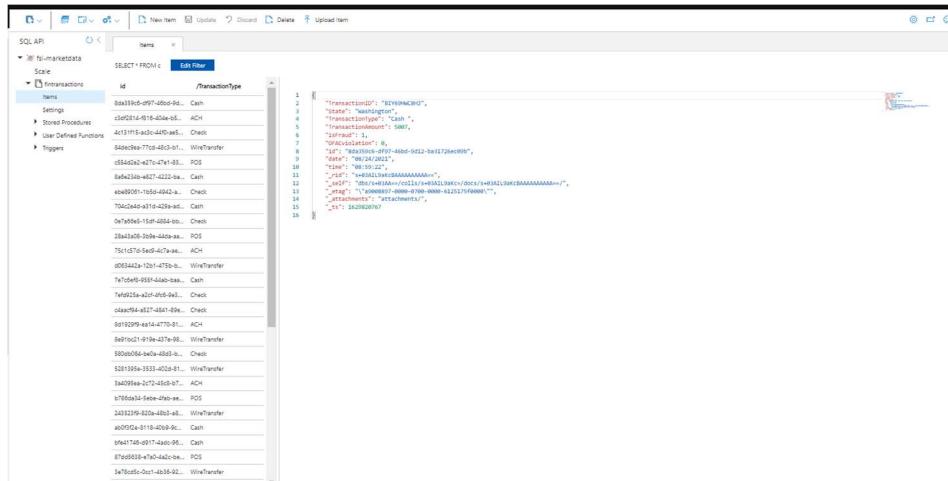
- v. If the correct subscription is selected press enter else copy and paste the name of the subscription from the list

```
Enter the desired Azure Subscription for this lab
Copy and paste the name of the subscription to make your choice.
[] Shekhar_learning_sandbox [] IDEAs MS Reporting [] Code generate Test and Infra [] MSUS Security Conversations [] Babylon_Partner_Sandbox [] astalati_microsoft
[] Microsoft Azure Internal Consumption[] Azure Migrate Demo Subscription [] Azure Migrate Program Management Team [] CyberSecSOC [] Contoso Hotels [] Contoso Hotels Tenant - Production
[] ES-CUS-PwCECDWAassist-DEV-Asademo[] Contoso IT - Retail - Prod [] TScience [] MSFT-Modern Device-Modern Mgmt-Imaging00 [] CLOUDBUILD-ANYBUILD-POC-01
[] ER: CE Security Service Operation Center[] Microsoft Services Disaster Response [] Babel [] Skype-NetEM-PROD [] DESP-APT-MTB-Prod [] ServicesPortfolio MCS [] Edge DevTools Client
[] Linux Microservices PROD[] Bing MM Measurement [] SPO-CyrusB [] AISC-EngSys-01 [] AISC-DEV-02 [] MSFT-SMIL-Tools Monitoring-POC-01 [] Microsoft Azure Internal Consumption
[] Microsoft Azure Internal - Nirmal[] Microsoft Azure - SHAKA [] CloudLabsAI.MS - Sponsorship 03 (Dev/Test) [?] Help (default is "Shekhar_learning_sandbox"):
Selecting the Shekhar_learning_sandbox subscription
```

- vi. The script will generate transactions in real time and upload it to cosmos DB It will take 3-4 minutes to complete.

```
CosmosDb Account fsibankinghack
json @[{"TransactionID": "BTY69HWC8HJ"}, {"State": "Washington", "TransactionType": "Cash", "TransactionAmount": 5007, "isFraud": 1, "OFACViolation": 0}, {"TransactionID": "LYM46NSD6PR", {"State": "Nebraska", "TransactionType": "ACH", "TransactionAmount": 4293, "isFraud": 0, "OFACViolation": 0}, {"TransactionID": "LSX15XF7KJ", {"State": "Oregon", "TransactionType": "Check", "TransactionAmount": 1054, "isFraud": 0, "OFACViolation": 0}, {"TransactionID": "NPP88HOL7ID", {"State": "Nebraska", "TransactionType": "WireTransfer", "TransactionAmount": 145, "isFraud": 0, "OFACViolation": 1}, {"TransactionID": "LRI22CXTQOI", {"State": "Arkansas", "TransactionType": "POS", "TransactionAmount": 4367, "isFraud": 1, "OFACViolation": 0}, {"TransactionID": "PSJ03XXM3AA", {"State": "Arkansas", "TransactionType": "Cash", "TransactionAmount": 4038, "isFraud": 0, "OFACViolation": 0}, {"TransactionID": "KYB55CKT6RY", {"State": "Wyoming", "TransactionType": "Check", "TransactionAmount": 995, "isFraud": 0, "OFACViolation": 0}, {"TransactionID": "ISMS7DBG1JV", {"State": "Maryland", "TransactionType": "Check", "TransactionAmount": 5072, "isFraud": 0, "OFACViolation": 1}, {"TransactionID": "IU7Y5KZJ5SK", {"State": "Tennessee", "TransactionType": "POS", "TransactionAmount": 3056, "isFraud": 0, "OFACViolation": 1}, {"TransactionID": "VAR91XFC0GD", {"State": "Pennsylvania", "TransactionType": "ACH", "TransactionAmount": 3070, "isFraud": 0, "OFACViolation": 1}, {"TransactionID": "XLM4AY327TR", {"State": "Illinois", "TransactionType": "WireTransfer", "TransactionAmount": 2200, "isFraud": 0, "OFACViolation": 0}], [{"id": 1, "TransactionID": "BTY69HWC8HJ", "state": "Washington", "transactionamount": 5007, "isFraud": 1, "ofacViolation": 0}, {"id": 2, "TransactionID": "LYM46NSD6PR", "state": "Nebraska", "transactionamount": 4293, "isFraud": 0, "ofacViolation": 0}, {"id": 3, "TransactionID": "LSX15XF7KJ", "state": "Oregon", "transactionamount": 1054, "isFraud": 0, "ofacViolation": 0}, {"id": 4, "TransactionID": "NPP88HOL7ID", "state": "Nebraska", "transactionamount": 145, "isFraud": 0, "ofacViolation": 1}, {"id": 5, "TransactionID": "LRI22CXTQOI", "state": "Arkansas", "transactionamount": 4367, "isFraud": 1, "ofacViolation": 0}, {"id": 6, "TransactionID": "PSJ03XXM3AA", "state": "Arkansas", "transactionamount": 4038, "isFraud": 0, "ofacViolation": 0}, {"id": 7, "TransactionID": "KYB55CKT6RY", "state": "Wyoming", "transactionamount": 995, "isFraud": 0, "ofacViolation": 0}, {"id": 8, "TransactionID": "ISMS7DBG1JV", "state": "Maryland", "transactionamount": 5072, "isFraud": 0, "ofacViolation": 1}, {"id": 9, "TransactionID": "IU7Y5KZJ5SK", "state": "Tennessee", "transactionamount": 3056, "isFraud": 0, "ofacViolation": 1}, {"id": 10, "TransactionID": "VAR91XFC0GD", "state": "Pennsylvania", "transactionamount": 3070, "isFraud": 0, "ofacViolation": 1}, {"id": 11, "TransactionID": "XLM4AY327TR", "state": "Illinois", "transactionamount": 2200, "isFraud": 0, "ofacViolation": 0}]]
```

- vii. One transaction have been uploaded you can see them on the data explorer on cosmos db page on Azure portal.



id	TransactionType
1	"transactionid": "BTY69HWC8HJ", "state": "Washington", "transactionamount": 5007, "isfraud": 1, "ofacviolation": 0}
2	"transactionid": "LYM46NSD6PR", "state": "Nebraska", "transactionamount": 4293, "isfraud": 0, "ofacviolation": 0}
3	"transactionid": "LSX15XF7KJ", "state": "Oregon", "transactionamount": 1054, "isfraud": 0, "ofacviolation": 0}
4	"transactionid": "NPP88HOL7ID", "state": "Nebraska", "transactionamount": 145, "isfraud": 0, "ofacviolation": 1}
5	"transactionid": "LRI22CXTQOI", "state": "Arkansas", "transactionamount": 4367, "isfraud": 1, "ofacviolation": 0}
6	"transactionid": "PSJ03XXM3AA", "state": "Arkansas", "transactionamount": 4038, "isfraud": 0, "ofacviolation": 0}
7	"transactionid": "KYB55CKT6RY", "state": "Wyoming", "transactionamount": 995, "isfraud": 0, "ofacviolation": 0}
8	"transactionid": "ISMS7DBG1JV", "state": "Maryland", "transactionamount": 5072, "isfraud": 0, "ofacviolation": 1}
9	"transactionid": "IU7Y5KZJ5SK", "state": "Tennessee", "transactionamount": 3056, "isfraud": 0, "ofacviolation": 1}
10	"transactionid": "VAR91XFC0GD", "state": "Pennsylvania", "transactionamount": 3070, "isfraud": 0, "ofacviolation": 1}
11	"transactionid": "XLM4AY327TR", "state": "Illinois", "transactionamount": 2200, "isfraud": 0, "ofacviolation": 0}