



Integrating Cosmos DB and Azure Functions

Azure Cosmos DB Conf

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Agenda

(Very) Brief intro to Cosmos DB

Bindings and Triggers concepts

Demo about solving a problem using Azure Functions and Cosmos DB

Bonus: Best practices for managing scaling

Read on resources

Download slides and code

<http://bit.ly/cosmosdb-slides>

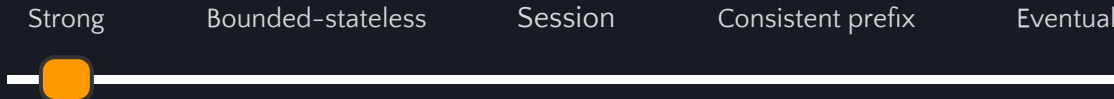


What is Azure Cosmos DB?

Massively scalable, fully managed, and NoSQL database in Azure.

Features

- Notebooks in Azure.
- Serverless consumption plan
- Five levels of consistency to choose from



Flavors of Cosmos DB models (**APIs**)

- SQL API Json Document
- MongoDB API BSon Document
- Table API - Key Value pairs, perfect for migrating Azure Table Storage
- Gremlin API Graph
- Cassandra API - Columnar Schema



More important features

- Point-and-click geo-replication.
- Horizontal Partitioning
- 99.99% availability SLA for all single-region database accounts, and 99.999% read availability on all multi-region database accounts.



How to get started?

- Get your Azure 30 day free trial

<http://azure.microsoft.com>

- Free try of 30 days of Cosmos DB (no subscription or credit-card required)

<http://azure.microsoft.com/en-us/try/cosmosdb/>

- For local development use the Local Emulator (no internet needed).

<http://aka.ms/cosmosdb-emulator>

- Take advantage of the Always free tier 5 GB and 400 RU/s (Request Units).

With Azure Cosmos DB free tier, you will get 400 RU/s and 5 GB of storage for free in an account. You can enable free tier on up to one account per subscription. Estimated \$24/month discount per account.

Apply Free Tier Discount

Apply

Do Not Apply



Input & Output bindings with Azure Functions

- Binding is a way of declaratively connecting another resource to a function;
- Bindings may be connected as *input bindings*, *output bindings*, or both.
- Data from bindings are provided to the function as parameters.
- Input bindings are the data the function receives.
- Output bindings are the data the function sends.

Supported Languages

C#, C# script, F#, Java, JavaScript, or Python



Triggers \neq bindings

- For triggers, the direction is always in.
- For Input and output bindings the direction is in and out.
- Bindings are used as connectors to Azure Functions.

Official documentation <http://bit.ly/cosmos-bindings>



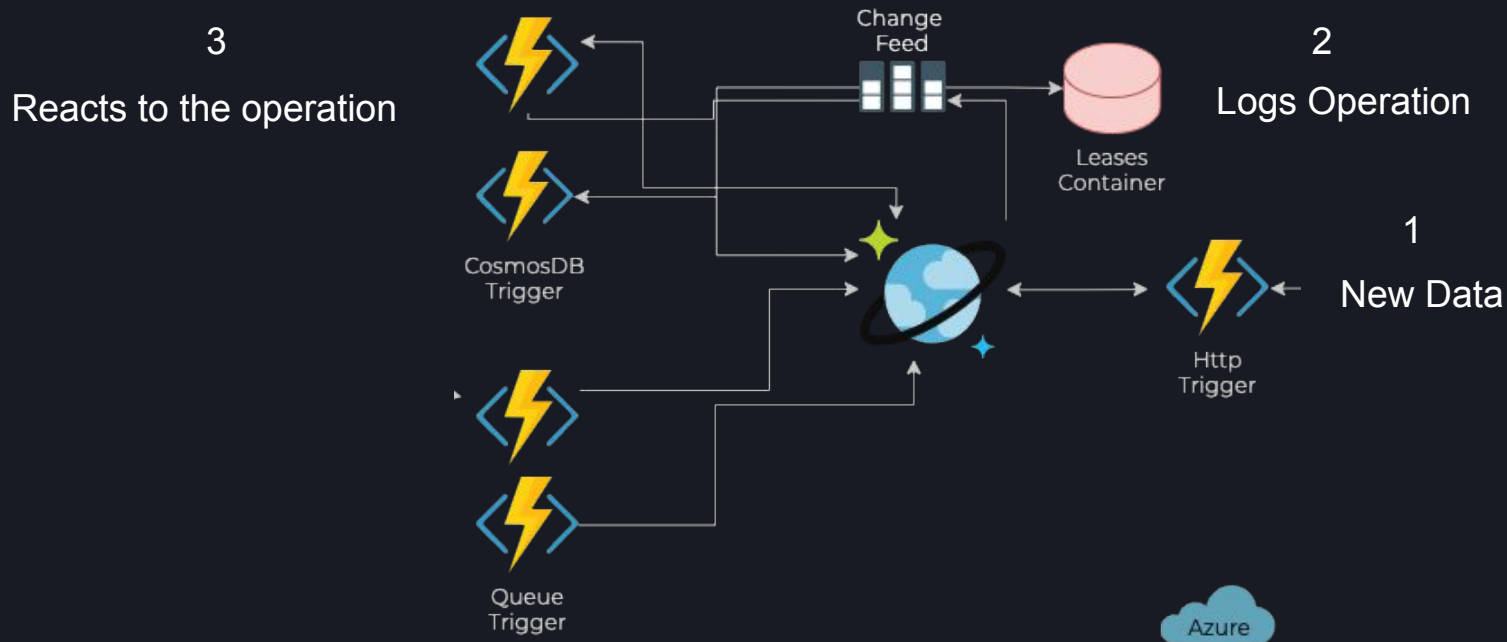
Cosmos DB Trigger and Azure Functions

- Triggers cause a function to run.
- A trigger defines how a function is invoked.
- A function must have exactly one trigger.
- Triggers have associated data, which is often provided as the payload of the function.
- Do not confuse these with the JavaScript Cosmos DB triggers.
- Triggers use the Change Feed in Cosmos DB.

Official documentation at <http://bit.ly/cosmos-bindings>



Change Feed in Cosmos DB



Demo

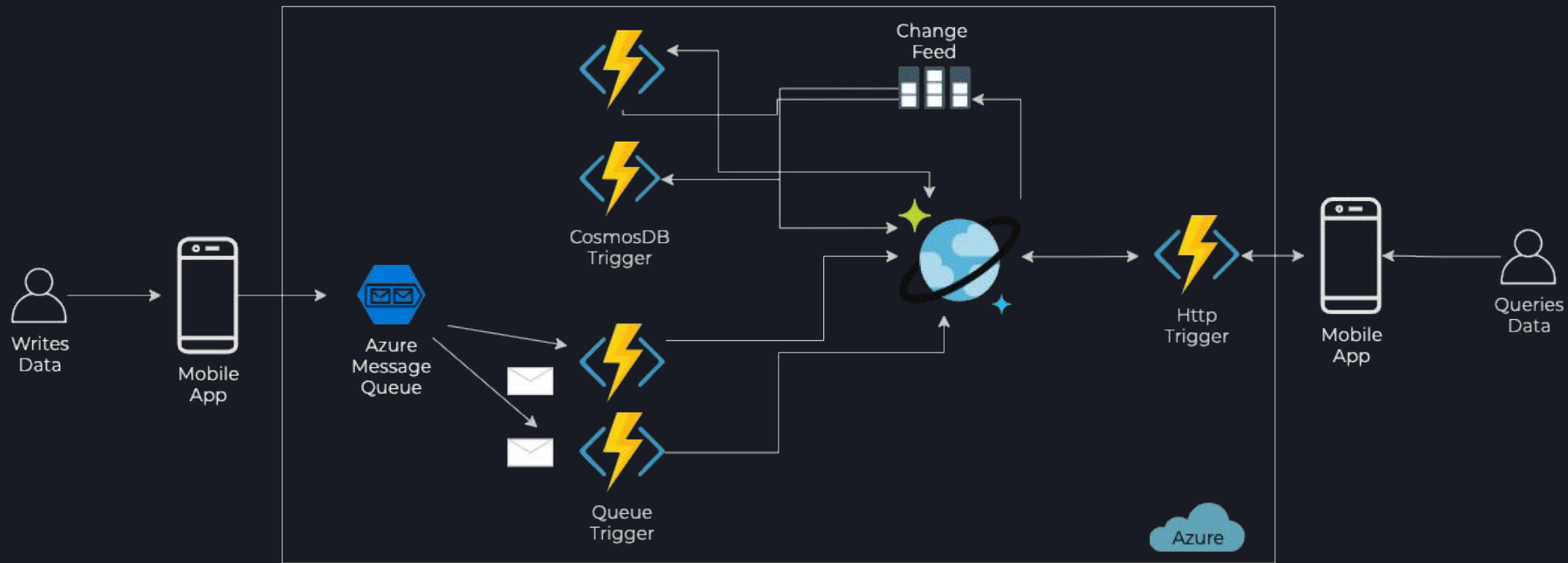
Create an Azure Function App with Bindings and Triggers



Create a serverless solution that:

1. Read data that was sent from a mobile application.
2. Save the data into Cosmos DB.
3. Make the data available to be queried from an external application.
4. Replicate new and modified data to another data container.





Demo solution



Tools and Azure services

- An Azure Subscription and a storage account
- The Azure Cosmos DB Emulator.
- The Azurite Emulator.
- The Azure Functions extension for VSCode.
- The Azure Storage Emulator for managing the queue
- VS Code

Let's do the coding!



Best practices for managing scaling

1. Know what are the heuristics for the used trigger with the Scale Controller.
2. Adjust the maximum execution limit to your own use case. Pay special attention to Databases, Service bus, Event Hub or other resources to throttle scale as required.
3. Monitor the Change Feed processing.
4. Understand Dynamic Scaling.

Maximum execution instances per Function App

Consumption plan 200

Premium plan 100



Read on resources

- Cosmos DB Workshop

<https://azurecosmosdb.github.io/labs/>

- Official Cosmos DB Docs

<https://docs.microsoft.com/en-us/azure/cosmos-db/>

- Microsoft Learn

<https://docs.microsoft.com/en-us/azure/cosmos-db/>

- Cosmos DB Capacity Calculator

<https://cosmos.azure.com/capacitycalculator/>





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Thank you!

