Asia's Largest

Cloud & AI

Conference 2023

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IIT Madras Research Park, Chennai

Sajeetharan Sinnathurai

Principal Program Manager (Azure Cosmos DB)

@sajeetharan

@kokkisajee

@sajeetharan

@sajeetharan

azconf

Unveiling the Latest Cosmos DB Features and Productivity Tools
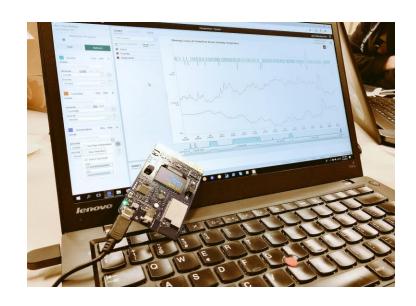
Let me start with a "short" story
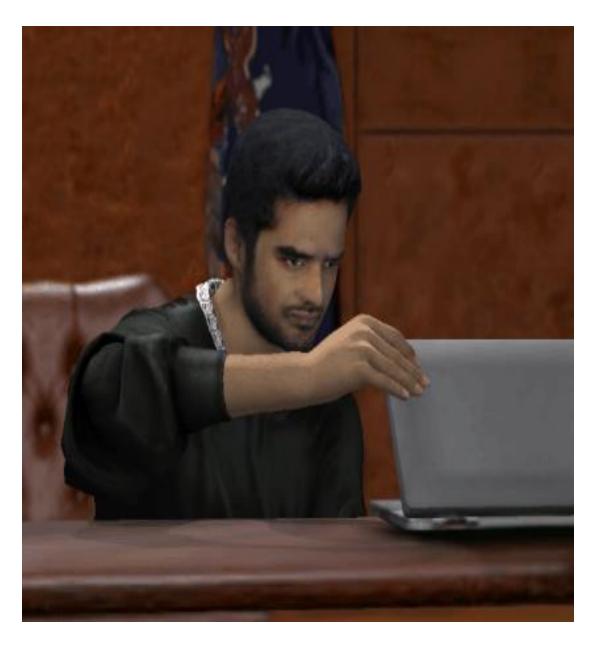
Azure Cosmos DB was
launched on
May 10, 2017

Bookmarks
@kokkisajee

rimma nehme @rimmanehme · Mar 5, 2018
At the #MVPSummit today, we've auctioned off an #Azure #CosmosDB
poster with the signatures of the #CosmosDB team for 54 #CosmosDB
blogs in 12 months. That's a lot of #CosmosDB ❤ and dedication. Look
forward to it @kokkisajee! Thank you. #mvpbuzz #MVPSummit2018

Sajeetharan @kokkisajee · Mar 5, 2018
I will write 54 blogs on #CosmosDB #azure and please send a similar
flyer signed by engineers @rimmanehme 😎

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My Journey with Azure Cosmos DB as a Developer

Agenda

Why Azure Cosmos DB for developers?

Productivity gain with Copilot for Azure Cosmos DB

Accelerated Development with Data API Builder for Azure Cosmos DB

Vercel Integration with Azure Cosmos DB

QnA

Azure Cosmos DB – next generation database for modern apps

Guaranteed performance

Just **set the throughput** your need
SLA guaranteed throughout and latency
Speed layer

Operational + Analytical

OLTP + OLAP with the same DB
Real-time Analytics and AI

OpenAI

24/7 Uptime

High Availability **99.999%**
Worldwide data **replication**
with 1 click (if you need it)

Flexibility + Security
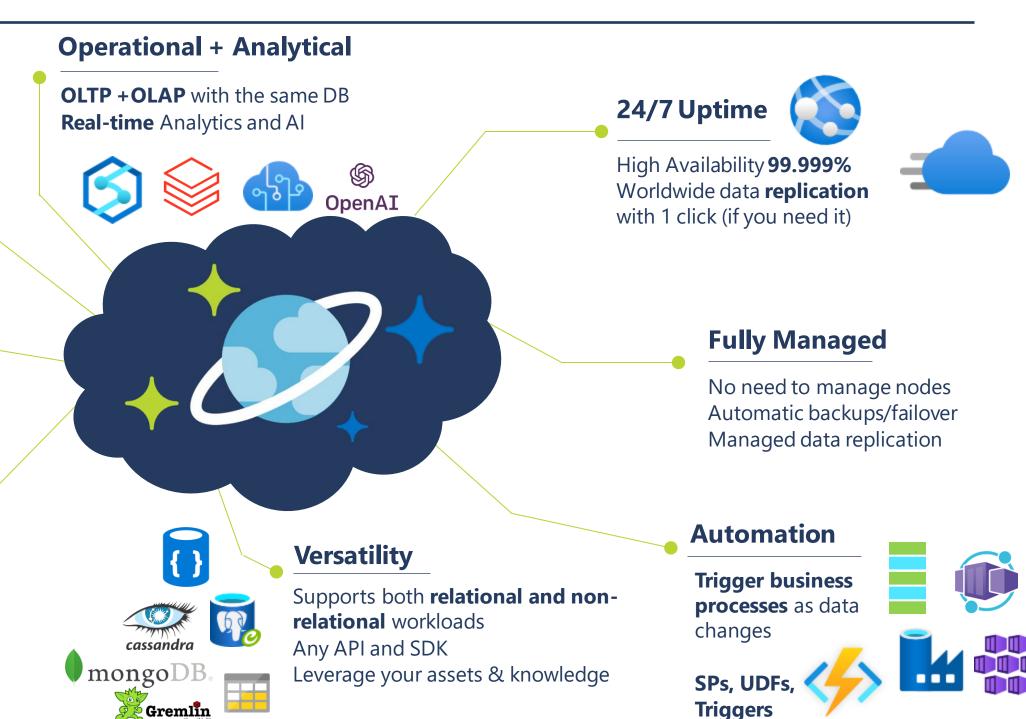
3 **operational modes** to adapt to
different business requirements
5 **consistency models**
Flexible **data model** (JSON)
Encryption, RBAC,CMK

Fully Managed

No need to manage nodes
Automatic backups/failover
Managed data replication

**Elastic scale out
of storage & throughput**

Design philosophy based on
response times
Adds more capacity as you need it

Versatility

Supports both **relational and non-relational** workloads
Any API and SDK
Leverage your assets & knowledge

cassandra

mongoDB.

Gremlin
$G = (V, E)$

Automation

**Trigger business
processes** as data
changes

**SPs, UDFs,
Triggers**

When can Azure Cosmos DB help?

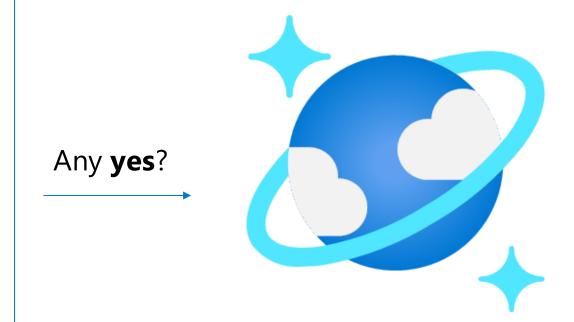Do you have applications that **struggle to scale with demand**?

Do you have processes that need **low-latency guarantees**?

Do you have applications where **high availability is a critical requirement**?

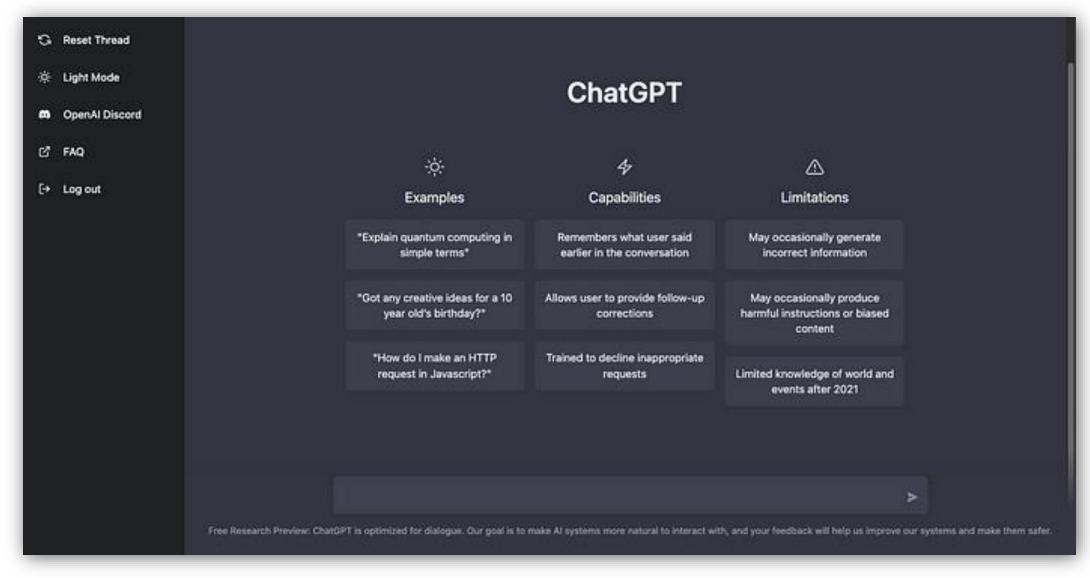Do you have applications that require **geo-replication to serve data anywhere**?

Do you have applications whose **data model changes** rather often or with **heterogeneous** data models?

Are you thinking about **event-driven or microservices architectures and AI capabilities**?

Any **yes**? →

ChatGPT uses Azure Cosmos DB

Azure Cosmos DB is used to store all ChatGPT results. The database was able to rapidly – and seamlessly – scale as the service's active user base took off.

Feature 1 : Copilot with Azure Cosmos DB

A typical Developer

"I may look okay but deep down I need a tool that can automatically write Cosmos DB queries for Me"

Copilot with Azure Cosmos DB

"Enabling natural language queries for Azure Cosmos DB data"

- Turn your **natural language** questions into Cosmos DB **NoSQL queries**

- Powered by state-of-the-art **Azure OpenAI LLMs**

- Your data and usage is **private** and **secure**

- Developed with **Microsoft's Responsible AI principles**

Copilot in Azure Cosmos DB - Demo

Feature 2 : Data API Builder for Azure Cosmos DB

How to Interact with Azure Cosmos DB in our code/apps?

APIS (REST)

SDKs

ORMs

Drivers

Data API Builder (GraphQL)

Modern Applications

Client-Server communication

REST

APP
(frontend)

GET
/speakers/{id}

{JSON
}

GET
/speakers/{id}/sessions

{JSON
}

GET
/speakers/{id}/tracks

{JSON
}

API
(backend)

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Client-Server communication

"so-called REST"

APP
(frontend)

API
(backend)

GET
~~/speakerWithSessionsAndTrackss/{id}~~

{JSON }

GET **/ ~~speakerWithSessionsAndTrackssMobile/{id}~~**

{JSON }

GET **/speakerWithSession/{id}**

{JSON }

Client-Server communication

APP
(frontend)

API
(backend)

{Query}

POST **/graphql**

{dynamic
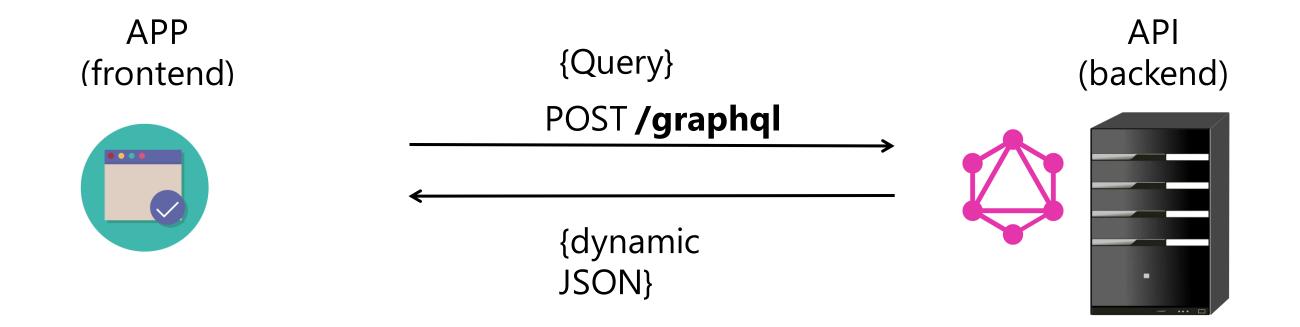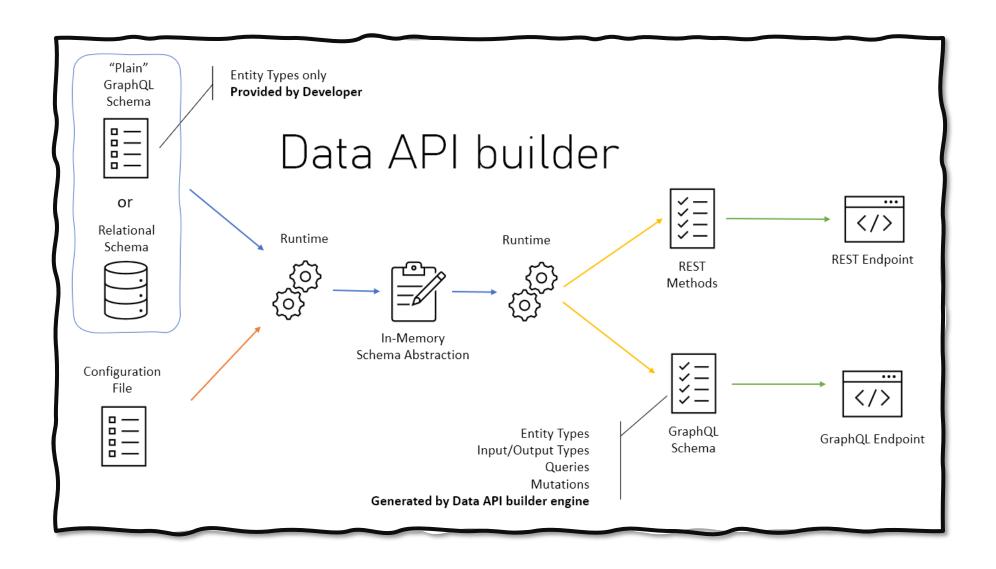JSON}

Introducing Data API Builder

- The approach Data API builder adopts to provide these capabilities is to develop a **separate middle tier resource** that hosts the GraphQL (or REST) endpoints and then transforms the request into equivalent backend calls.

Client Application   Data API Builder   Azure Databases

https://aka.ms/dab

Data API Builder a.k.a DAB

Usage options

Build a container from the opensource DAB repo and host it your self

Managed DAB service through Azure Static Web Apps (SWA)

Data API Builder CLI

- It's a command line Interface for Data API builder.

- DAB-CLI enables developers to easily manage the dab configuration file to initialize, add, or update entities, their permissions.

- It gives developers more control over the DAB-engine.

- It is much faster and has many validations that quickly generates the correct config to be consumed by the runtime engine.

- Supported Commands: **init**, **add**, **update**, and **start**

Run time configuration file

It's a JSON file containing:

- The backend database and the related connection info
- Runtime settings such as rest/graphQL path and host settings.
- Exposed entities
- The security rules (AuthZ) needed to access those entities
- Relationships between entities (if not inferable from the underlying database)
- The name mapping rules (aliasing)
- Special/Specific behavior related to the chosen backend database.
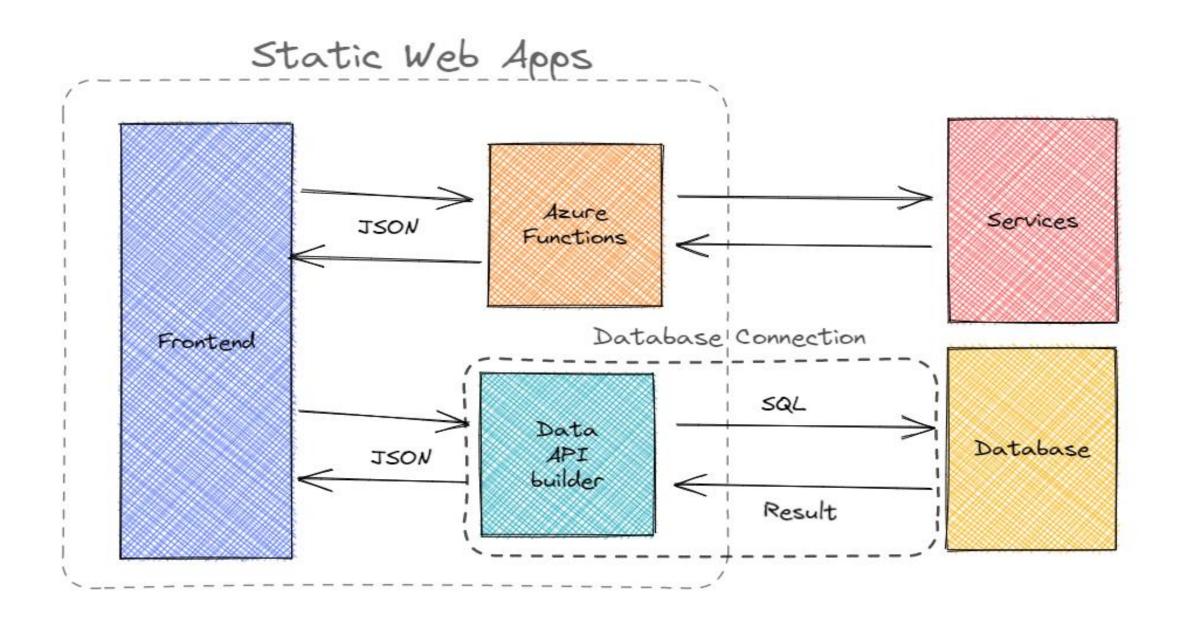
Authorization: Engine RBAC Configuration

- **Entity** -> Represents the database object.

- **Permissions** -> List of roles and associated access.

- **Role** -> Defines supported CRUD action.

- **CRUD** action -> defines column level access.

- **Policy** -> An level security rule which adds result constraining predicates database queries.

```
"MyEntityName": {

    "permissions": [
    {

      "role": "anonymous",

      "actions": [
        {
          "action": "Read",
          "fields": {
            "include": [ "*" ],
            "exclude": [ "name" ]
          },
          "policy": {
            "database": "@item.id eq @claims.userId"
          }
        }
      ]
    },
    {
      "role": "authenticated",
      "actions": ["create", "read", "update", "delete"]
    }
    ]

}
```

Data API Builder with Azure Static Web Apps

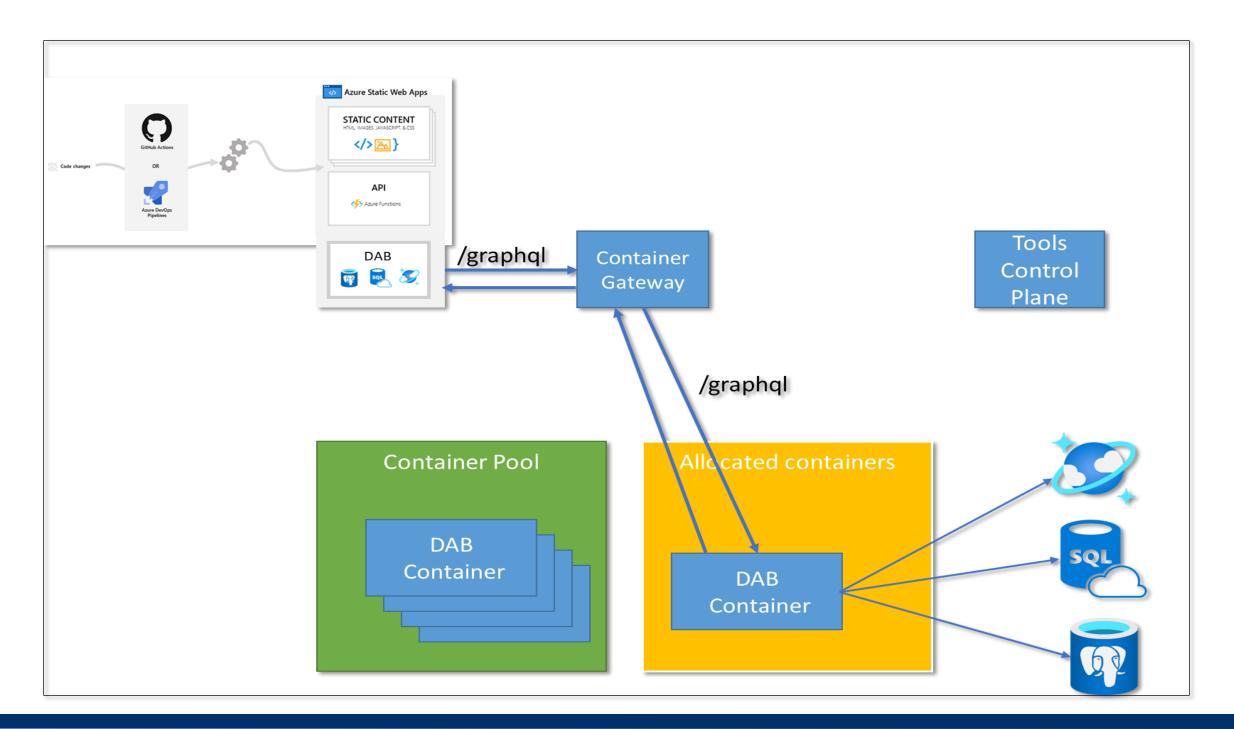# Data API Builder Hosted on Azure

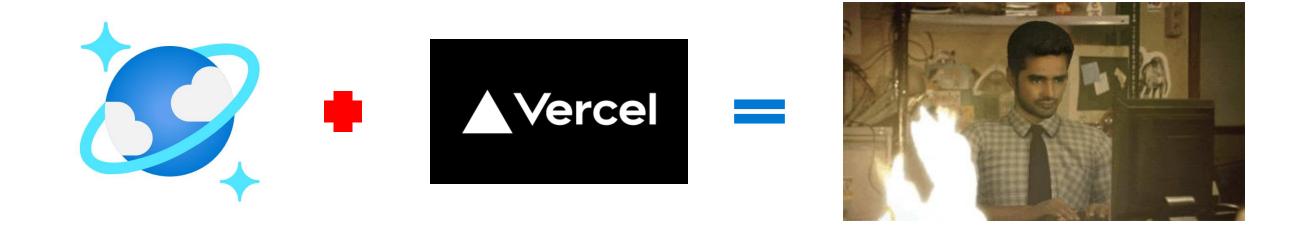# Data API Builder Demo – Let's build world cup app in 5 mins

https://github.com/sajeetharan/azconf2023
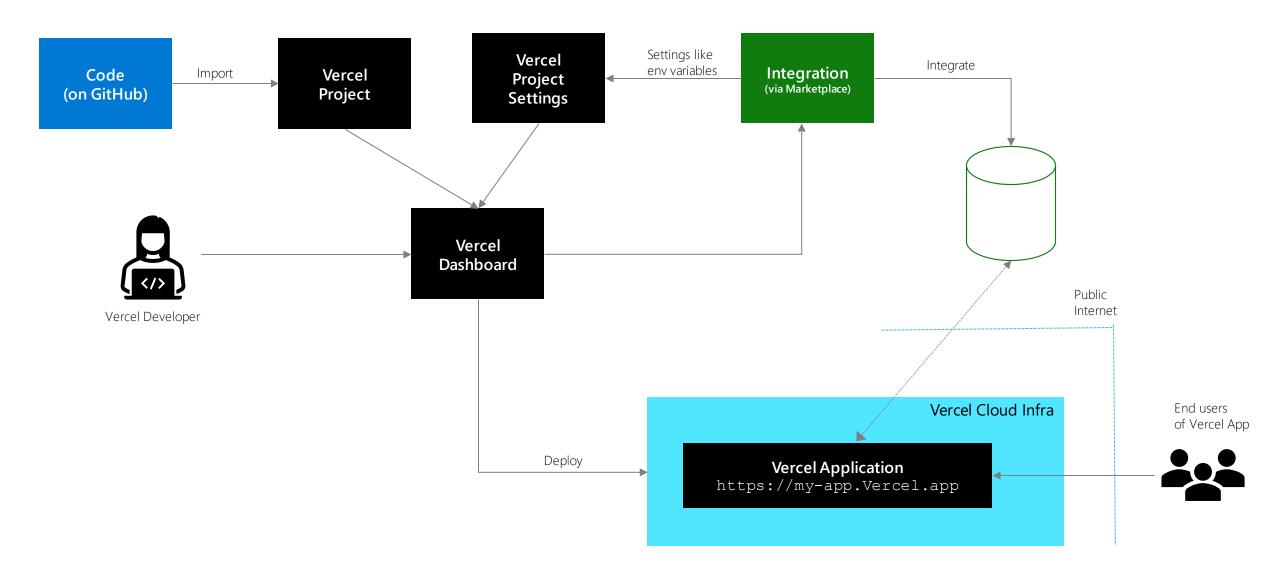
Vercel Integration with Azure Cosmos DB

No pay barriers, insta-create and develop

Vercel Integration with Azure Cosmos DB

Code (on GitHub) → Import → Vercel Project

Vercel Project Settings ← Settings like env variables ← Integration (via Marketplace) → Integrate

Vercel Developer → Vercel Dashboard

Vercel Dashboard → Deploy → Vercel Application https://my-app.Vercel.app

Vercel Cloud Infra

Public Internet

End users of Vercel App

Vercel Integration Demo

QnA

Where to go from here?

https://aka.ms/dab

https://aka.ms/vercel-getting-started
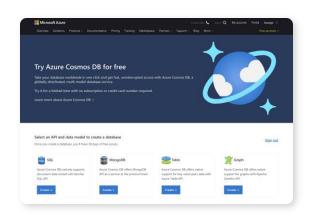
sajeetharan/azconf2023 (github.com)
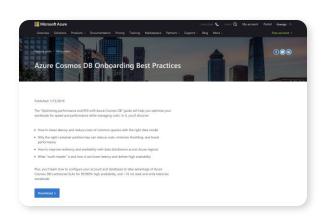
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Thanks a lot everyone!

Are developers ready to build intelligent apps with Azure Cosmos DB?
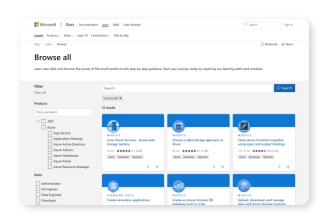
Get started today:

Try Azure Cosmos DB free

Learn how to use Azure Cosmos DB through tutorials and best practices

Build your skills with Azure Cosmos DB learning modules

Platinum Partner

PRO

Gold Partner

PRESIDIO®

Silver Partner

ManageEngine Site24x7
Crafted at ZOHO Corp.

SAGENT

Securra Health