

Journey to the Cosmos DB

Sharing story of a cosmic journey with Cosmos DB

Elkhan Yusubov

July 2, 2020



Elkhan Yusubov

Cloud Principal Engineer

T-Rex Solutions

Speaker • Microsoft Certified Trainer • SAFe CSM • HL7

FHIR • EDI X12 • MCSD • Azure • AWS • GCP • OCI

Welcome!



A cloud computing service created by Microsoft for building, testing, deploying, and managing applications and services through a global network of Microsoft-managed data centers



Azure Cosmos DB

A fully managed database service with turnkey global distribution and transparent multi-master replication & guaranteed 99.999% SLA



1. What is Cosmos DB
2. Managed Databases
3. Consistency Models
4. Configuration
5. Development Tools
6. Demos
7. Security Considerations
8. Onboarding Best Practices

1. What is Cosmos DB

- Build planet-scale applications more easily than ever
- Turnkey global distribution
- Single-digit millisecond latency backed by SLA
- Elastic and unlimited scalability
- Multi-model with wire protocol compatible API endpoints



Turnkey global distribution with transparent multi-master replication and five well-defined consistency choices



Single-digit millisecond latency at the 99th percentile and 99.999-percent high availability, for any scale, backed by SLAs



Elastic and unlimited scalability to meet demand with capacity, and payment based on only the throughput and storage you need



Multi-model with wire protocol-compatible API endpoints for Cassandra, MongoDB, SQL, Gremlin, Etc, and Table along with built-in support for Apache Spark and Jupyter notebooks

2. Managed Databases



Table

SQL

SQL



JavaScript

{LEAF}

API for MongoDB



Gremlin



Cassandra

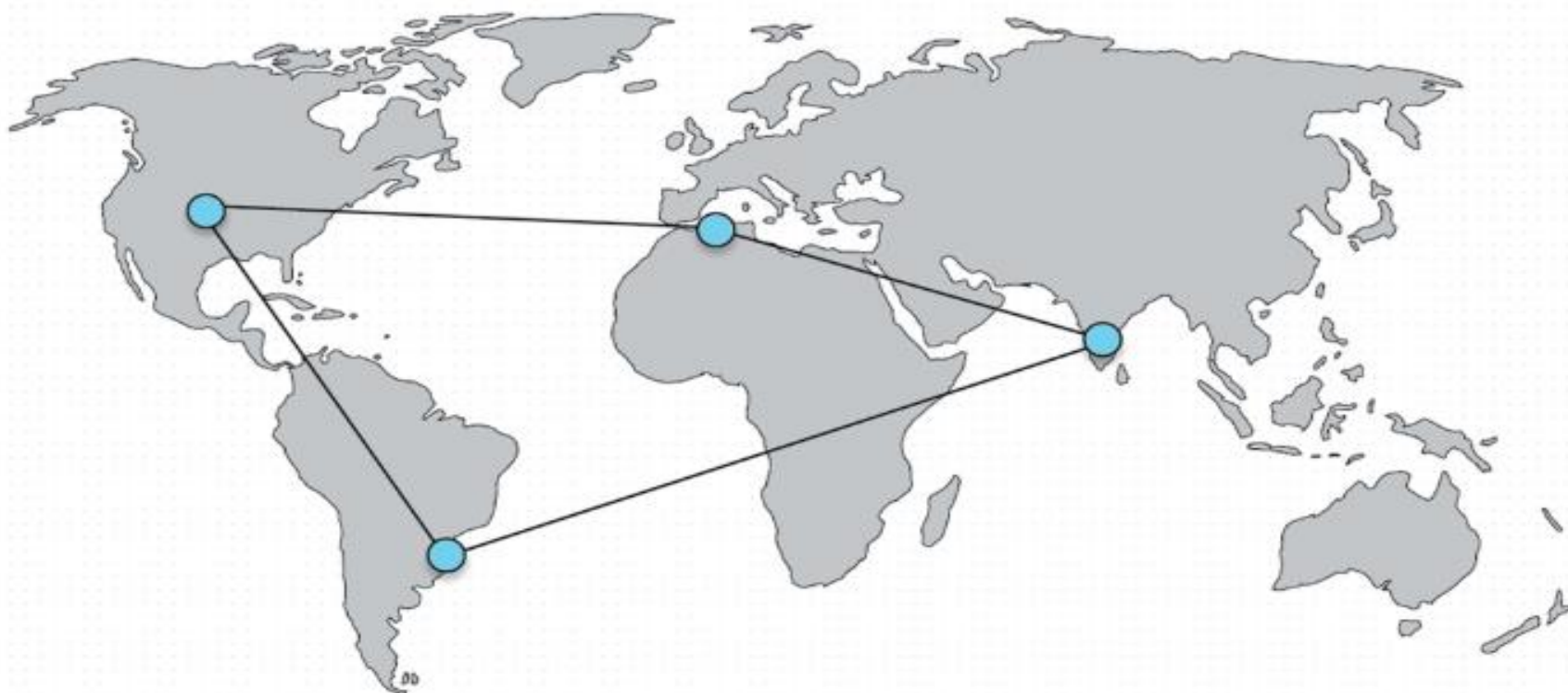


Spark



ETCD

...more APIs coming



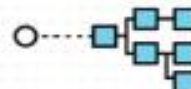
Key-Value



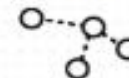
Column-Family



Documents



Graph



Global distribution

Elastic scale-out

Guaranteed low latency

Five consistency models

Comprehensive SLAs

[illegible]

3. Consistency Models

- Strong
- Bounded staleness
- Session
- Consistency prefix
- Eventual



4. Setup & Configuration

- Azure account – provision from portal
- Reserved capacity
- Use budgets and cost alerts
- Create and manage Azure budgets

Create Azure Cosmos DB Account


Create a new Azure Cosmos DB account with multi-region writes in North Europe, West Europe, South Central US, or North Central US by November 30, 2019. Restrictions apply.*

*** Subscription** Primary MSDN

*** Resource Group** Select existing... [Create new](#)


Instance Details


*** Account Name** Enter account name

*** API** Core (SQL) 

- Core (SQL)
- Azure Cosmos DB for MongoDB API
- Cassandra
- Azure Table
- Gremlin (graph)

*** Location**

Geo-Redundancy 

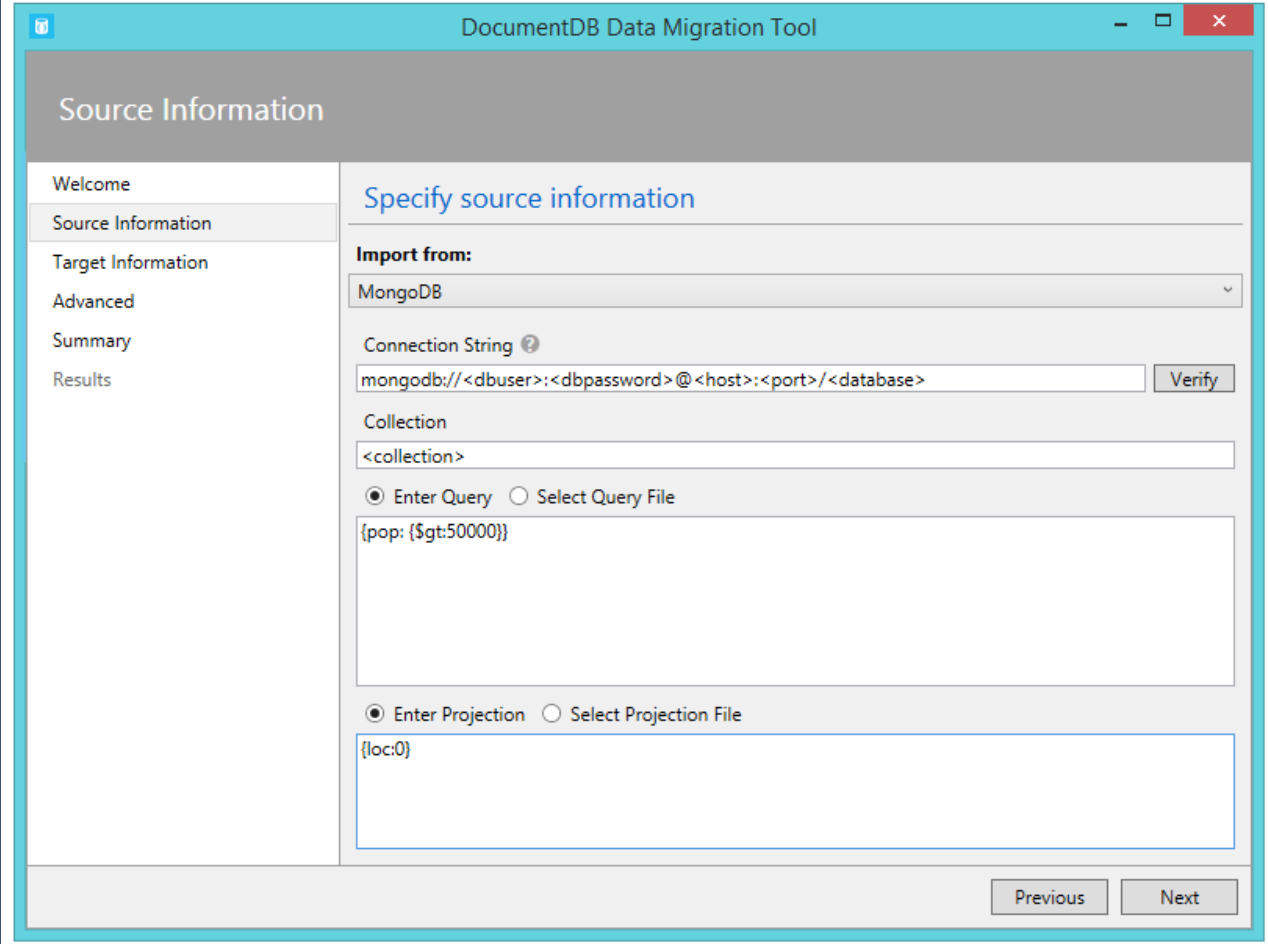
Multi-region Writes  [Enable](#) [Disable](#)

*Up to 33% off multi-region writes is available to qualifying new accounts only. Accounts must be created between August 15, 2019 and November 30, 2019. Offer limited to accounts with both account locations and geo-redundancy only in North Europe, West Europe, South Central US, or North Central US regions, and applies only to multi-region writes in those same regions. Both Geo-Redundancy and Multi-region Writes must be enabled in account settings. Actual discount will vary based on number of qualifying regions selected.

[Review + create](#) [Previous](#) [Next: Network](#)

Database Migration Tool

- Install .NET Framework 4.5.2 or later
- Increase throughput
- Create Azure Cosmos DB Resources



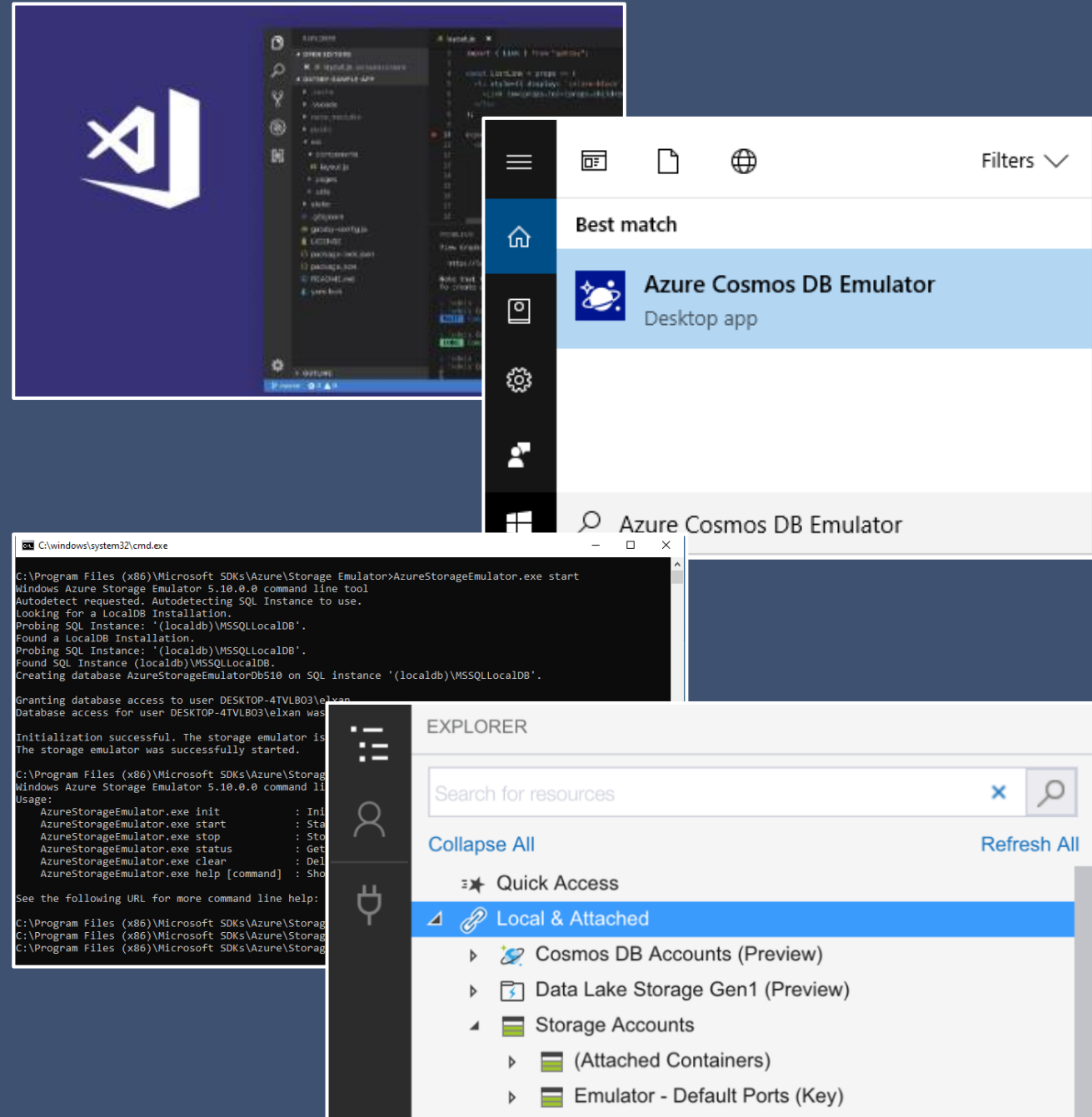
The screenshot displays the 'DocumentDB Data Migration Tool' window. The 'Source Information' tab is selected in the left-hand navigation pane. The main content area is titled 'Specify source information' and includes the following fields and options:

- Import from:** A dropdown menu currently set to 'MongoDB'.
- Connection String:** A text input field containing the template `mongodb://<dbuser>:<dbpassword>@<host>:<port>/<database>`, accompanied by a 'Verify' button.
- Collection:** A text input field containing the placeholder `<collection>`.
- Query Selection:** Radio buttons for 'Enter Query' (selected) and 'Select Query File'. Below this is a text area containing the query `{pop: {$gt:50000}}`.
- Projection Selection:** Radio buttons for 'Enter Projection' (selected) and 'Select Projection File'. Below this is a text area containing the projection `{loc:0}`.

At the bottom right of the window, there are 'Previous' and 'Next' navigation buttons.

5. Development Tools

- VS Code (or IDE of your choice)
- Emulator for Azure Cosmos DB
- Emulator for Azure Storage
- Azure storage explorer



6. Demos

Cosmos DB SQL API on Azure

- **Explore a NodeJS app and its connection**

Query Cosmos DB SQL API on Azure

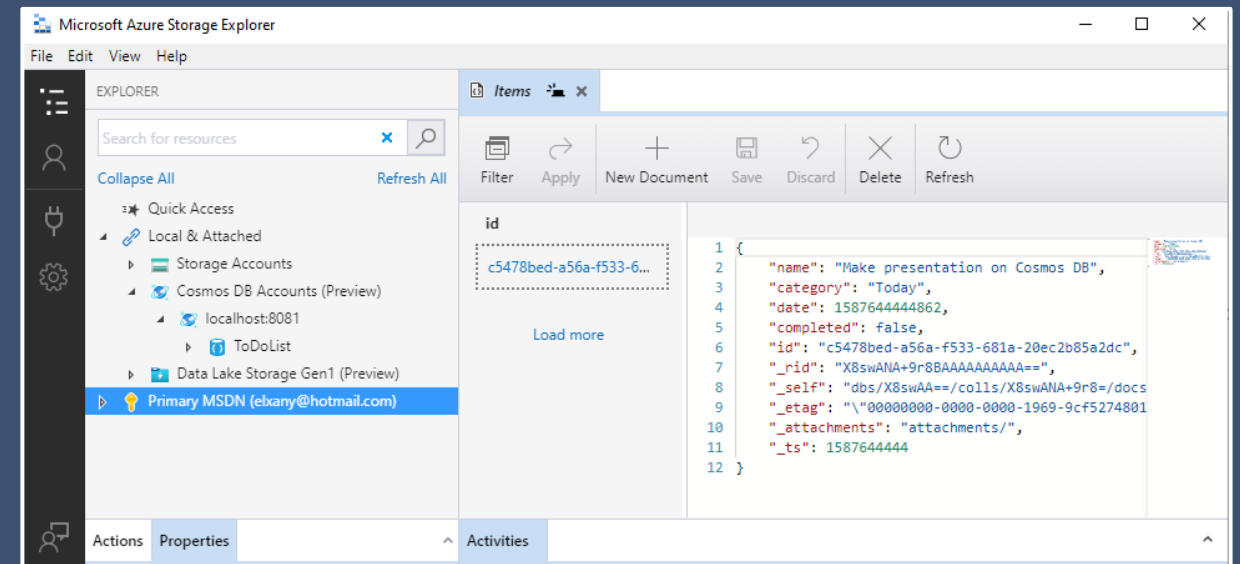
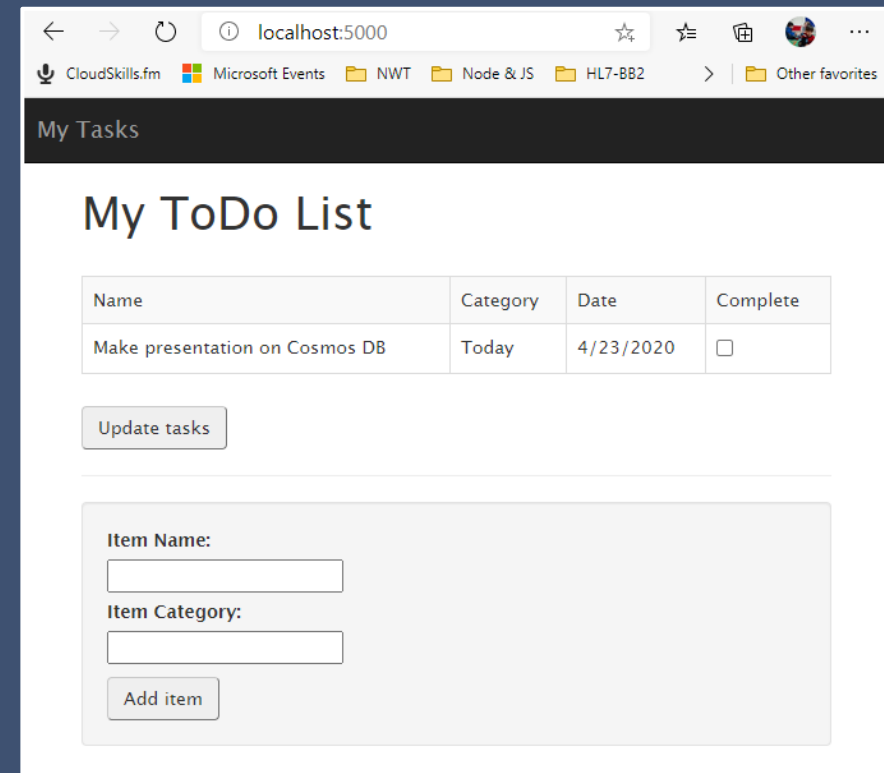
- **Explore query of collections**

Cosmos DB Mongo API on Azure

- **Use mean stack app**
- **Explore query of collections**

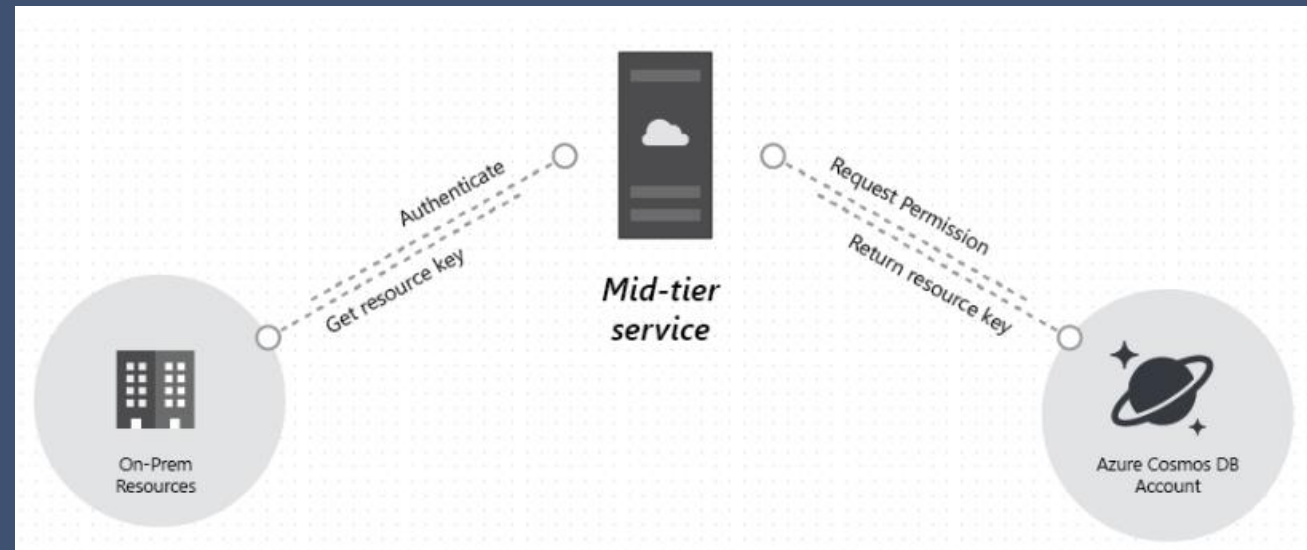
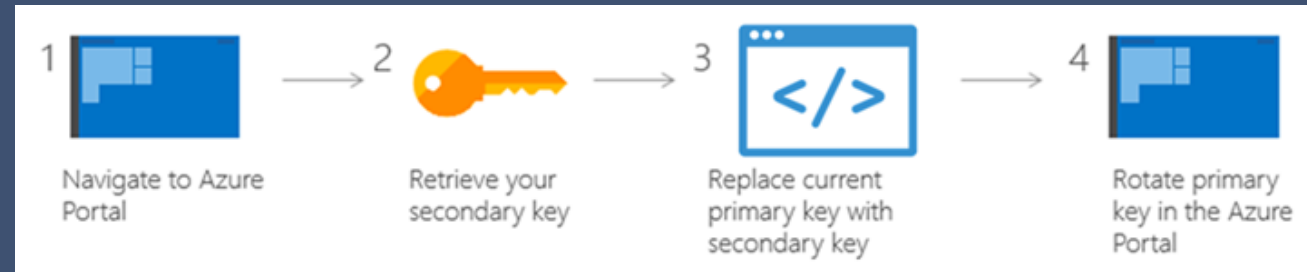
How backups setup

- **Online & on-demand data restore**



7. Security Considerations

- **Master keys**
- **Resource tokens**
- **Users**
- **Permissions**



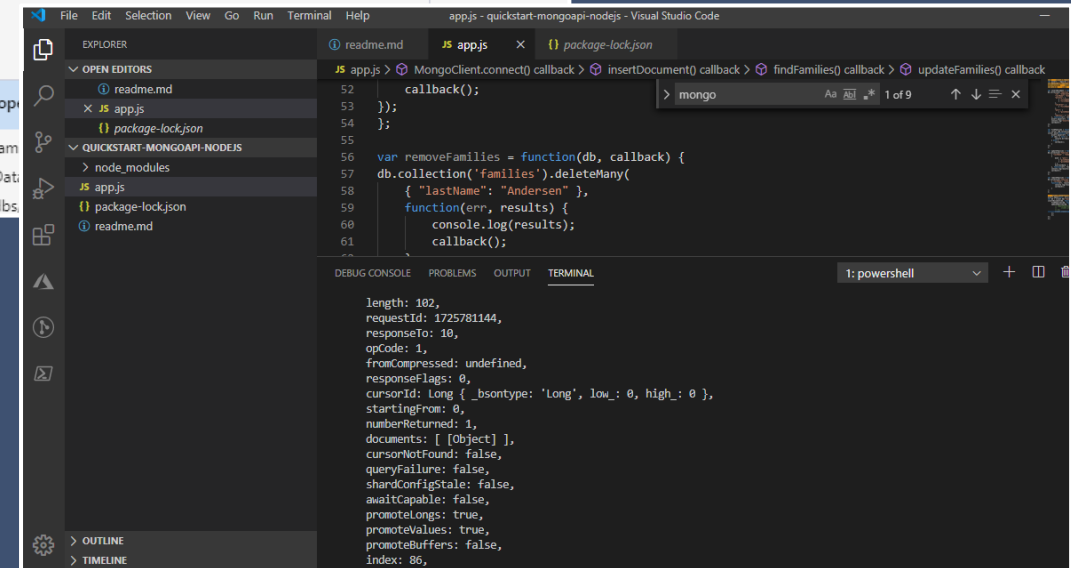
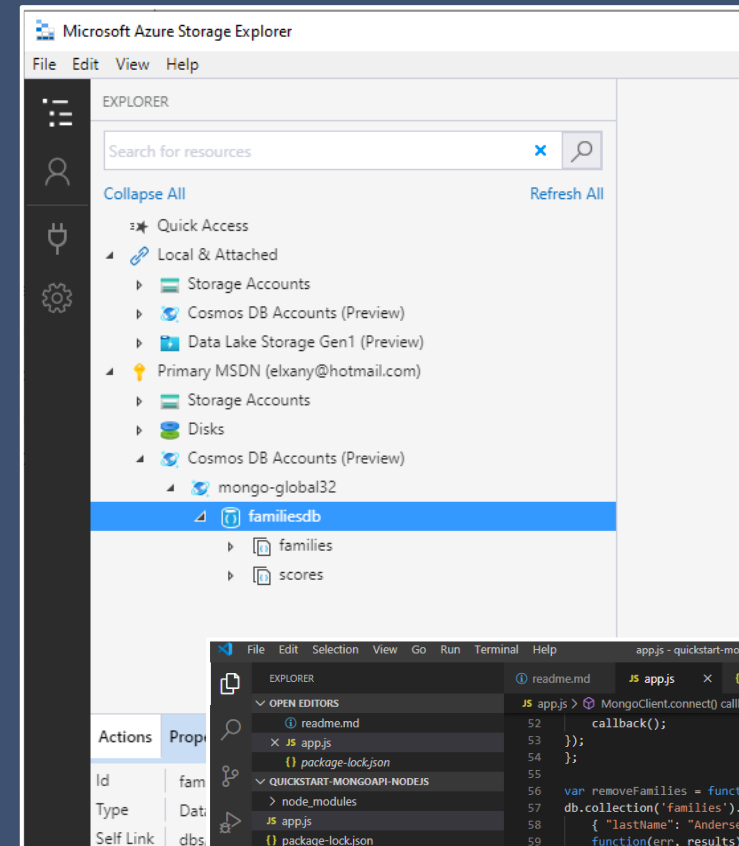
Demo – apps on production?

Cosmos DB SQL API on Emulator

- **Explore a NodeJS app and its connection**
- **Show quickstart-nodejs starter app**

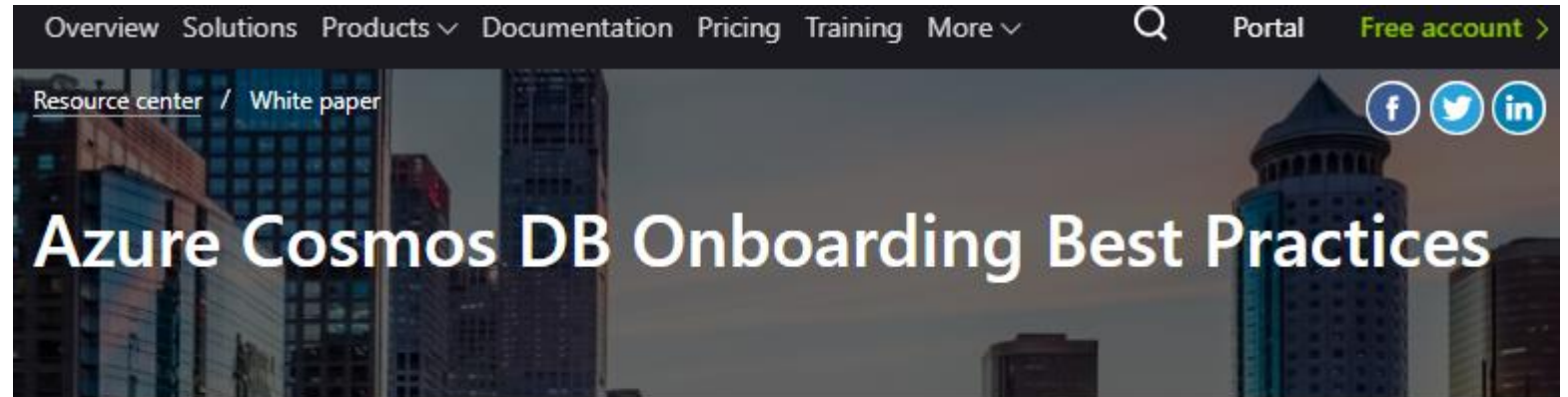
Cosmos DB Emulator details

- **Explore query of collections**



8. Azure Cosmos DB Onboarding Best Practices

- Data Modeling
- Partitioning
- Global distribution
- Performance
- Cost Optimization



Published: 7/15/2019

Optimizing performance and ROI with Azure Cosmos DB

Reference: <https://azure.microsoft.com/en-us/resources/azure-cosmos-db-onboarding-best-practices/>

1. What is Cosmos DB
2. Managed Databases
3. Consistency Models
4. Configuration
5. Development Tools
6. Demos
7. Security Considerations
8. Onboarding Best Practices

What does Cosmos have to do with database anyway?



T-REX



Elkhan Yusubov

Cloud Principal Engineer

T-Rex Solutions

Speaker • Microsoft Certified Trainer • SAFe CSM • HL7

FHIR • EDI X12 • MCSD • Azure • AWS • GCP • OCI

Thank you for coming!

