What is Azure Cosmos DB?

Building globally distributed applications

Mission-critical applications for
a global userbase need …

Global distribution

Elasticity of compute and storage

Fast, Responsive millisecond latency

Durable, Consistent and Highly available

SQL

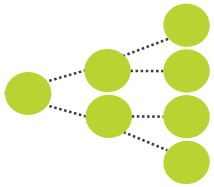
Azure Cosmos DB

… more coming soon

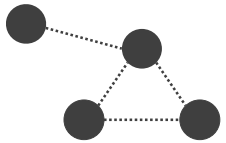
Key-Value

Column-family

Documents

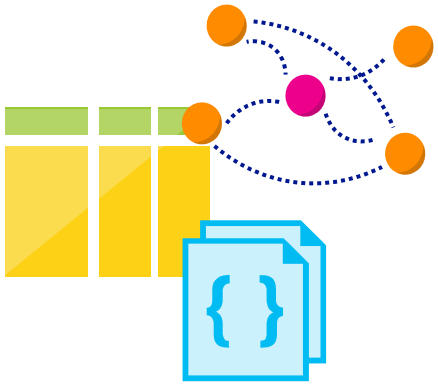


Graph



Global distribution | Elastic scale out | Guaranteed low latency | Five consistency models | Comprehensive SLAs

A globally-distributed, multi-model database service



Multi-model, multi-API

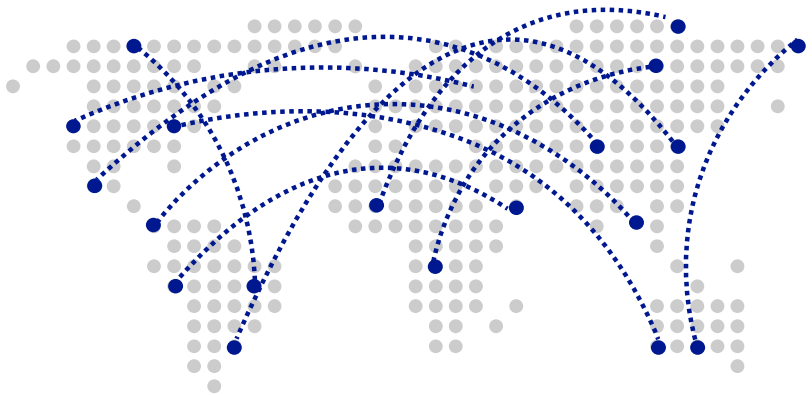
First party and popular third-party OSS APIs

Key-value, Document, Columnar, and Graph

DocumentDB (SQL and JavaScript), MongoDB, Table, and Gremlin

Supported across number of programming languages

More APIs to be added



Global distribution from the ground-up

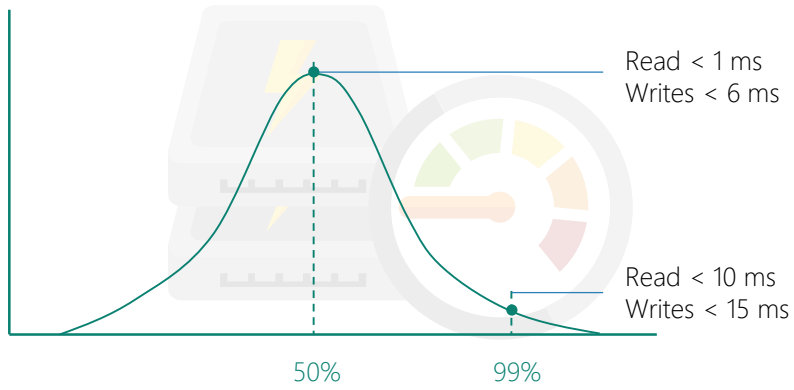
Worldwide presence

Automatic multi-region replication

Multi-homing APIs

Manual and automatic failovers

Latency, throughput, consistency, and availability guarantees



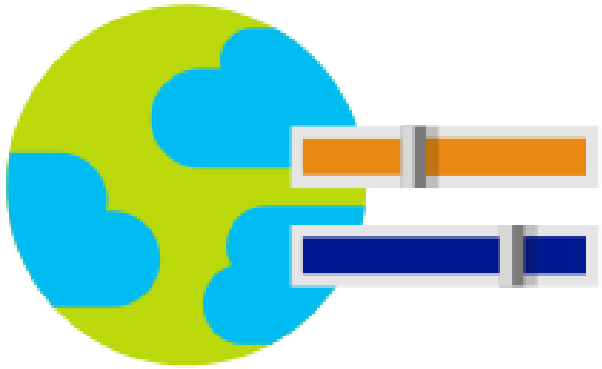
Guaranteed low latency

Globally distributed with reads and writes served from local region

Write optimized, latch-free database engine designed for SSDs

Synchronous and automatic indexing at sustained ingestion rates

Single-digit millisecond latency at any scale



Elastically scalable storage

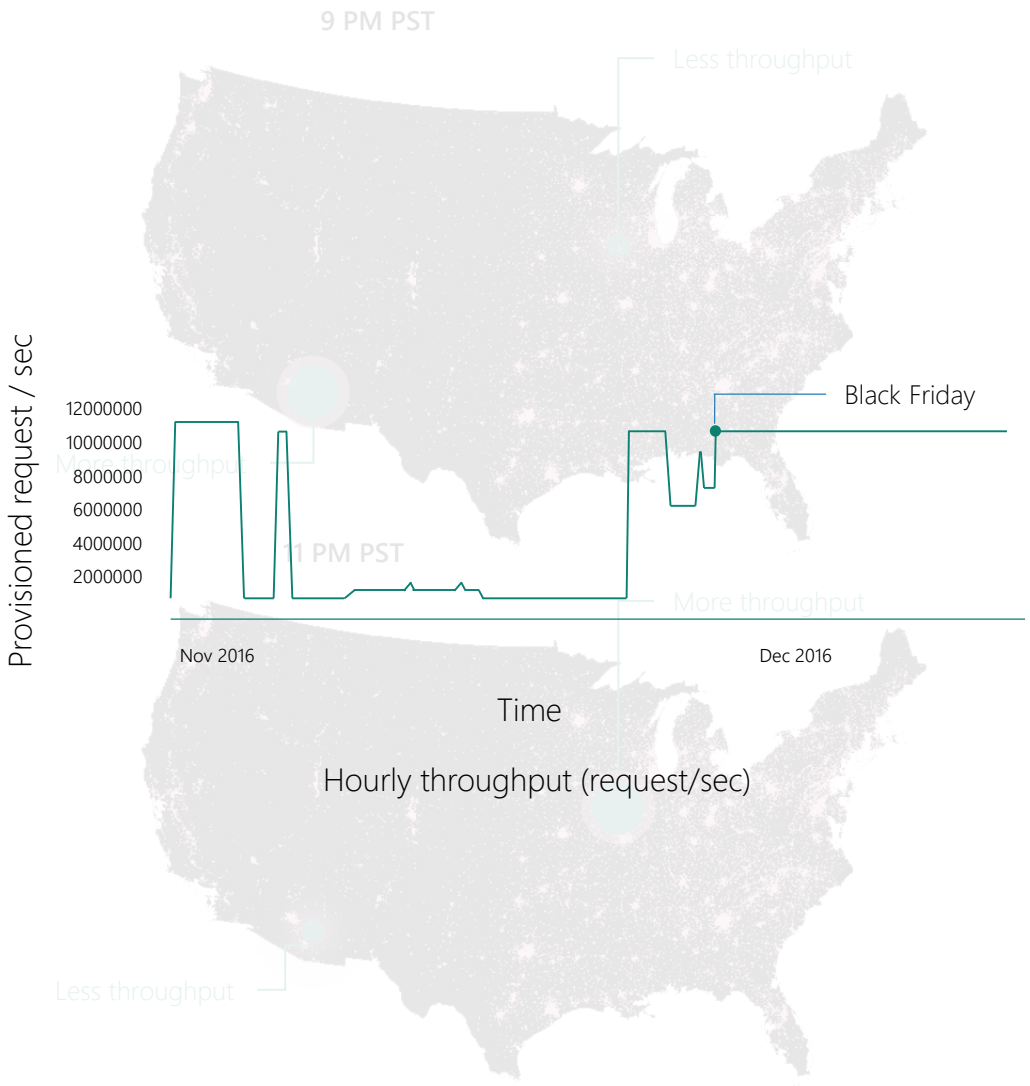
Pay per GB used

No partition management, no limits

Automatically indexed SSD storage

Global distribution across Azure regions

Automatic expiration via TTL



Elastically scalable throughput

Pay by the hour, only what you need

No partition management, no limits

Change throughput at any time, effective in seconds

Scale from 100 to 100s of millions of requests/sec across any number of regions

Now supports requests/min to handle spikes cost-effectively

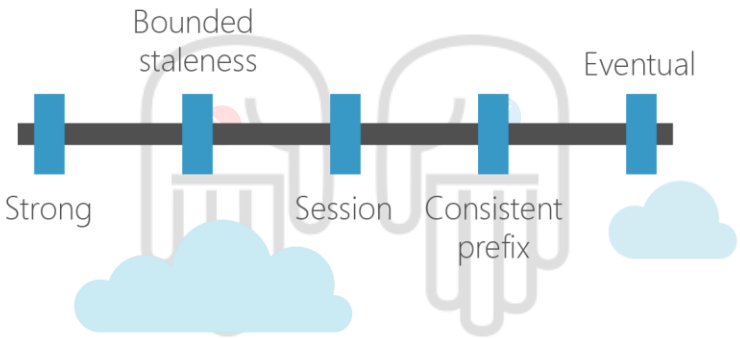
Enterprise-grade SLAs

99.99% availability

Made possible with highly-redundant storage architecture

Low-latency, consistency, and throughput also covered by financially backed SLAs

Durability – majority quorum committed, synchronous and indexed writes



Well defined consistency models

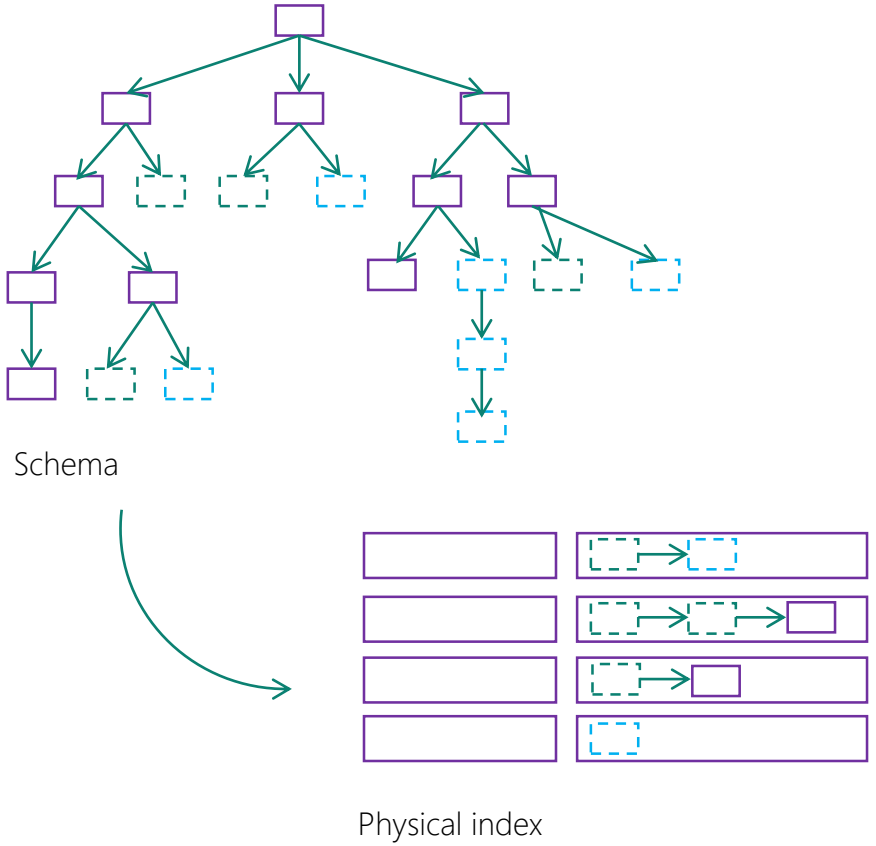
Global distribution forces us to navigate the CAP theorem

Writing correct distributed applications is hard

Five well-defined consistency levels

Intuitive and practical with clear PACELC tradeoffs

Can be overridden on a per-request basis



No schema or index migrations

Highly write-optimized database engine

Works across every data models

Automatic and synchronous indexing

Hash, range, and geospatial

Fully resource governed

Online and in-situ index transformations

Security & Compliance

Always encrypted at rest and in motion

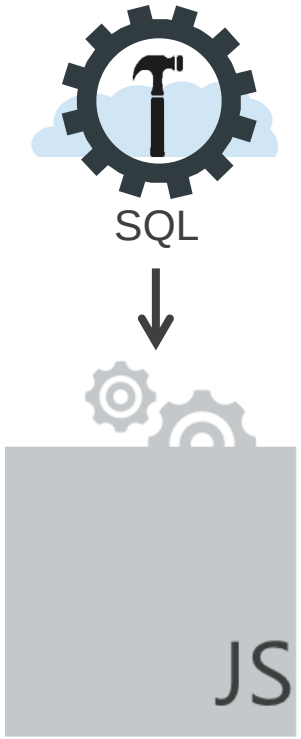
Highly scalable “row level” authorization

IP firewall rules

ISO, EUMC, HIPAA, PCI - certified

SOC1, SOC2, FedRAMP, IRS 1075, UK Official – audit complete, Q2 2017

APIs



DocumentDB API

JavaScript-Native with JSON Documents

Familiar SQL Query Capabilities

Automatic Indexing of JSON Documents

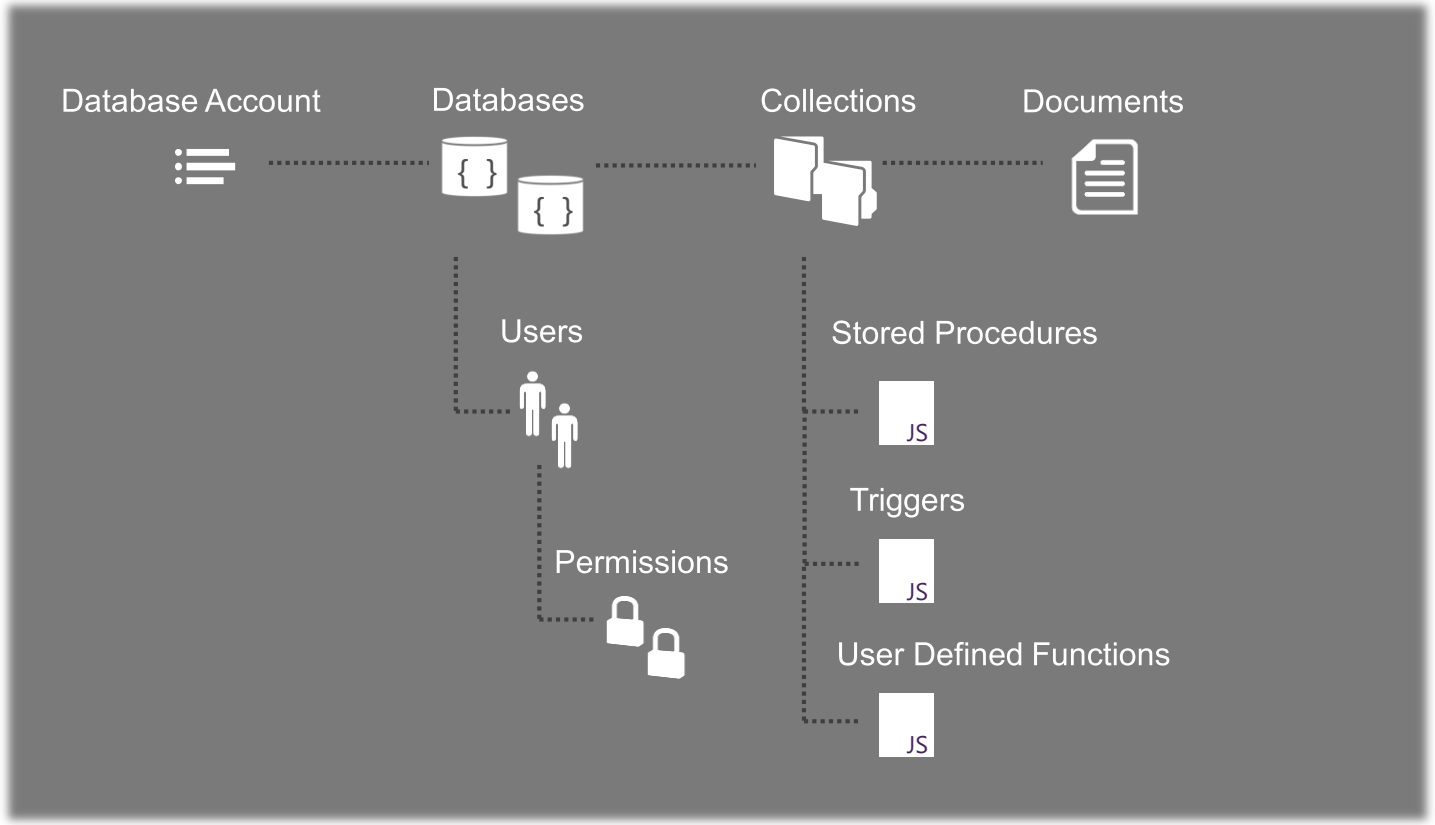
Supports Geospatial Queries

JavaScript code execution with stored procedures, triggers and user-defined functions

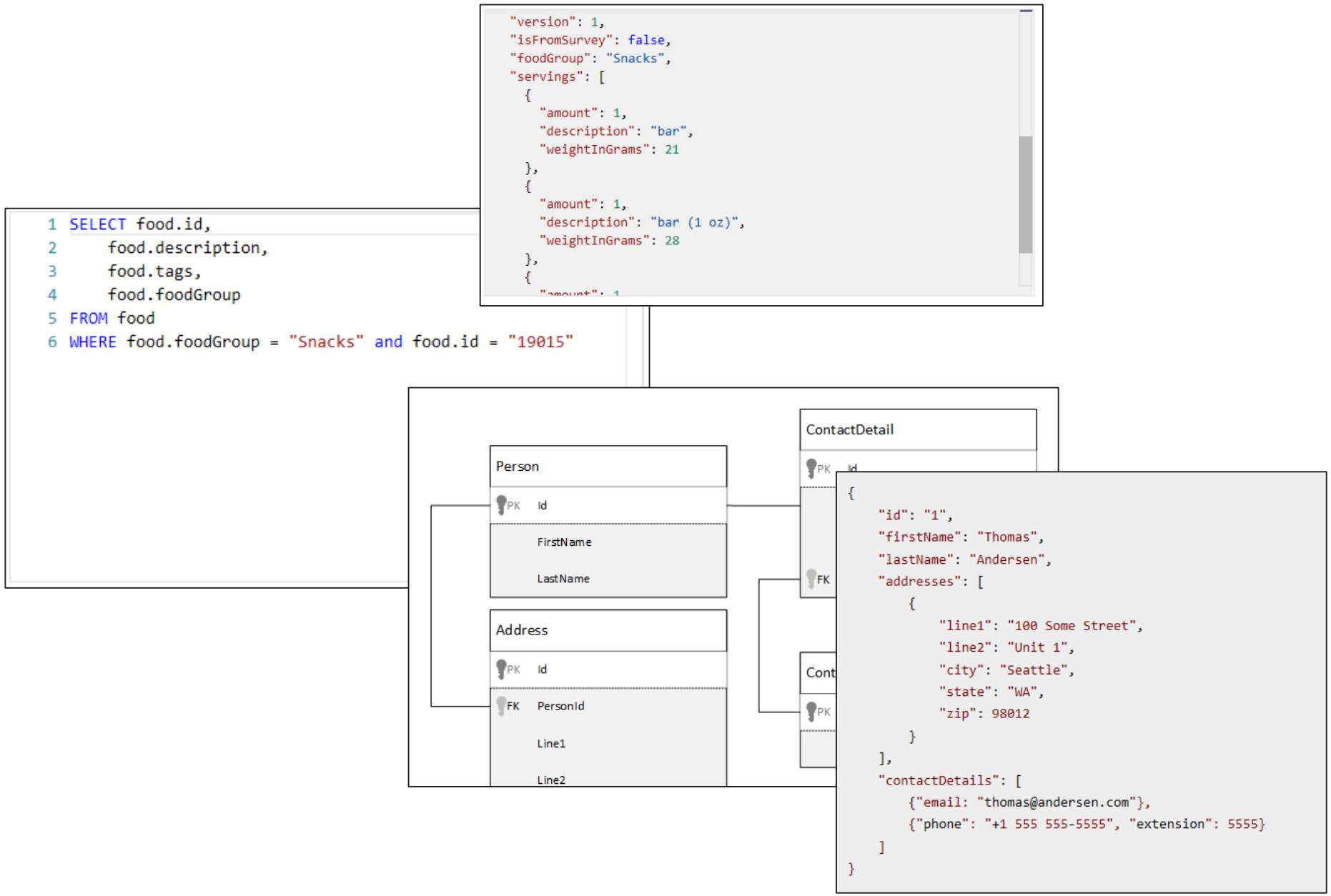
Change feed support

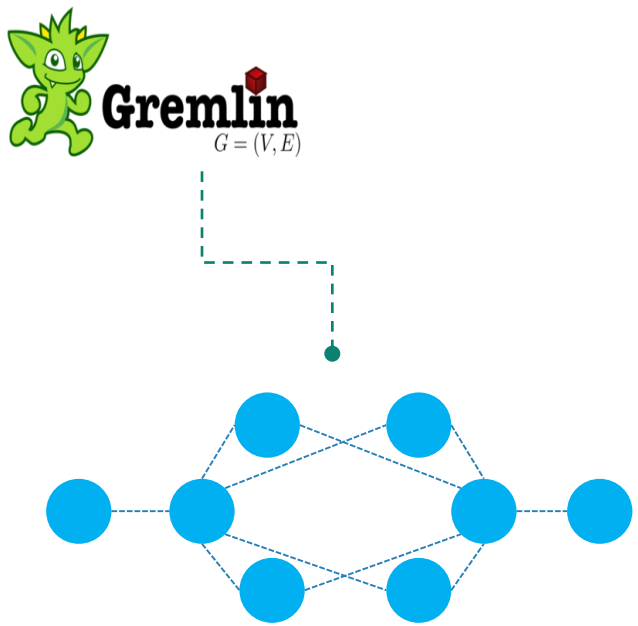
Document Store

Document Resources



Modeling and Querying Data





Graph API

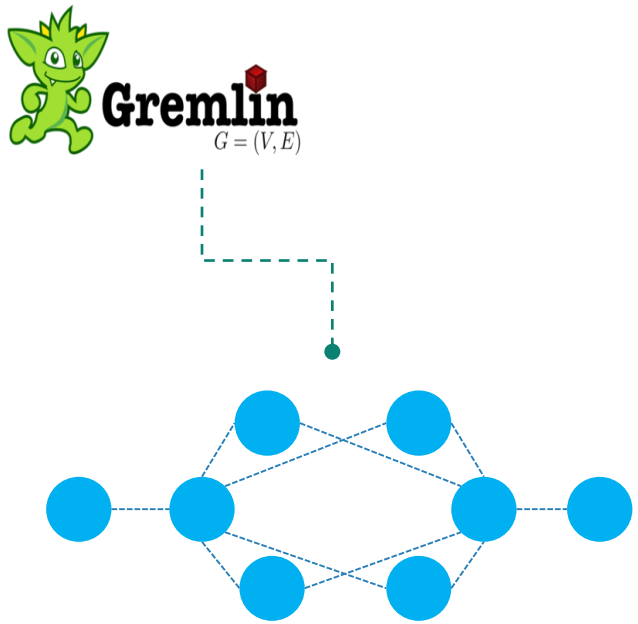
Social networks, recommendations, logistics, and IoT

Globally distributed, horizontally scalable graphs

Supports Apache TinkerPop Gremlin

Models real world entities and relationships

OSS friendly



Graph API

Graph modeling

Traversal APIs

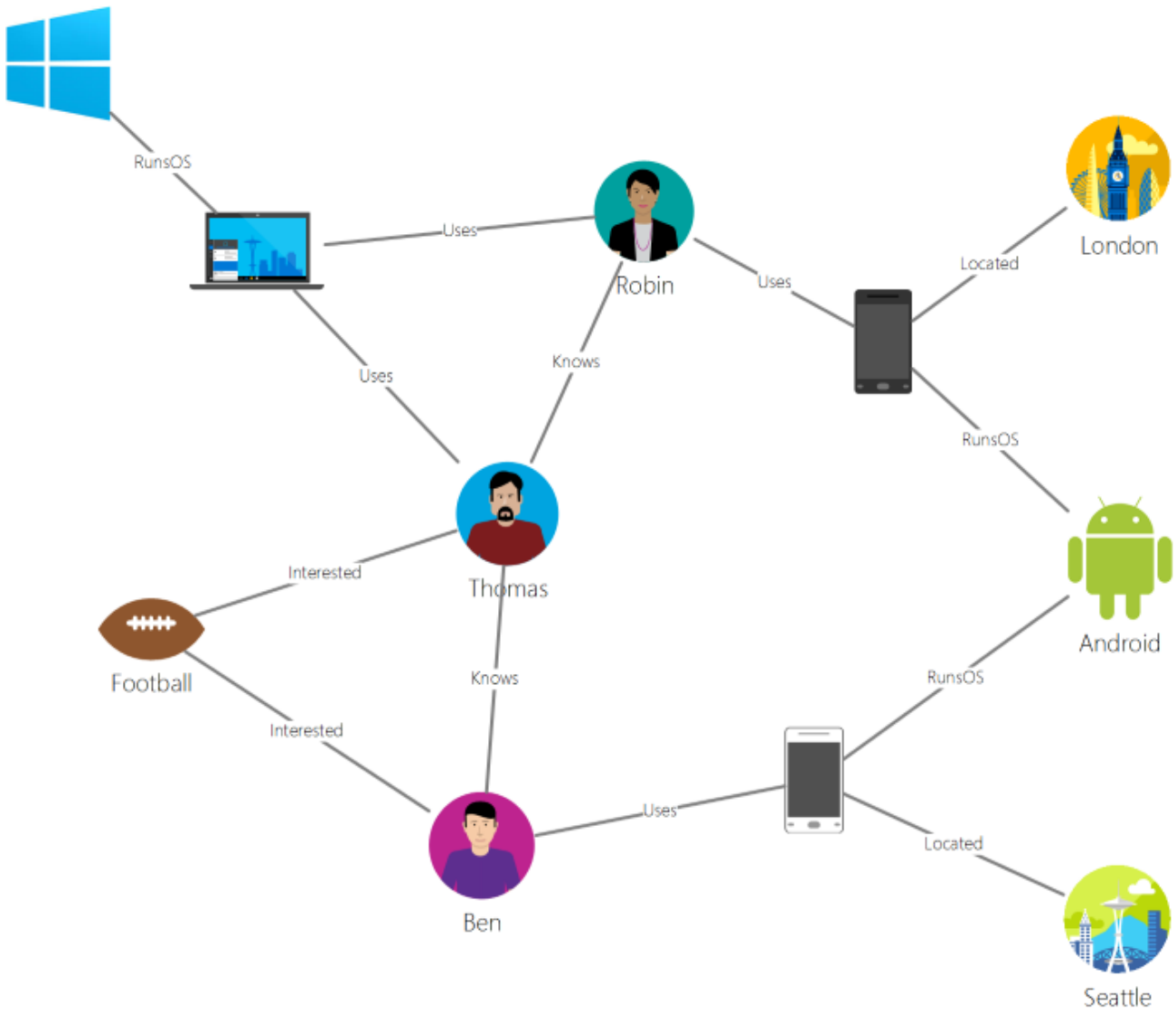
Turn-key global distribution

Elastic scaling of storage and throughput

Automatic indexing with instant query availability

Tunable consistency levels

Comprehensive SLAs including 99.99% availability



Graph Structures

Comprised of vertices (nodes) and edges (lines)

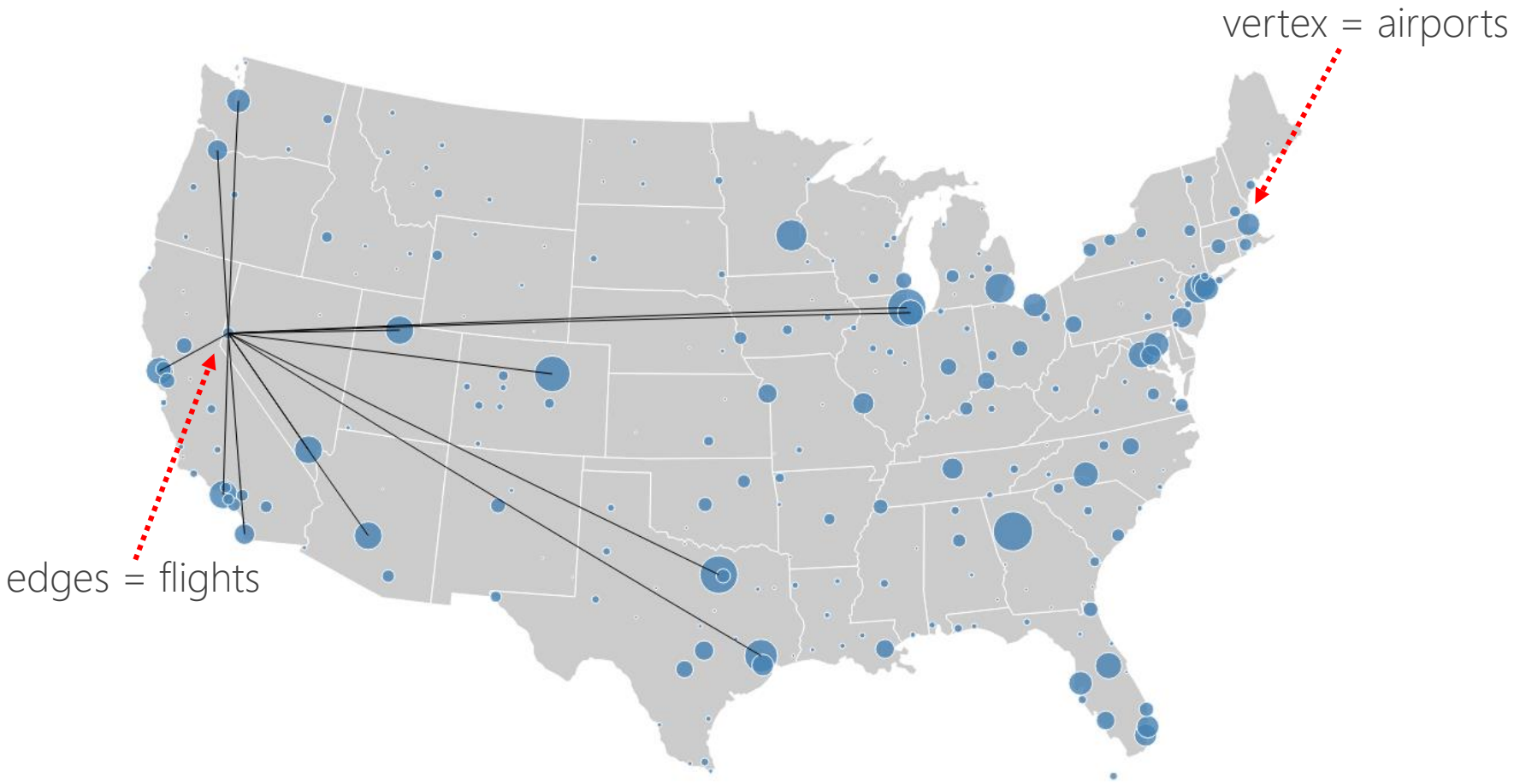
Edges denote relationships between vertices

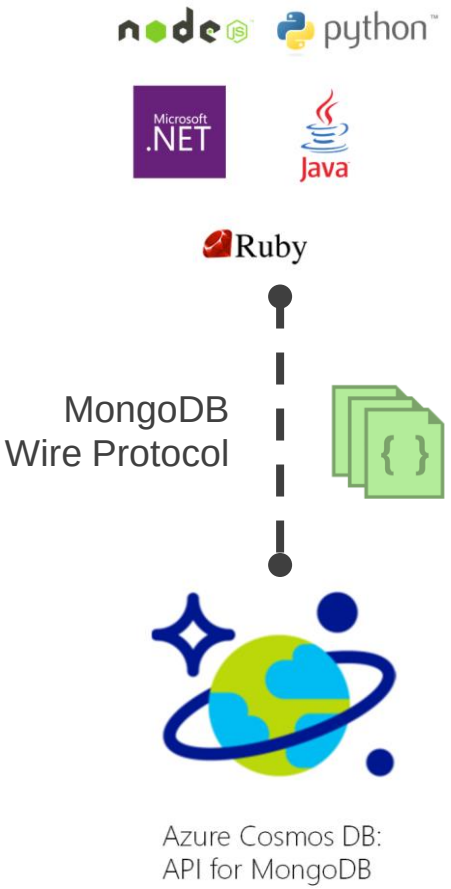
Properties express information about vertices and edges

Also known as a property graph

Sample graph shows relationships among people, mobile devices, interests, and operating system

Logistics
(e.g. Flights)





MongoDB API

Data store for existing MongoDB Apps

Implements MongoDB 3.4 (version 5) wire protocol

Supports queries, aggregation and unique indexes

Automatic indexing supported out of the box

Compatible with existing MongoDB tooling and packages

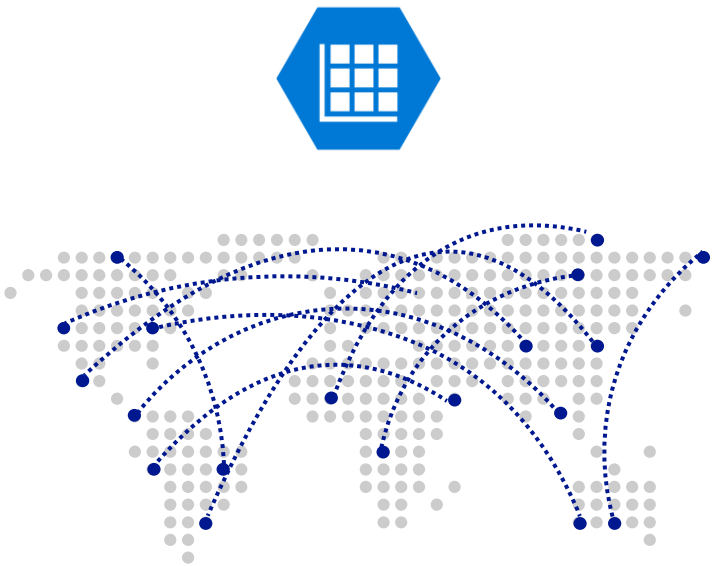


Table API

Premium experience for Azure Table Storage

Secondary indexes, dedicated throughput, low latency, global distribution for Table storage customers

Backwards compatible with existing Table SDKs

Roadmap: update for standard Tables, optimized for storage

Roadmap: seamless migration to Cosmos DB

Integrations

Spark Connector for Cosmos DB

RDD and Dataset-based connectors available

Native integration with Spark SQL

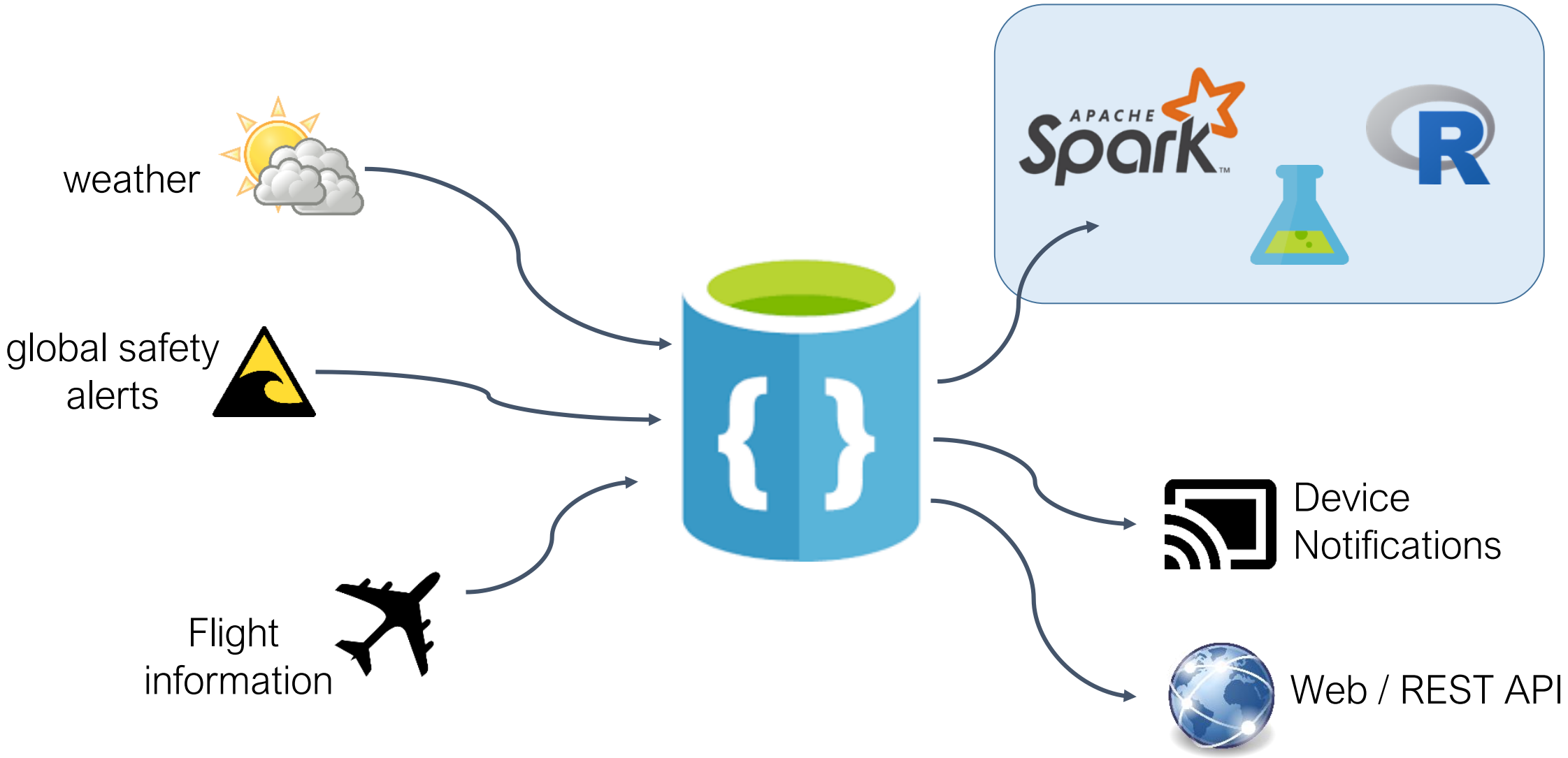
Direct mapping to Cosmos DB partitions

Natively leverage Cosmos DB index

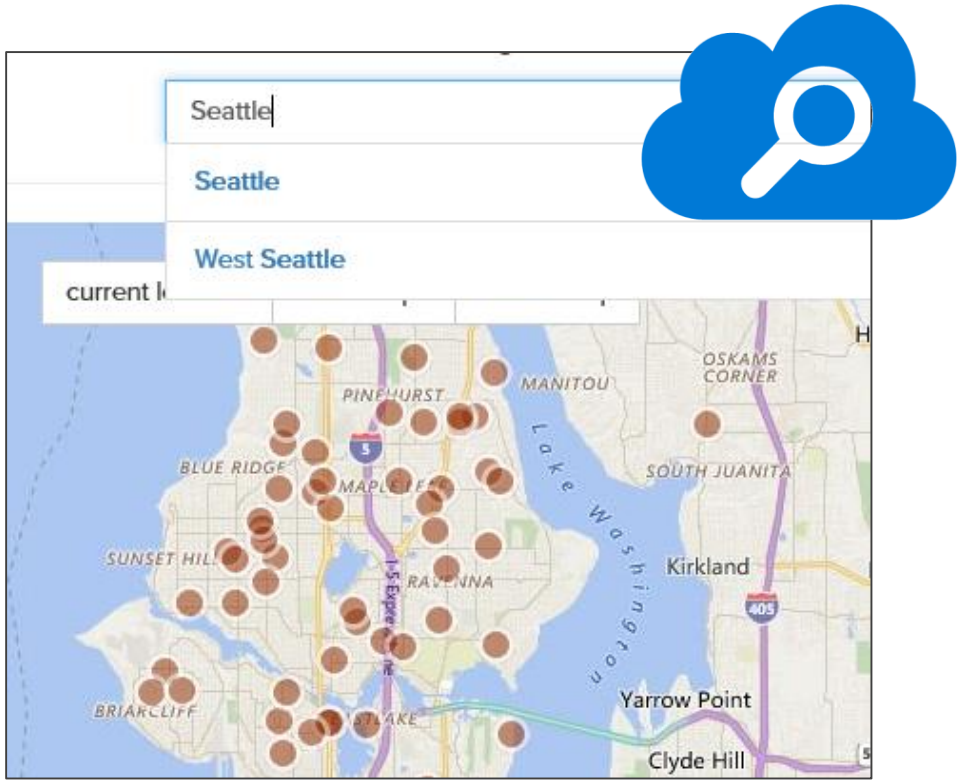
Predicate pushdown

GA in H2 CY2017

Cosmos in IoT Scenarios



Azure Search



Customer Stories

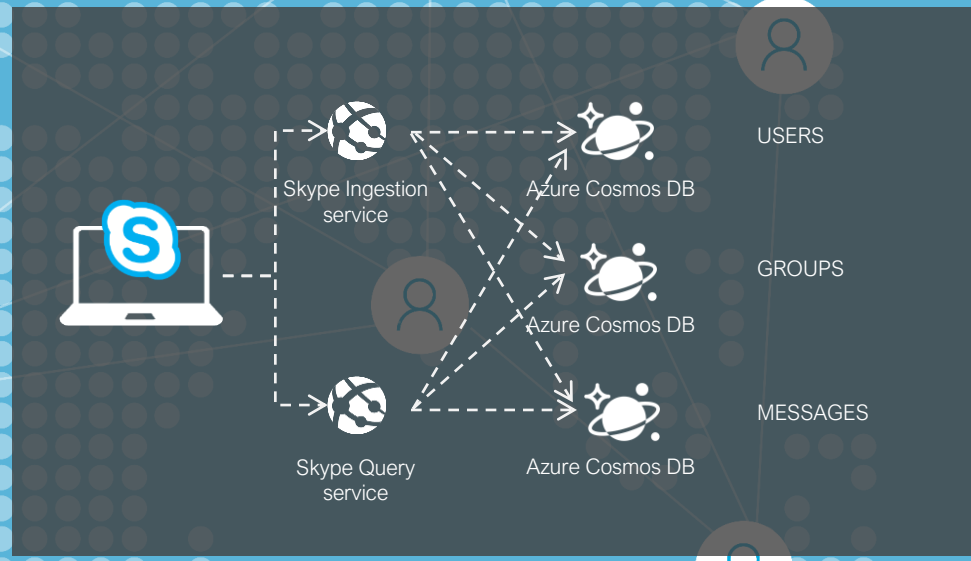
Skype powers 1M searches per second over conversation data

Business need

- Provide search capabilities over TBs-PBs of Skype and Teams conversations
- Fast ingestion with multiple writes, overlay group memberships
- Secure & compliant data storage with high privacy requirements

Key benefits

- Cosmos DB supports fast ingestion of message data from 1:1 communication, group chats
- Cosmos DB enables real-time query over message and group conversations, with custom filters on when user enters/leaves thread



skype™

6TB
User data

1TB
Group data

44TB
Message data

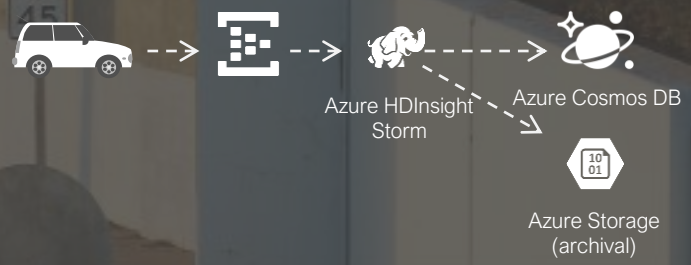
Toyota drives connected car push forward with Azure Cosmos DB

Business need

- Need to ingest massive volumes of diagnostic data from vehicles and take real-time actions as part of connected car platform
- Management and operations of database infrastructure to handle exponential growth of data

Key benefits

- Cosmos DB can scale elastically without operational overhead of MongoDB
- Perform fast queries over events to deliver recommended services, safety notices to vehicles
- Perform staged migration via MongoDB APIs



TOYOTA

8TB
Vehicle Telemetry

250K
Lexus Cars

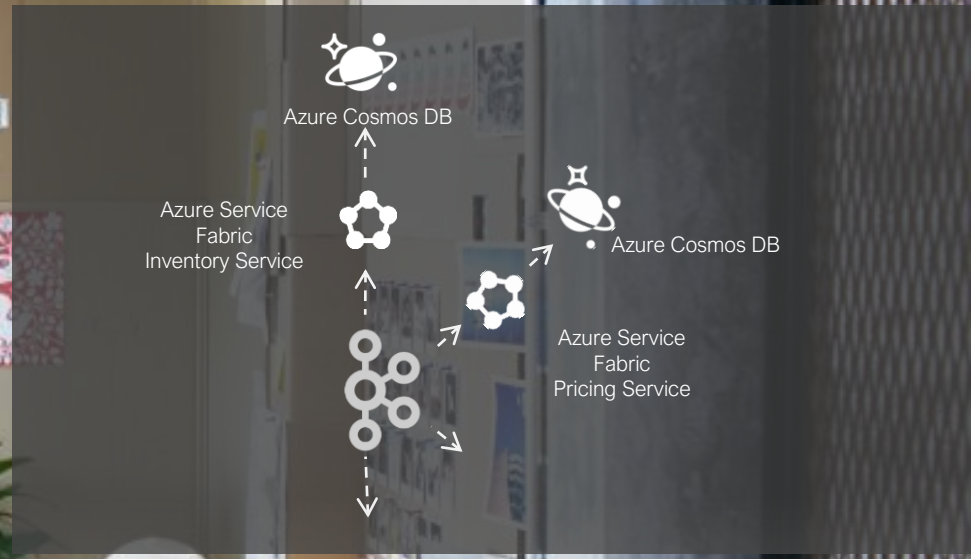
E-commerce challenger eyes the top spot, runs on Azure Cosmos DB

Business need

- Process Ms of retail transactions per second in milliseconds in inventory pipeline during peak (“Black Friday”)
- Fast development cycles and loosely coupled micro-services to keep up with a competitive marketplace

Key benefits

- Cosmos DB provides elastic scalability from 1-10M requests per second
- Improved reliability, and faster order processing times than previous OSS solution
- Reduced development time and operational overhead



jet

10M Peak RPS

12TB Provisioned

64 Databases

Want to Learn More?

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

Overview

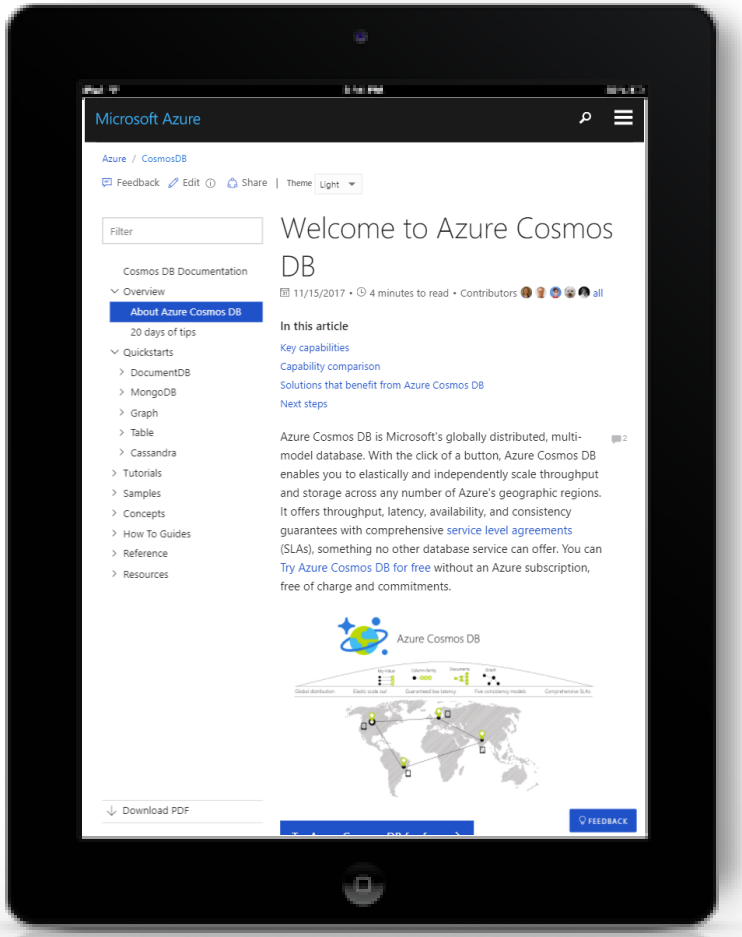
Explanation of the service and the general value proposition

Quickstarts

Simple demos to get you going quickly with the platform

Tutorials

Deeper dive into each individual API



Reference

Links to other related tutorials, guides and documentation

Samples

Sample applications that can be downloaded and ran on your machine

Concepts

Academic concepts that can help explain some of the new NoSQL functionality

View My Content

http://azlab.io/cosmos