



**CH-CH-CH-CHANGES:**

**TRACING  
CHANGES**

**IN AZURE  
COSMOS DB**



# Conference Mobile App



We want to hear from you!

#devup2022



# David Bowie - Changes

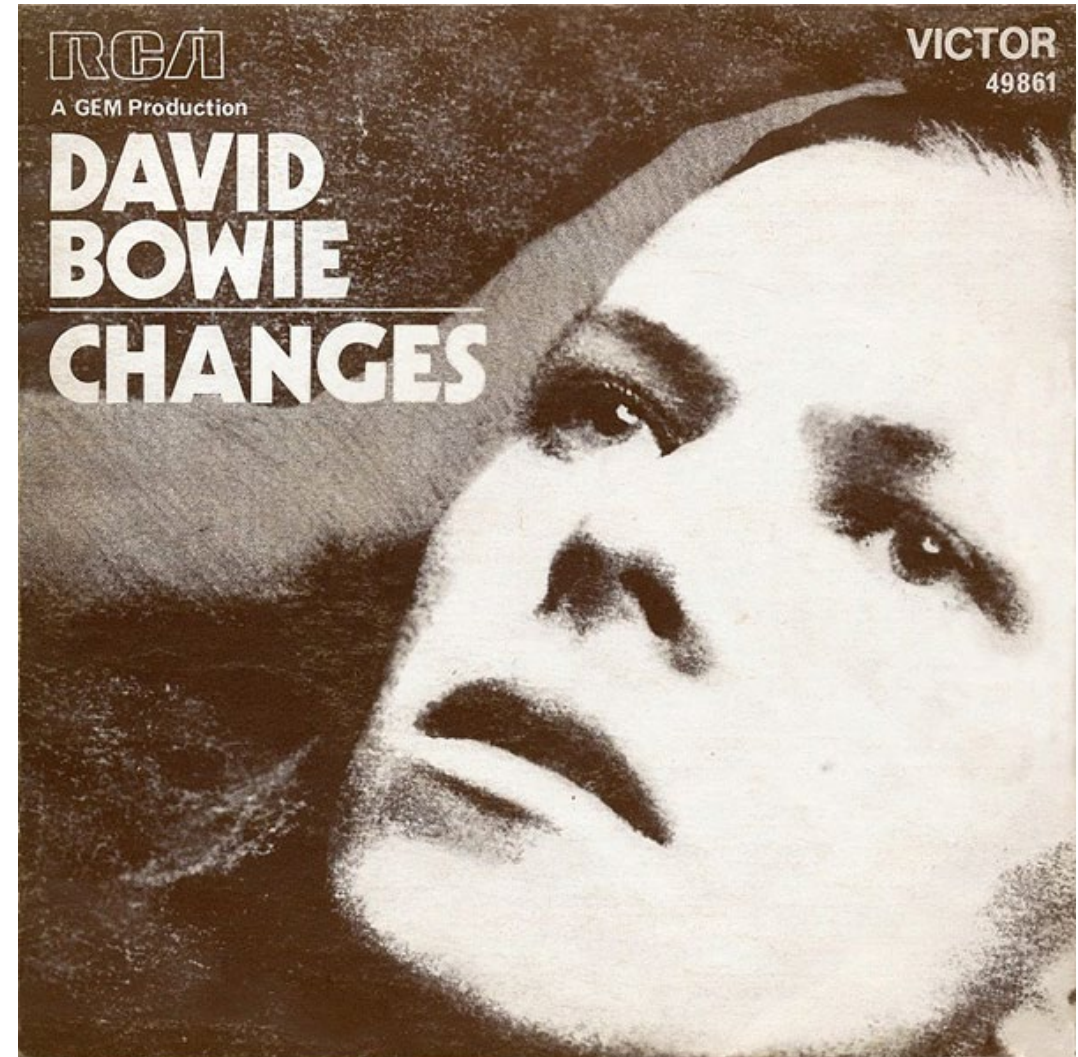
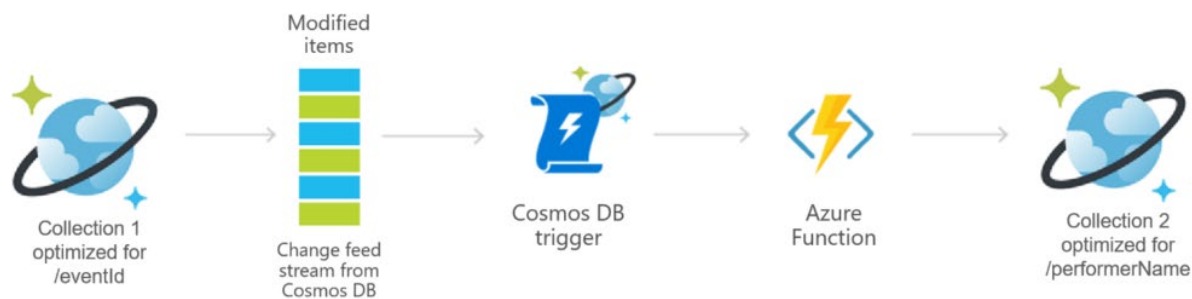
Ch-ch-ch-changes: Tracing Changes in Azure Cosmos DB

**Time may change me**

**But I can't trace time**

**I said that time may change me**

**But I can't trace time**



# Who is Chad Green

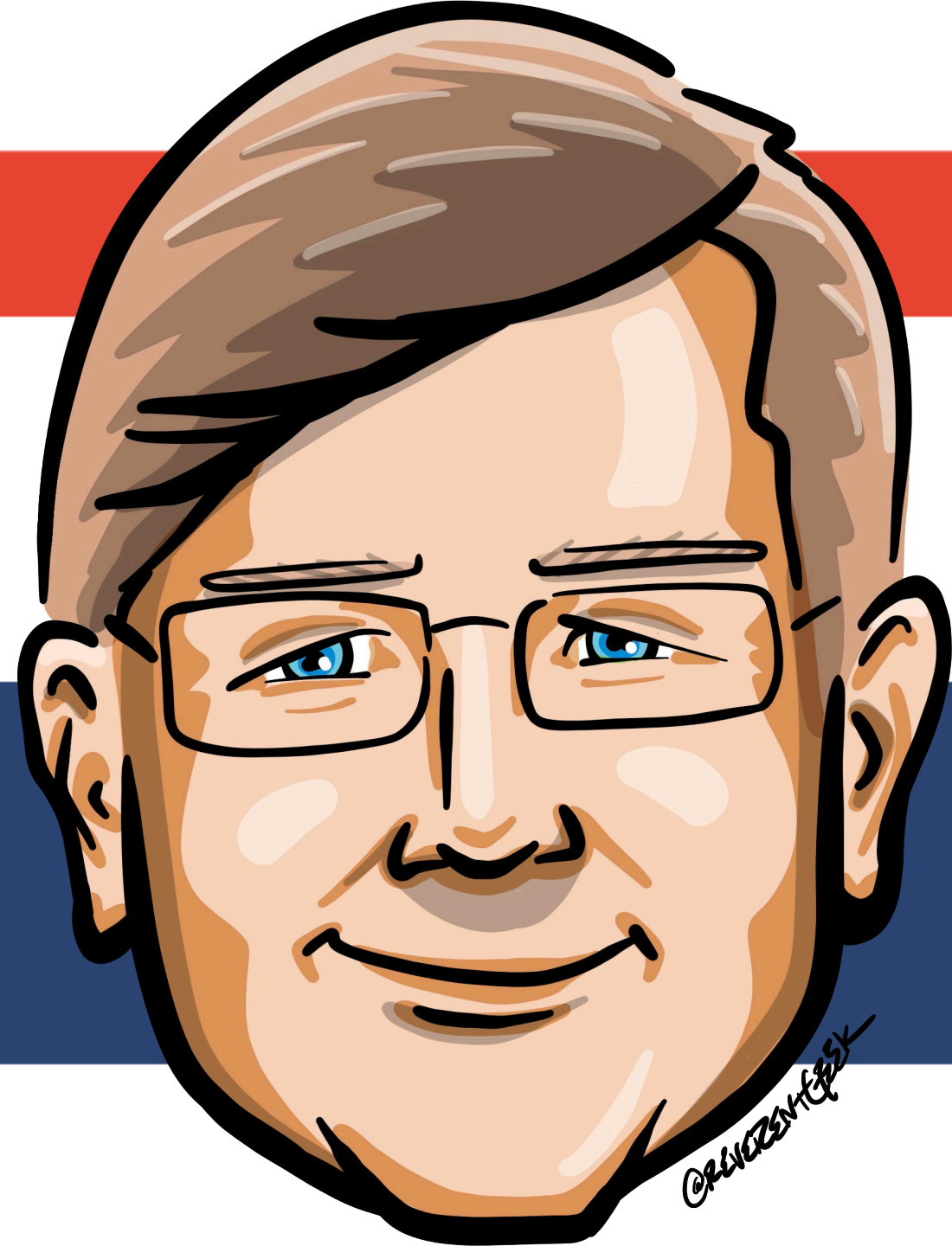
✉ chadgreen@chadgreen.com

💬 TaleLearnCode

🌐 ChadGreen.com

🐦 ChadGreen & TaleLearnCode

🌐 ChadwickEGreen



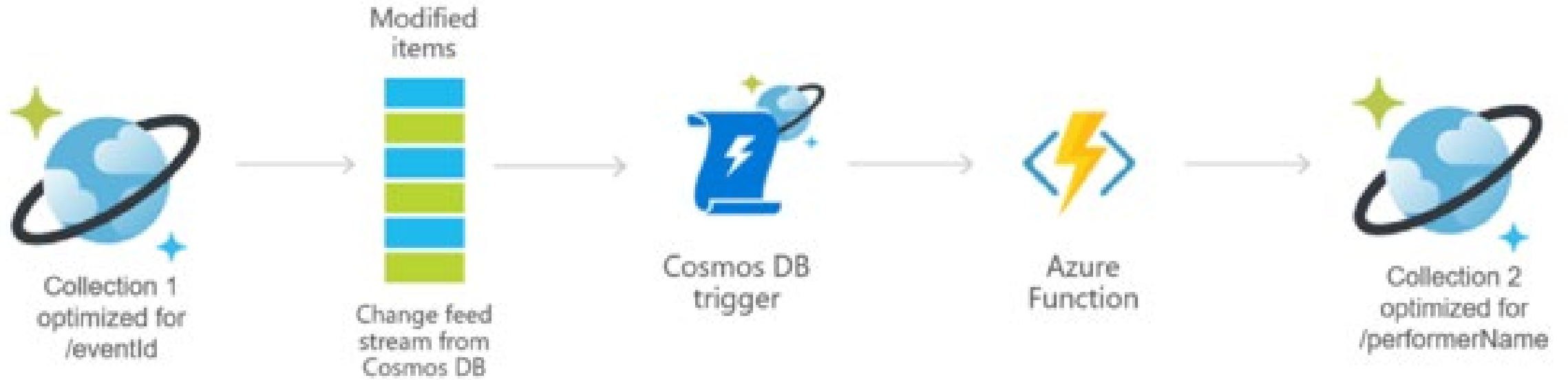
# Change Feed

Ch-ch-ch-changes: Tracing  
Changes in Azure Cosmos DB



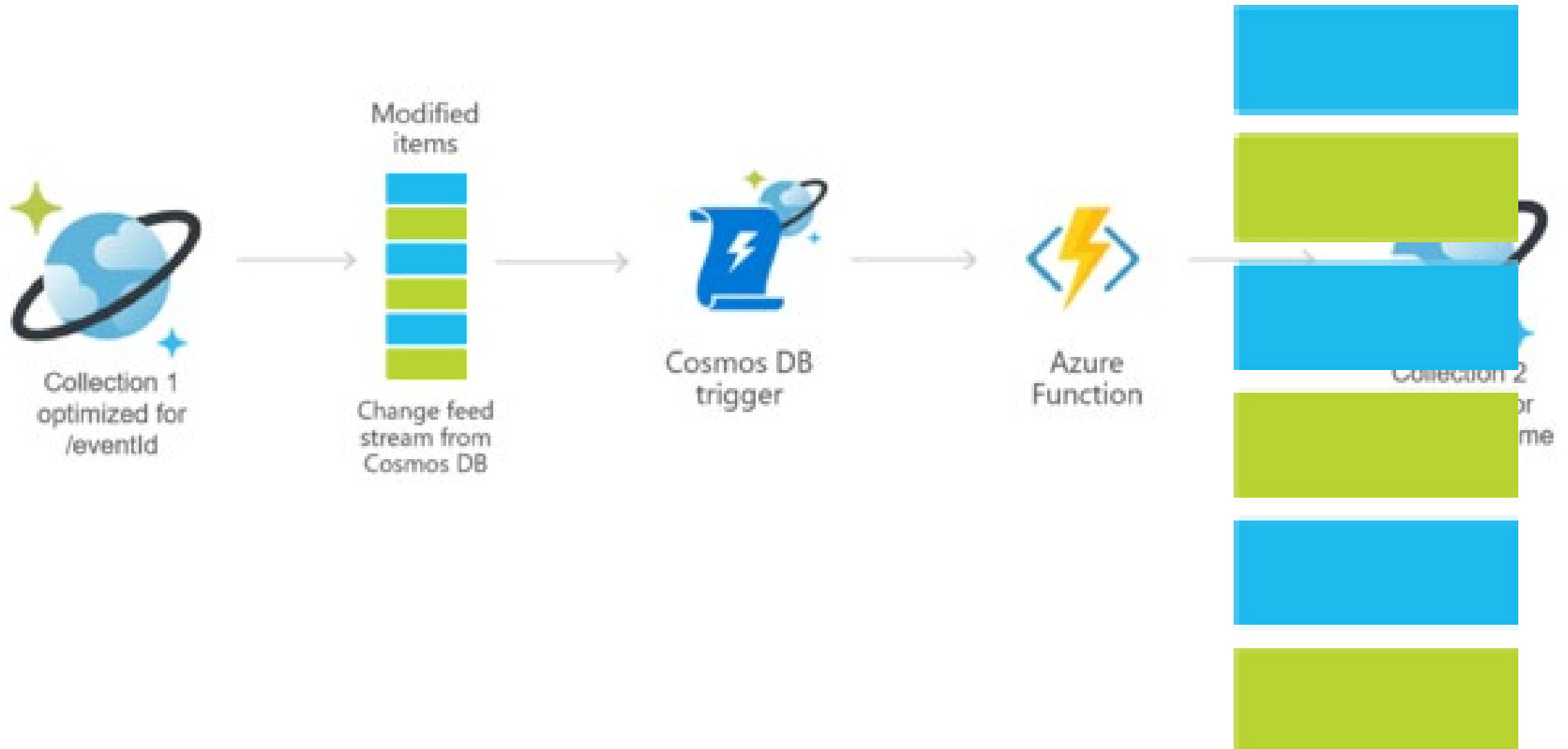
# Overview

## Change Feed



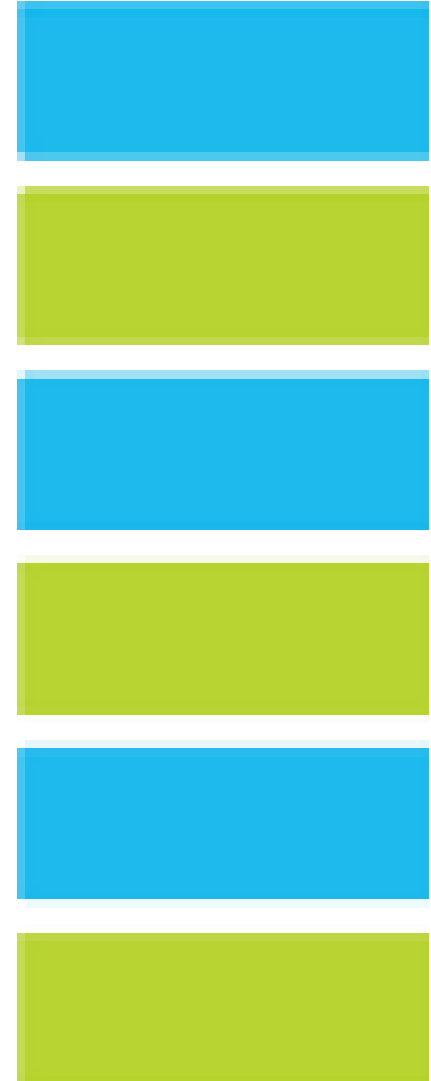
# Overview

## Change Feed





## Unsung Hero of Azure Cosmos DB



**Enabled by  
default**

# Overview

Change Feed

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**Includes insert  
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Clients manage checkpointing logic

**Applications can request multiple change feeds**

Sorted by order of modification

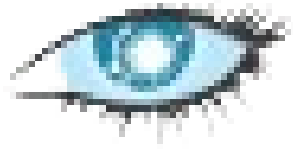
No guaranteed order logical partitions

Synchronized from any point-in-time

Changes available in parallel for logical partitions

# Supported APIs and Client SDKs

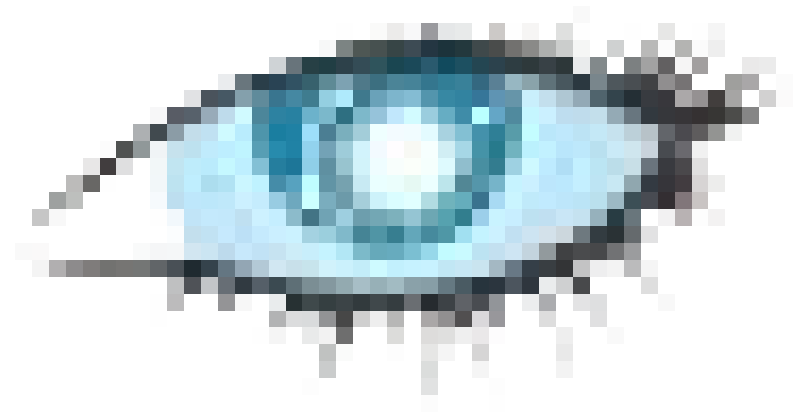
Change Feed



# Supported APIs and Client SDKs

Change Feed

{LEAF}



# Current Limitations

Change Feed

**Intermediate  
Updates**

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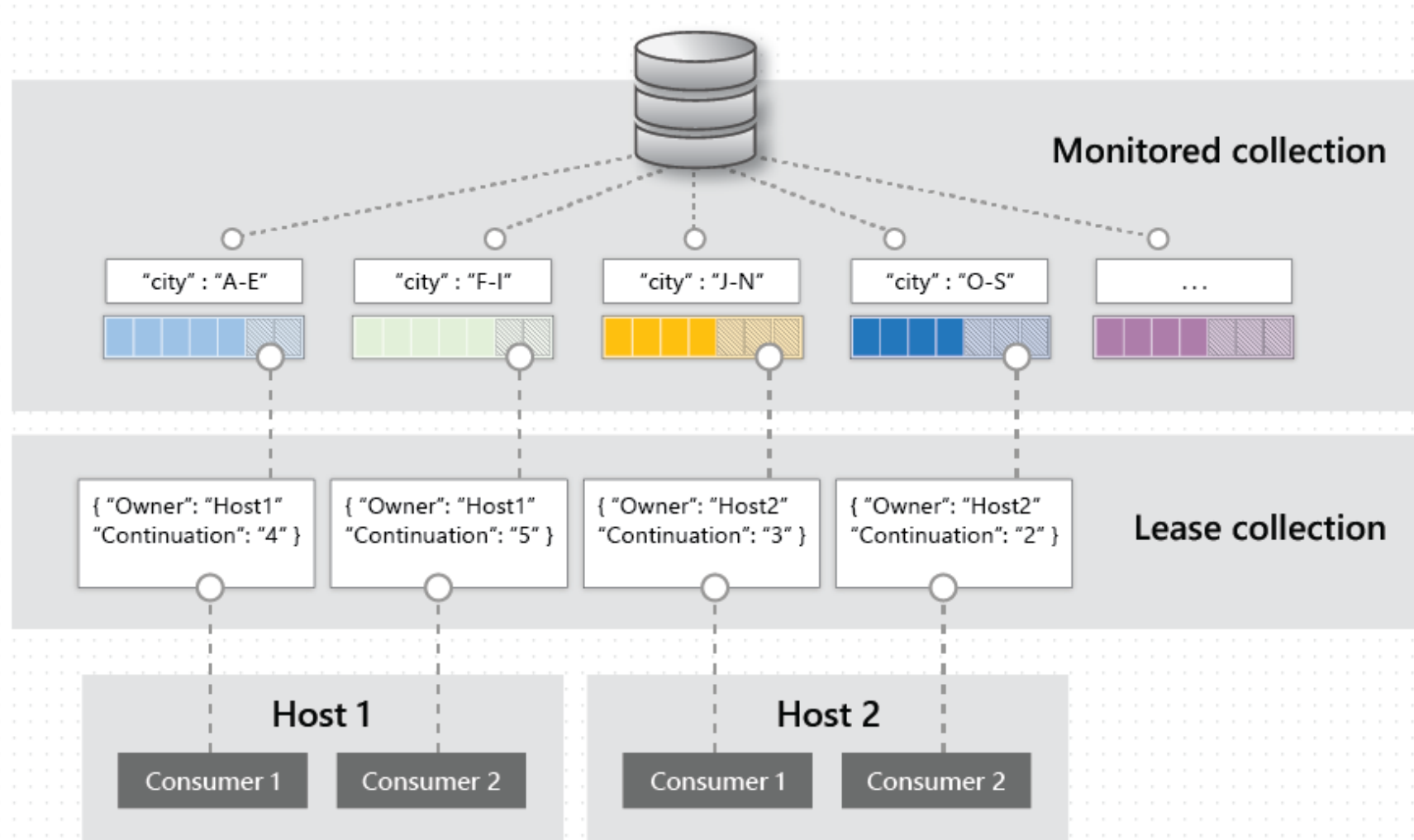
# Change Feed Processor

Ch-ch-ch-changes: Tracing  
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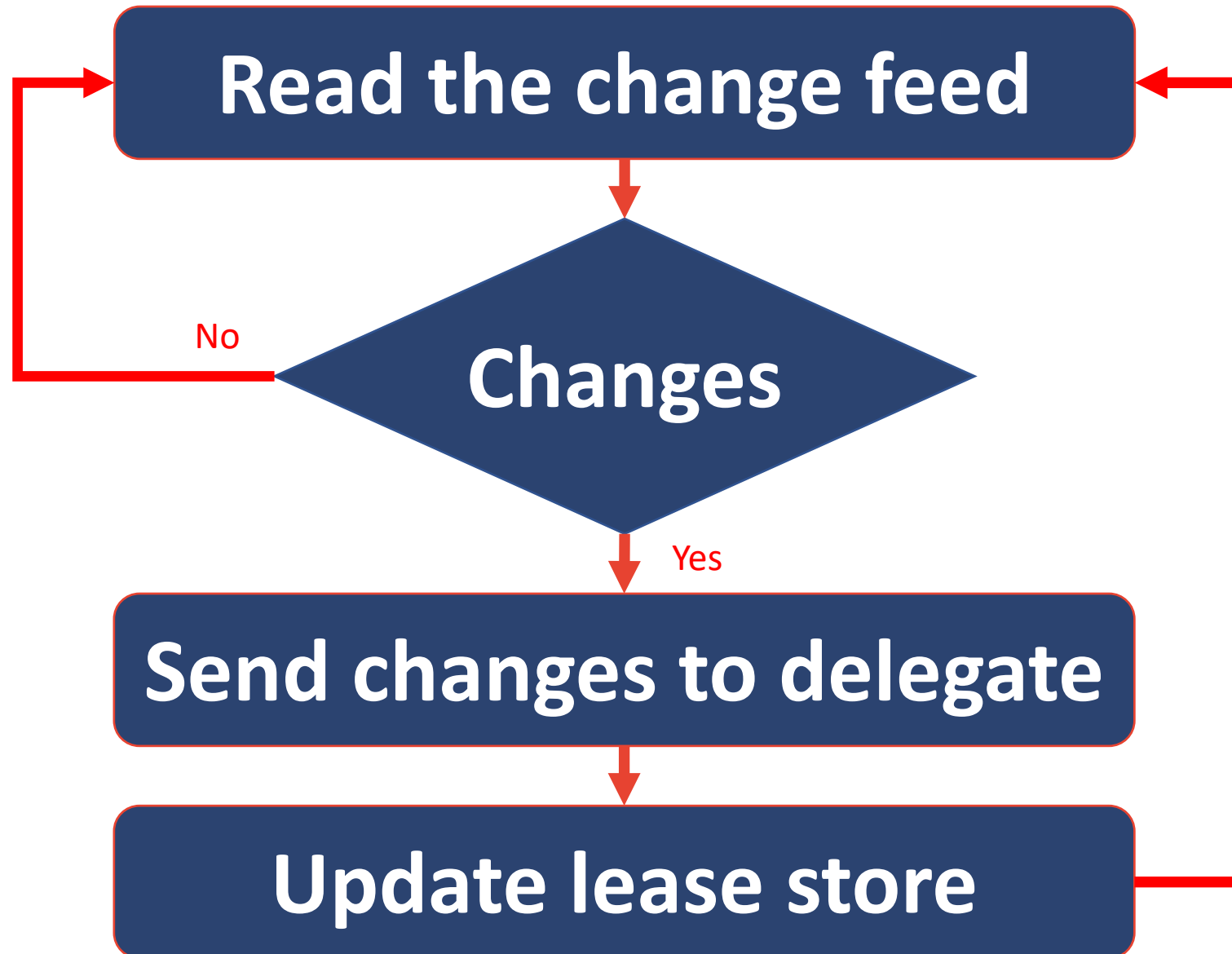
# Change Feed Processor Components

Reading the Change Feed



# Processing Life Cycle

Reading the Change Feed



# Hosting the Change Feed Processor

Reading the Change Feed

**Azure WebJob**

**Azure Virtual  
Machine**

**Azure Kubernetes  
Service**

**ASP.NET Hosted  
Service**

# Serverless Event-Based Architectures

Ch-ch-ch-changes: Tracing  
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# Azure Functions

Serverless Event-Based Architectures





# What can you do with Azure Functions?

Serverless Event-Based Architectures

**HTTP**

**Timer**

**Blob storage**

**Queue storage**

**Event Grid**

**Event Hub**

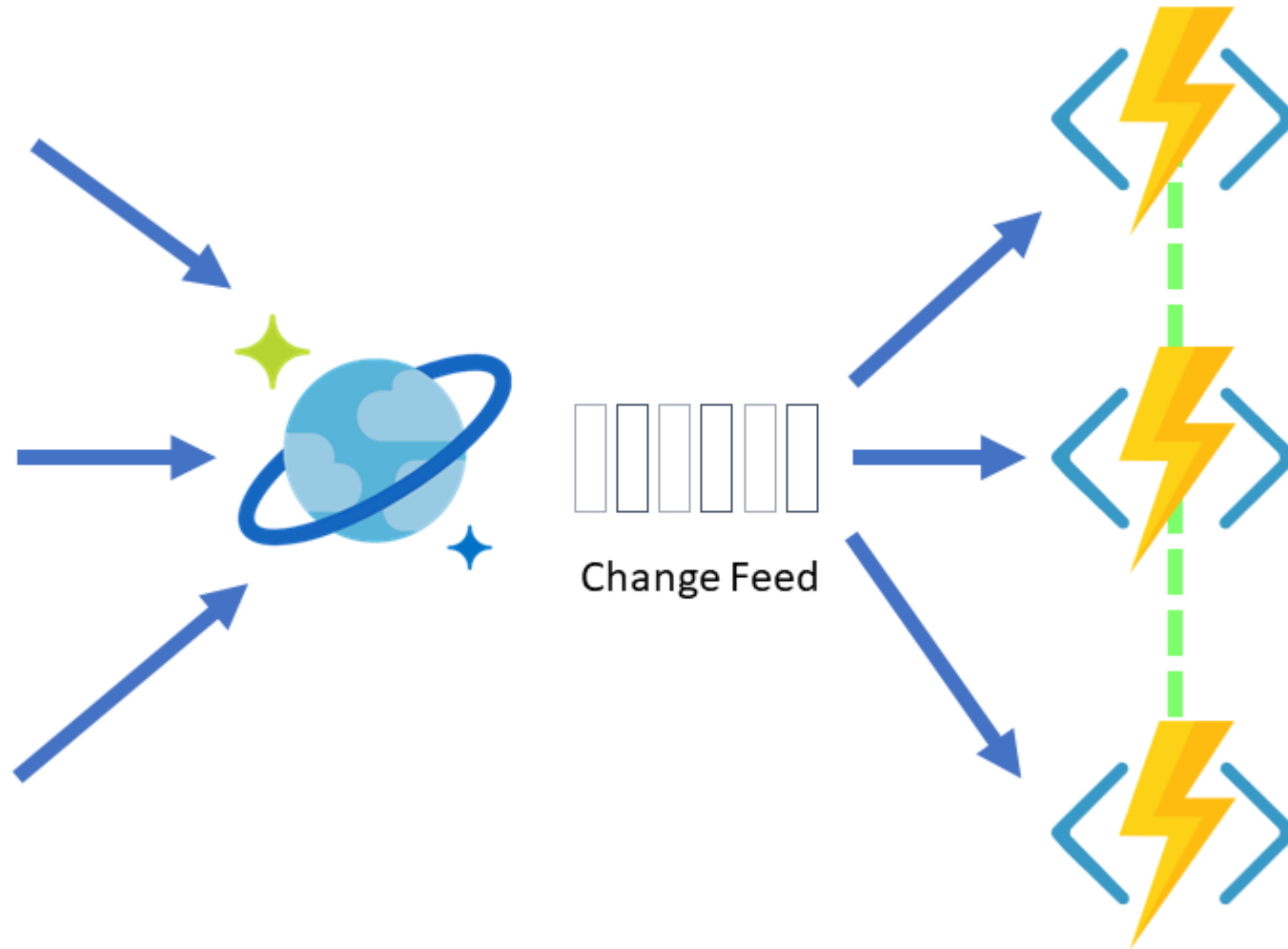
**Service Bus Queue**

**Service Bus Topic**

**Cosmos DB**

# Azure Cosmos DB and Azure Functions

Serverless Event-Based Architectures



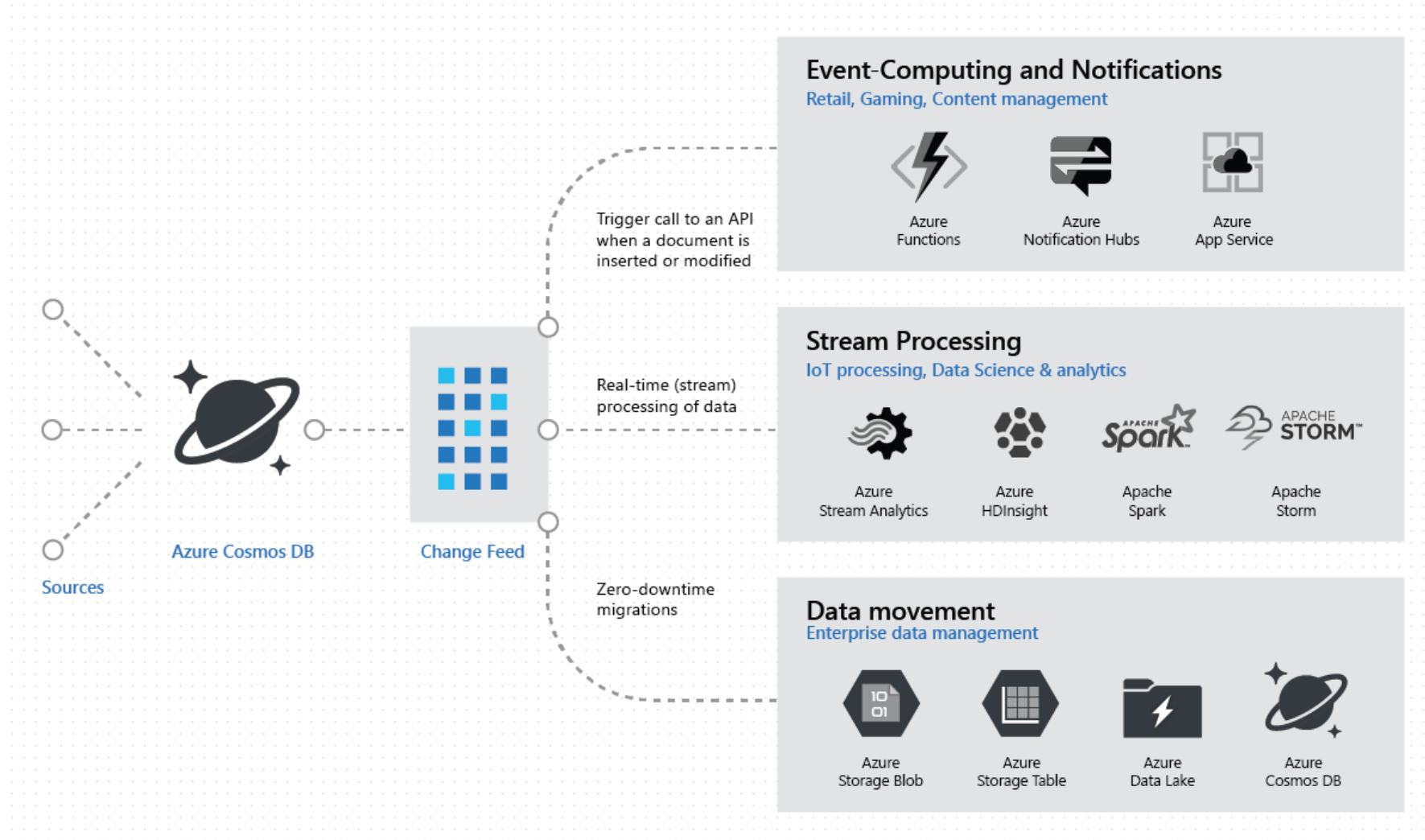
# Change Feed Design Patterns

Ch-ch-ch-changes: Tracing  
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# Common Uses of the Change Feed

## Change Feed Design Patterns



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Change Feed Design Patterns

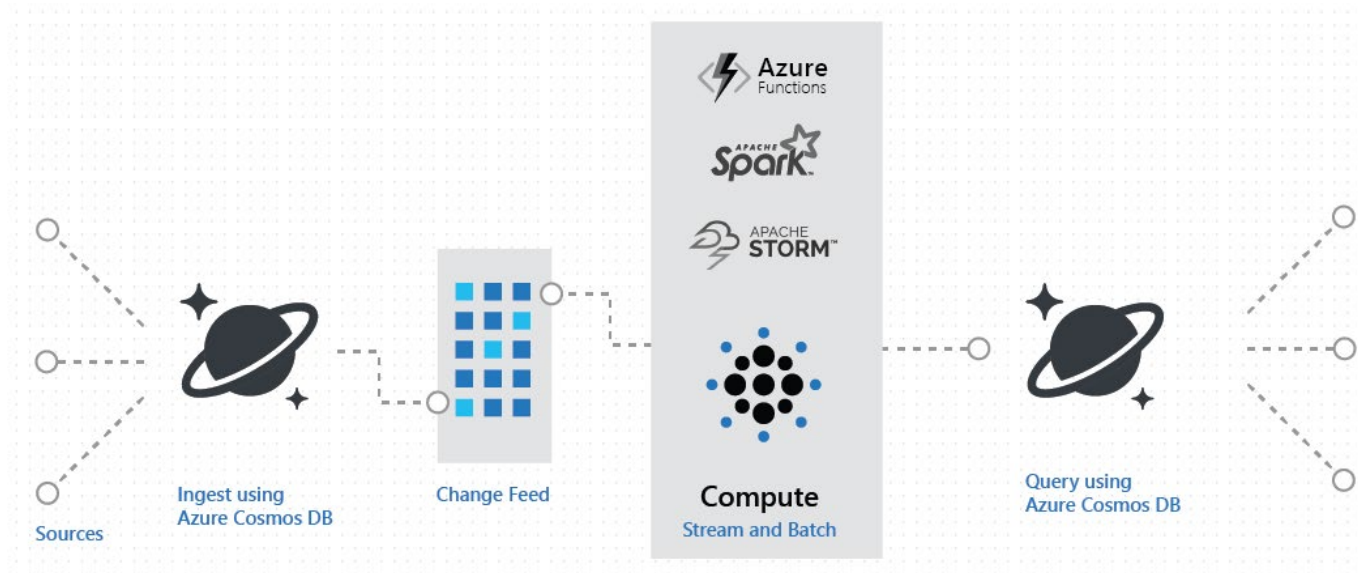
**Event Computing  
and Notifications**

# Common Uses of the Change Feed

Change Feed Design Patterns

**Event Computing  
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**Real-Time Stream  
Processing**



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**Data Movement**

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**Event Computing  
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**Data Movement**

**Event Sourcing**



# Demos

Ch-ch-ch-changes: Tracing  
Changes in Azure Cosmos DB



# Basic Change Feed Demo

Change Feed Demos



Data written  
to Cosmos DB



Insert/Update  
recorded in the  
Change Feed



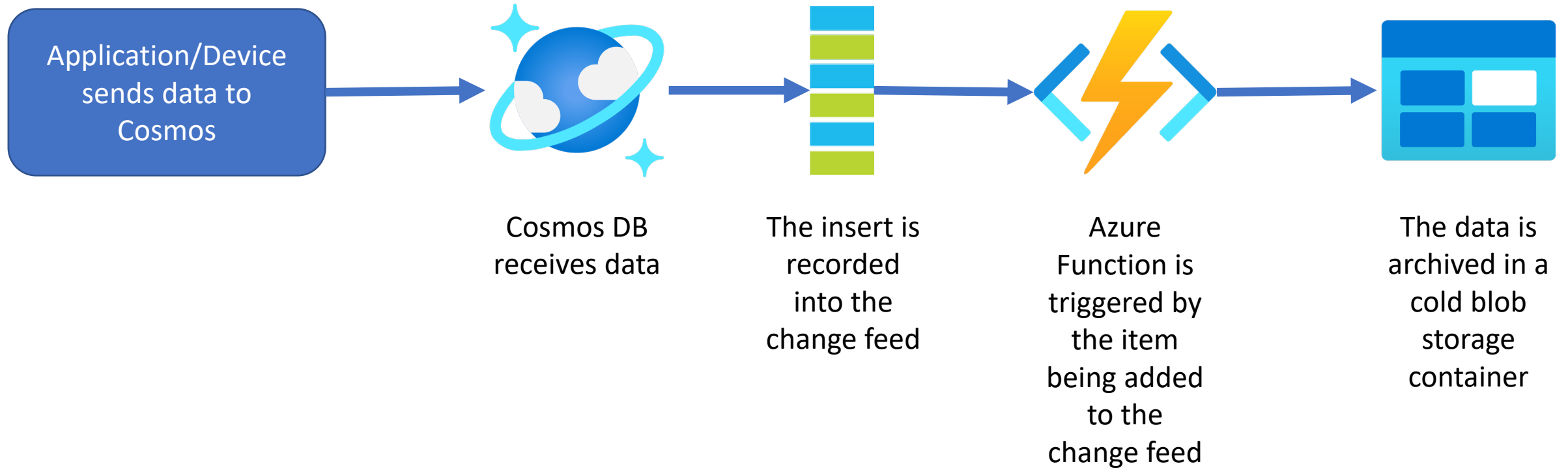
Azure Function is  
triggered by the  
item being added  
to the change feed

## Scenario

- Practice test application
- Data is useful for active queries within 30 days (2,592,000 seconds)
- Need to keep archive for historical, compliance reasons
- Demo will process 428k records over 24-hour period
- Real data that has been autonomized

# Data Archival

## Change Feed Demos

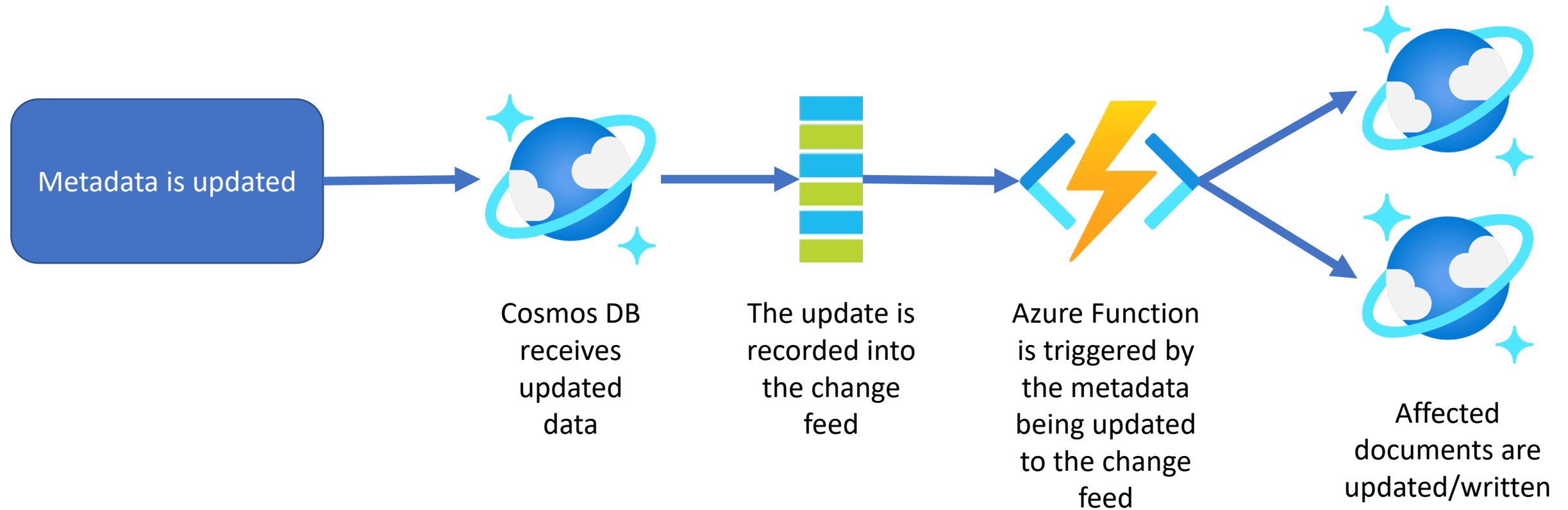


## Scenario

- Shindig Manager
- Manages presentations for different shindigs (events)
- Metadata maintained in its own container
- Need way to update denormalized data in shindig (event) partitions

# Denormalization

## Change Feed Demos

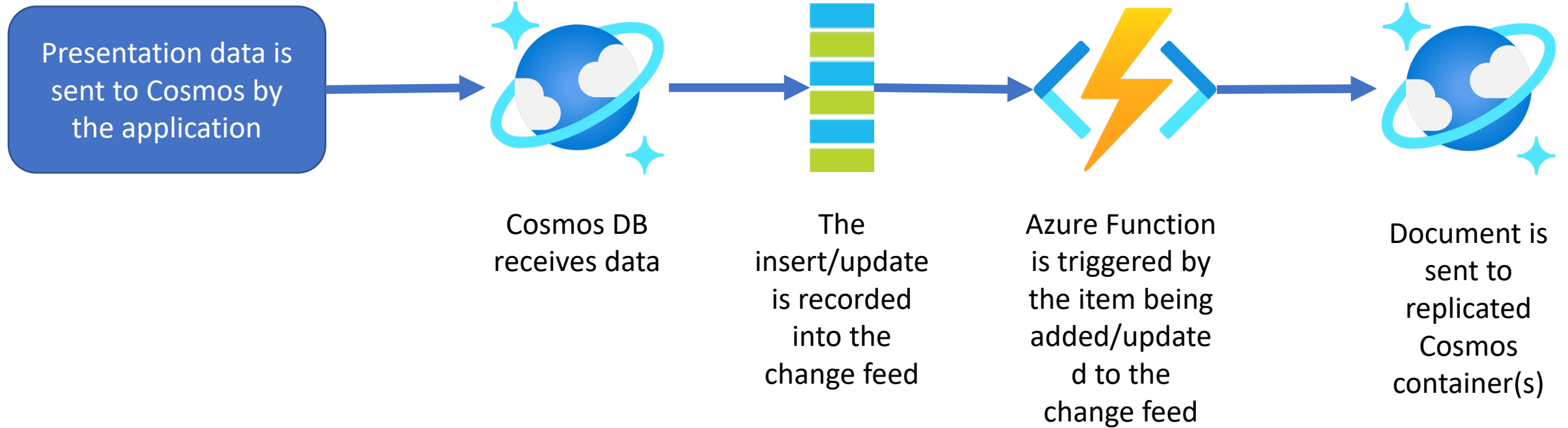


## Scenario

- Shindig Manager
- Manages presentations for different shindigs (events)
- Presentations partitioned by shindig
- Want to improve query performance when searching across tags (original partitioning would require cross-partition querying)

# Replicating Containers

Change Feed Demos



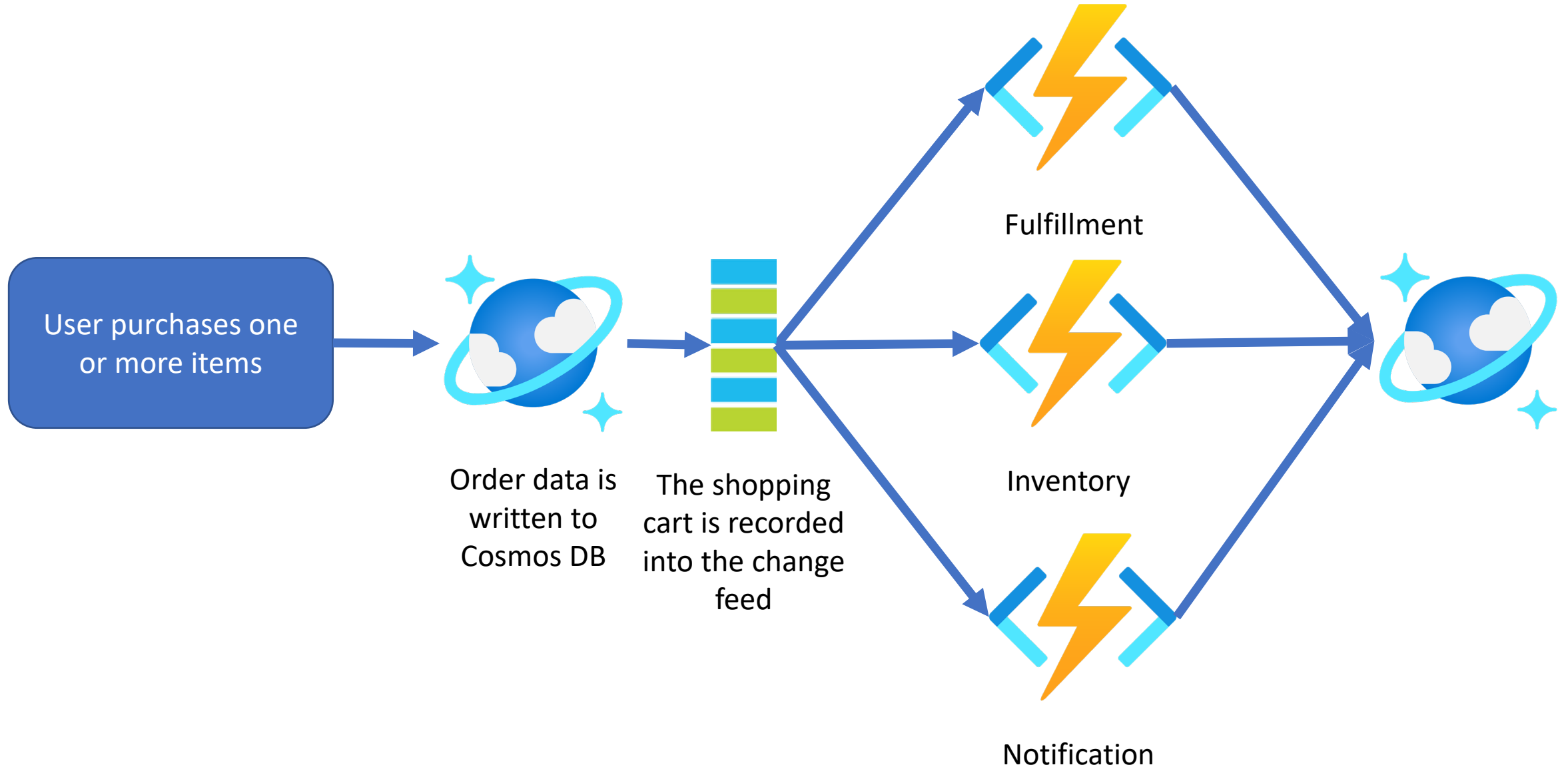


## Scenario

- Shopping cart implementation – Lego store
- Implementing an event-driven architecture to allow for asynchronous processing of an order
- Note: functions are only simulating doing actions

# Triggering Event-Driven Architecture

Change Feed Demos



# Wrap-Up

Ch-ch-ch-changes: Tracing  
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Ch-ch-ch-changes: Tracing Changes in Azure Cosmos DB

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- Current limitations
  - Intermediate Updates
  - Guaranteed Order
  - Deletes

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- Demos

# Thank You!

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