Azure Streaming Analytics

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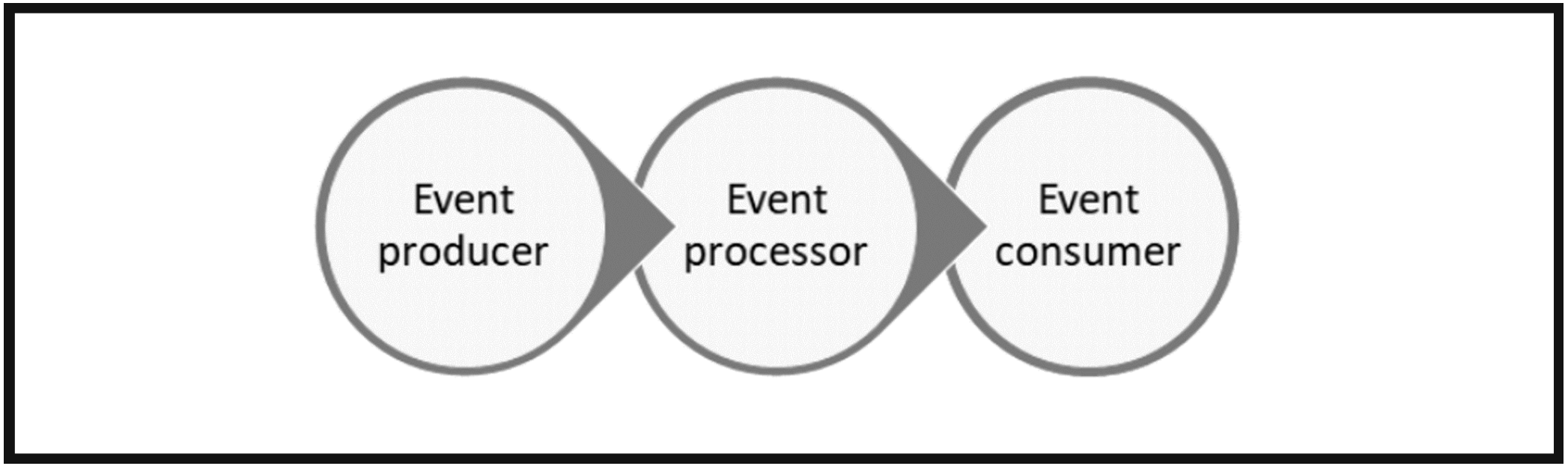
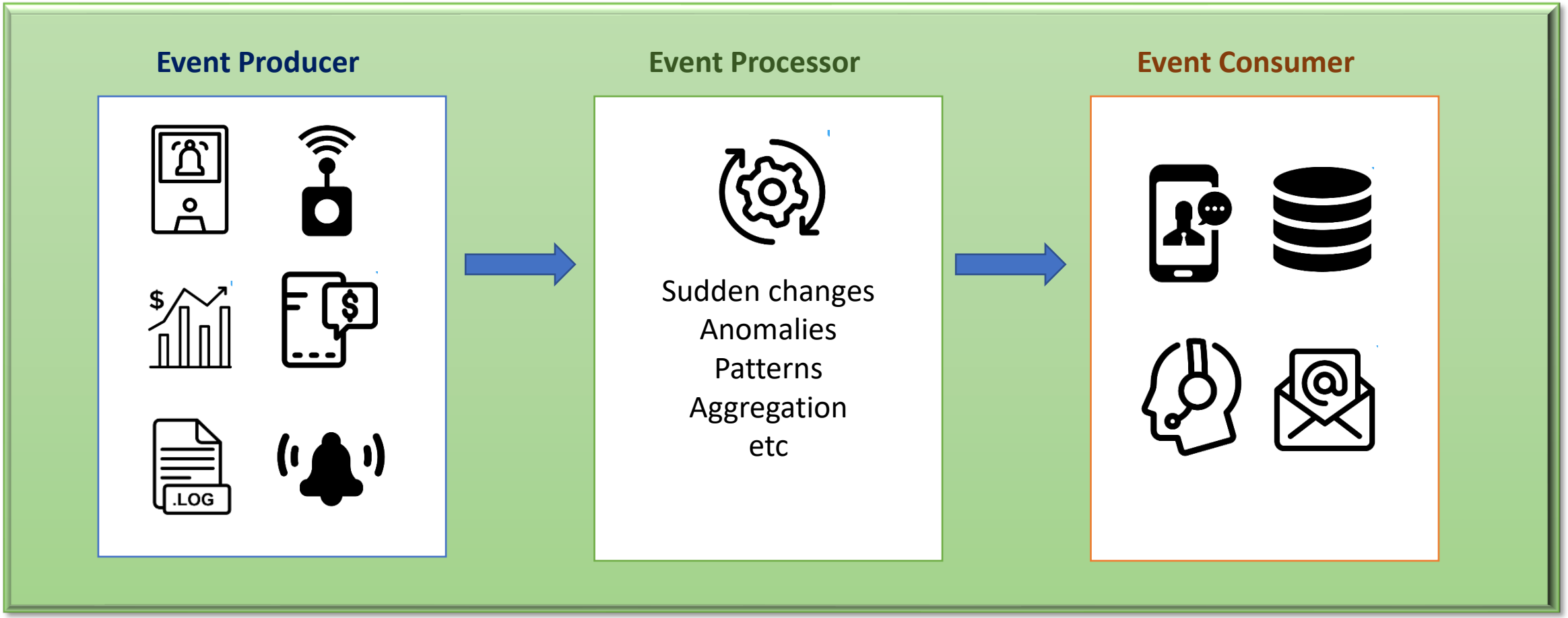
Event Processing



- **Event Producer** – Process that generate data continuously
- **Event Processor -** An engine to consume event data streams and derive insights from them. -
- **Event Consumer-** An application that consumes the data and takes specific action based on the insights.

Live Event Processing



Challenges

Live Data Processing Challenges

- Data ingestion, processing and output should happen in real-time
- Support high volume of data
- Enough processing power
- Output storage should have high bandwidth
- Quick act on Output processing

Azure options for Live Data Processing

HDInsight with Spark Streaming

HDInsight with Storm

Apache Spark in Azure Databricks

Azure Functions

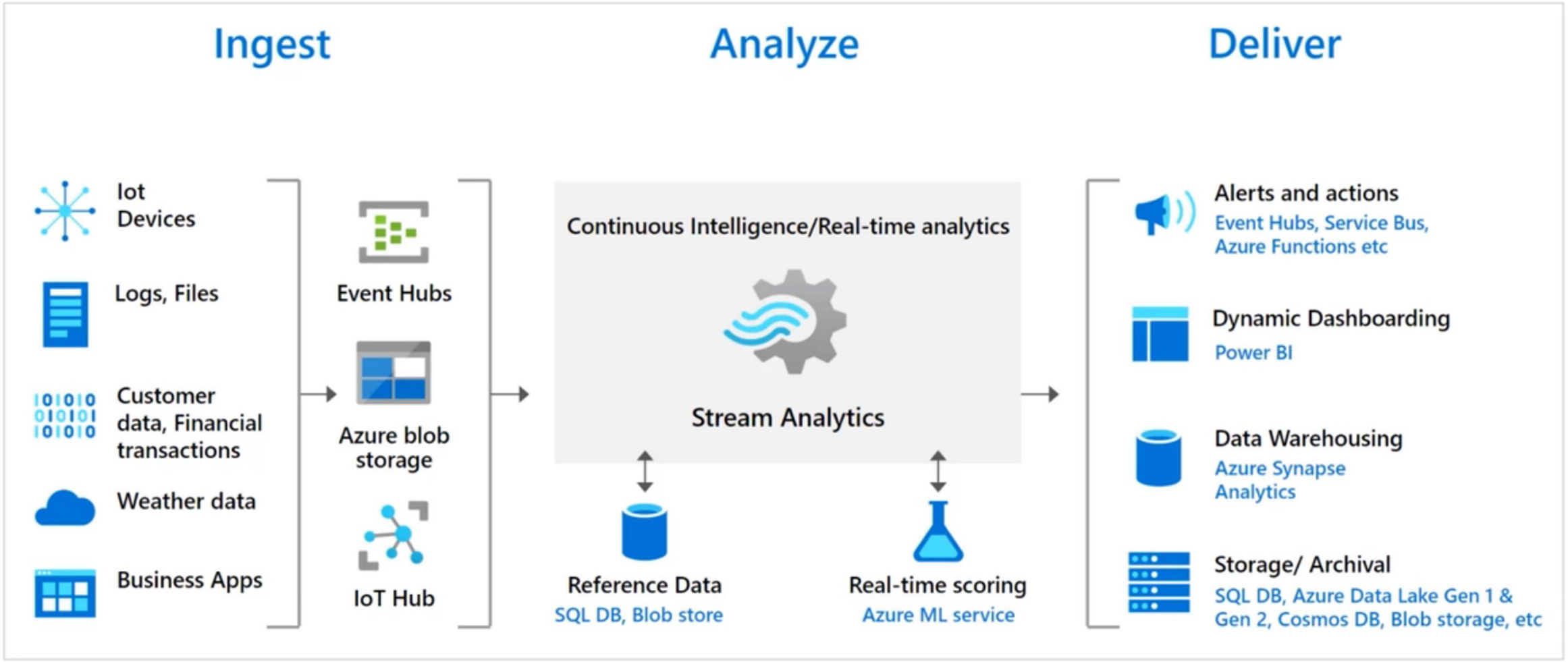
WebJobs

Azure Stream Analytics

Azure Stream Analytics

"A fully managed, real-time analytics service designed to process fast moving streams of data."

Azure Stream Analytics Data Flow

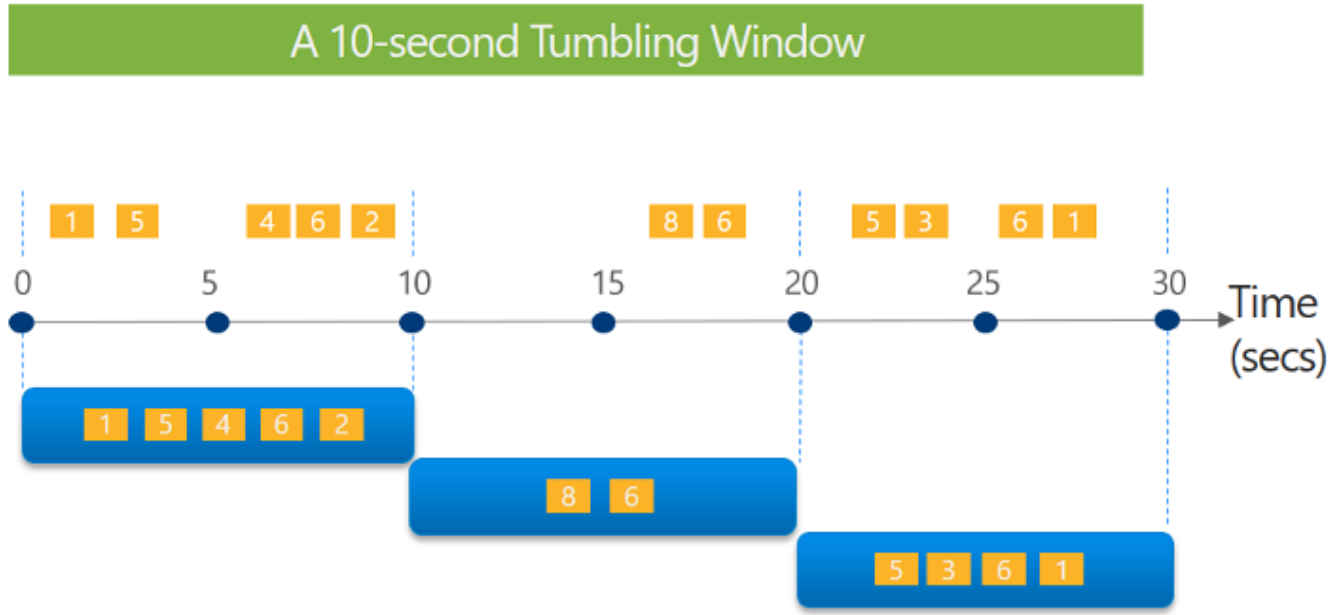


Azure Stream Analytics Windowing

- Each data event has a timestamp
- There is an need to perform an operation (e.g. Count) on events falling in the same time window.
- Azure Stream Analytics achieve this through windows
- Four types of window functions
  - Tumbling window
  - Hopping window
  - Sliding window
  - Session window

TUMBLING WINDOW

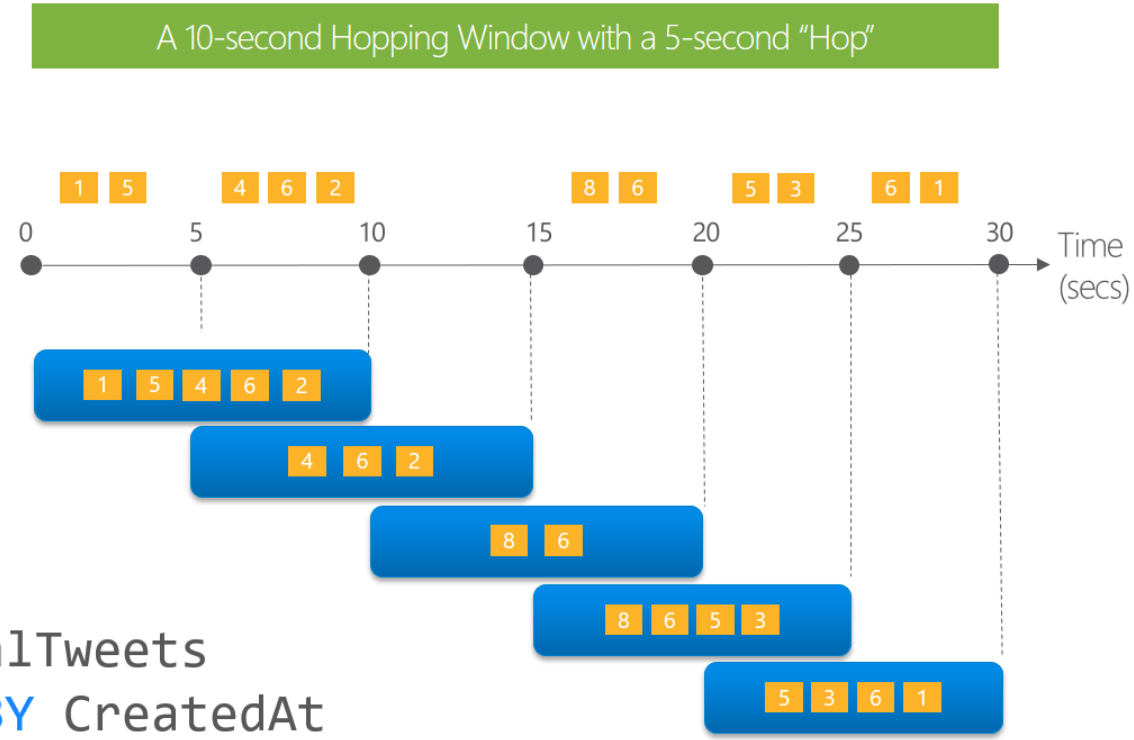
Tell me the count of tweets per time zone every 10 seconds




```
SELECT TimeZone, COUNT(*) AS Count
FROM TwitterStream TIMESTAMP BY CreatedAt
GROUP BY TimeZone, TumblingWindow(second,10)
```

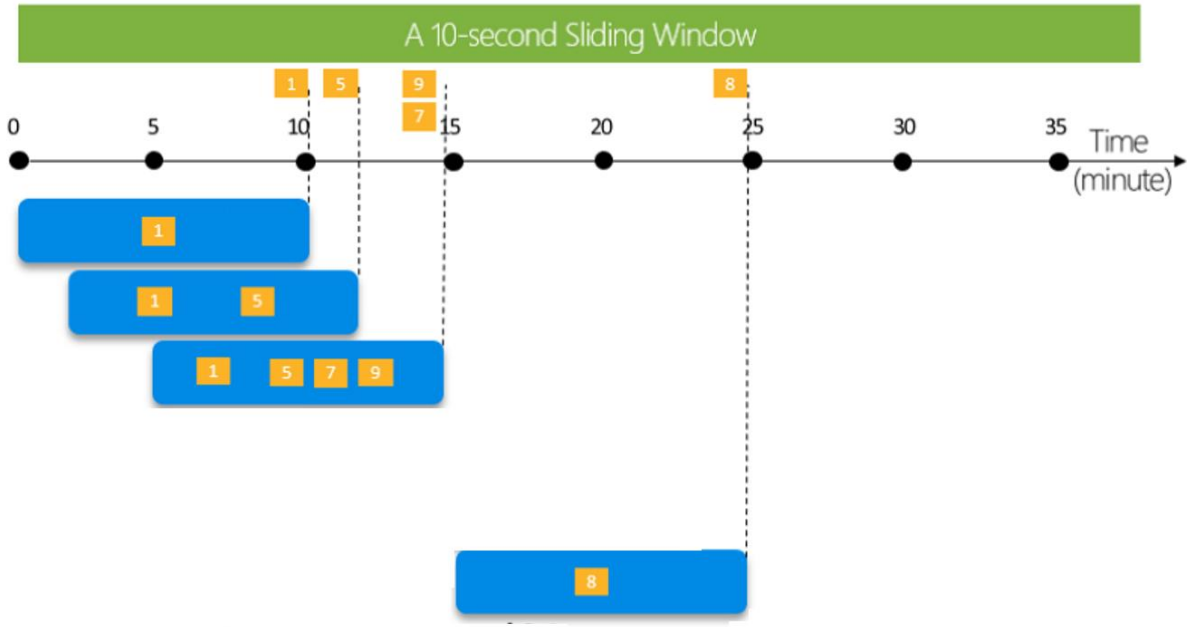
HOPPING WINDOW

Every 5 seconds give me the count of tweets over the last 10 seconds




```
SELECT Topic, COUNT(*) AS TotalTweets
FROM TwitterStream TIMESTAMP BY CreatedAt
GROUP BY Topic, HoppingWindow(second, 10 , 5)
```

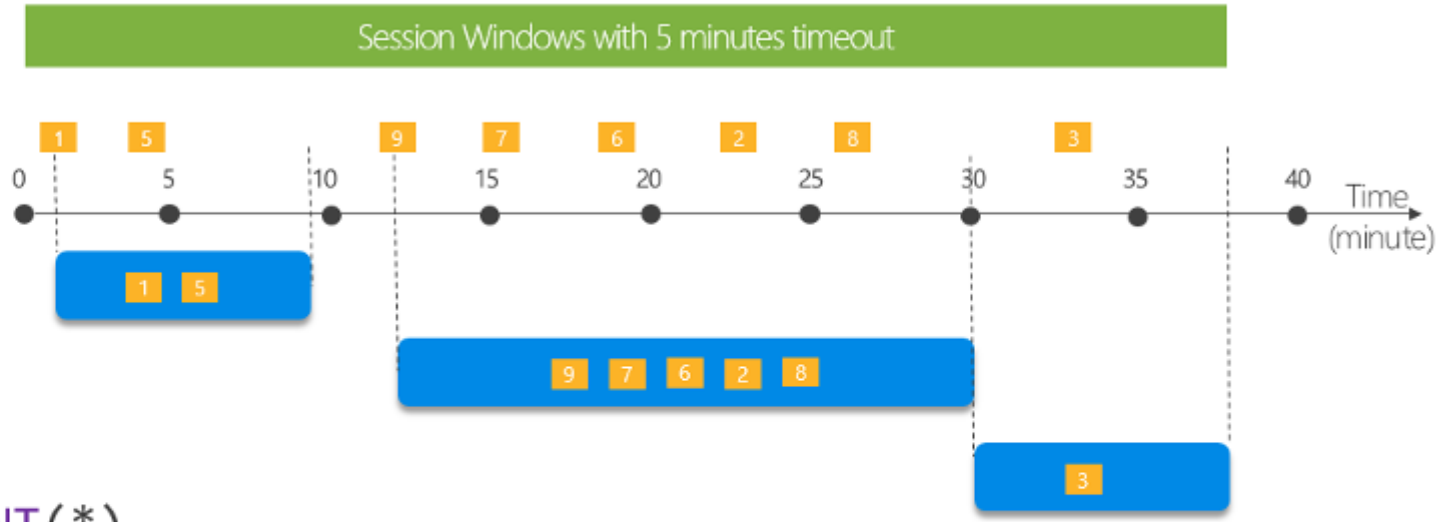
SLIDING WINDOW




```
SELECT COUNT(*)
FROM Input
GROUP BY SlidingWindow(second, 10)
```

SESSION WINDOW

Tell me the count of tweets that occur within 5 minutes to each other.




```
SELECT Topic, COUNT(*)
FROM TwitterStream TIMESTAMP BY CreatedAt
GROUP BY Topic, SessionWindow(minute, 5, 10)
```

Demo Overview

Azure Blob Storage

INPUT

OUTPUT

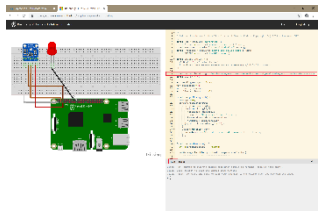
INPUT

OUTPUT

Streaming analytics job

Query (Processing Logic)

Demo Overview



Azure IoT Hub

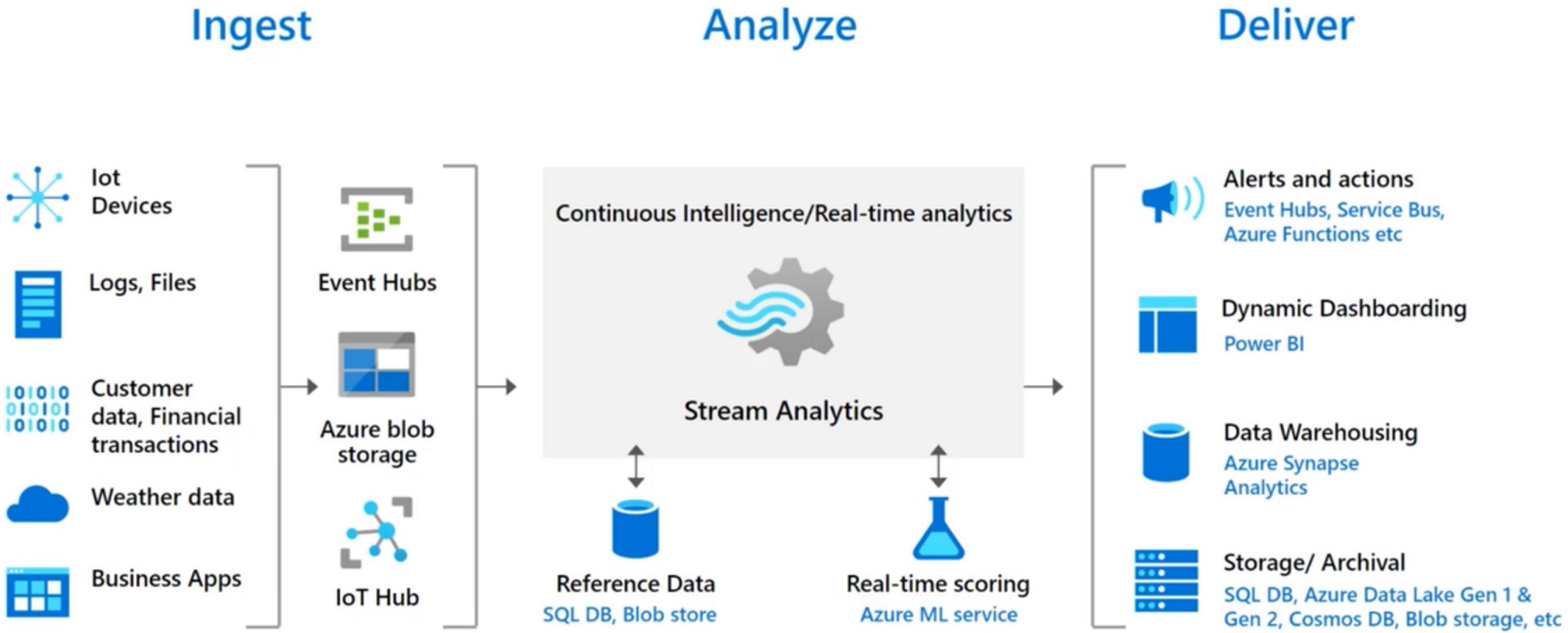
INPUT

Streaming analytics job

OUTPUT

Azure Blob Storage

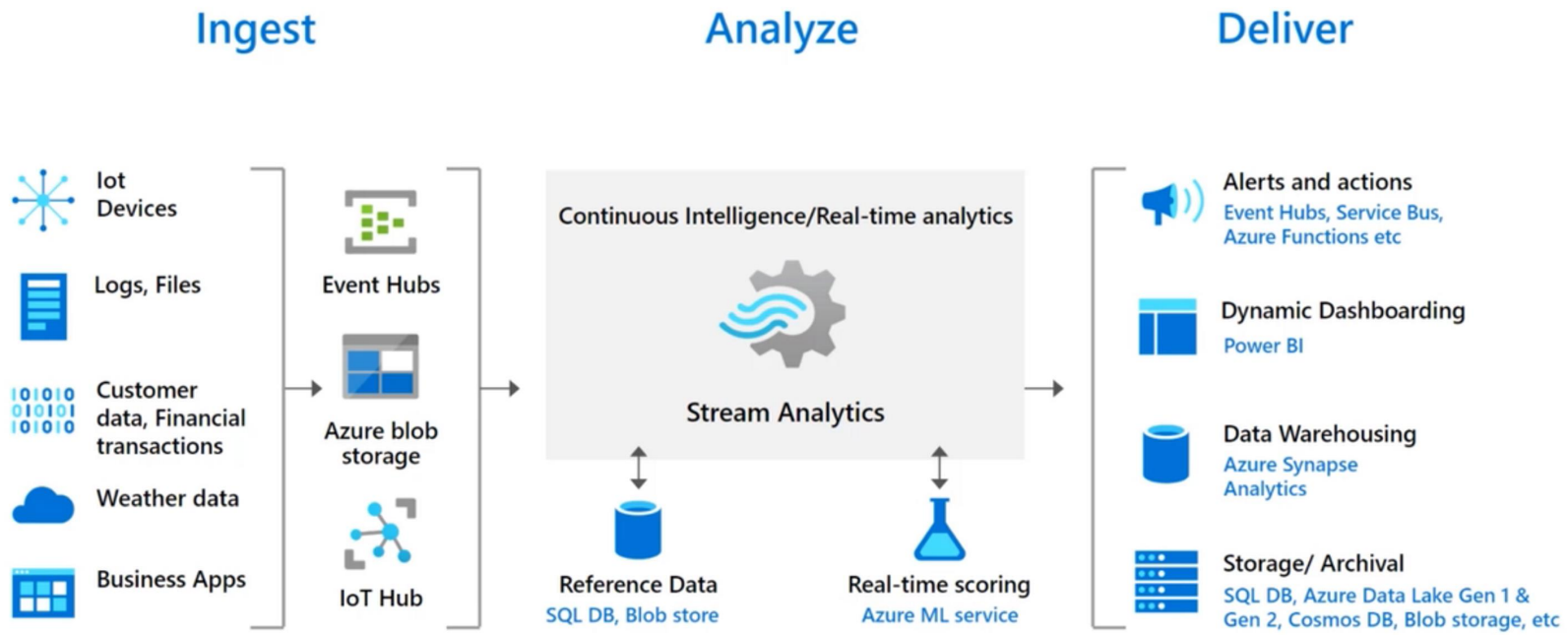
Azure Stream Analytics Data Inputs



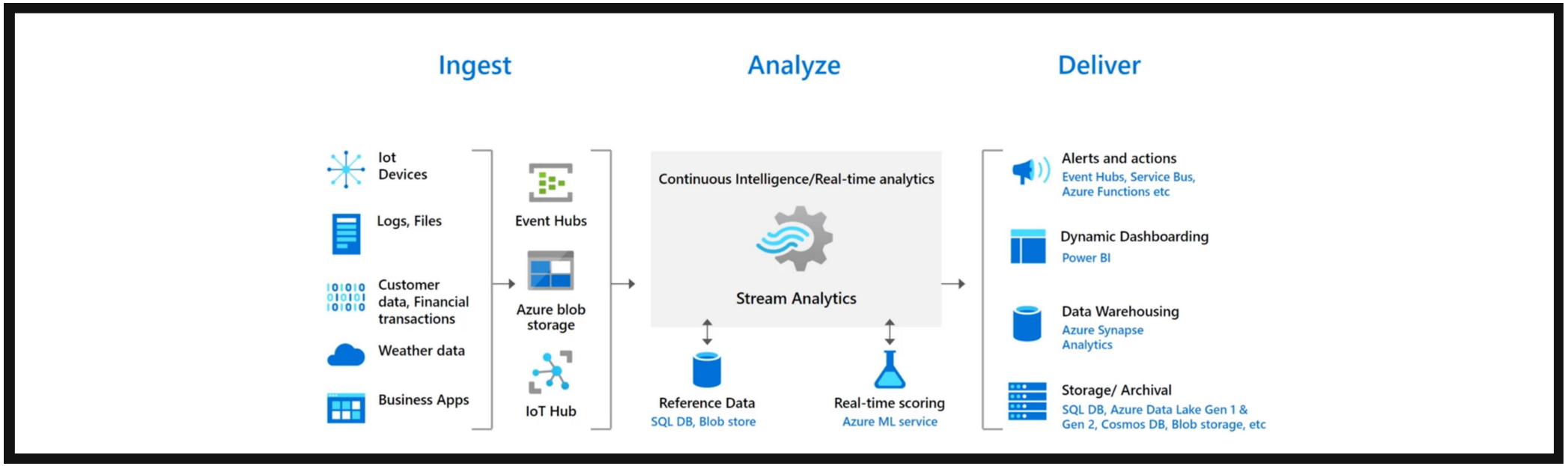
Azure Stream Analytics Data Inputs

- Reference Data Inputs
  - Metadata Lookups

    (Device name, etc.)



Reference Data Inputs



Metadata Lookup

Device capacity, name, etc.

Acceptable thresholds

Allowed temperatures, etc.

Trusted entities

Registered devices

Any lookup or slow

Changing data

Azure Stream Analytics Stream Data Output

Azure SQL Database

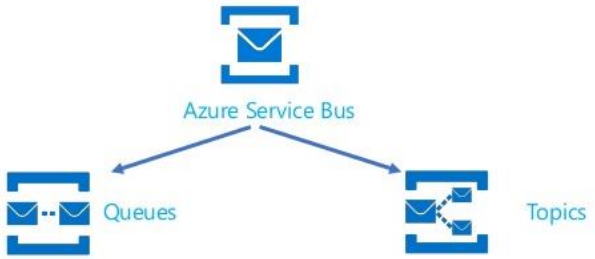
Azure Blob Storage

Azure Data Lake Storage Gen2

Azure Event Hubs

Power BI

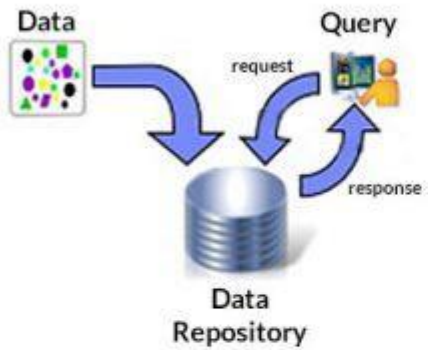
Table Storage



Azure Cosmos DB

Azure Functions

Traditional Processing



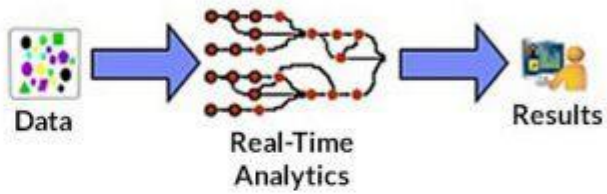
Historical fact finding

Find and analyze information stored on disk

Batch paradigm, pull model

Query-driven: submits queries to static data

Stream Processing



Current fact finding

Analyze data in motion – before it is stored

Low latency paradigm, push model

Data driven: bring data to the analytics

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