Microsoft

DP-200T01: Performing Real-Time Analytics with Stream Analytics

Agenda

- L01 - Data streams and event processing
- L02 - Data ingestion with Event Hubs
- L03 - Processing data with Stream Analytics Jobs

Lesson 01

Data Streams and Event Processing

Lesson Objectives

- Explain data streams
- Explain event processing
- Learn about processing events with Azure Stream Analytics

What are data streams

Data Streams

In the context of analytics, data streams are event data generated by sensors or other sources that can be analyzed by another technology

Data Stream Processing Approach

There are two approaches. Reference data is streaming data that can be collected over time and persisted in storage as static data. In contrast, streaming data have relatively low storage requirements. And run computations in sliding windows.

Data Streams are used to:

Analyze Data

Continuously analyze data to detect issues and understand or respond to them.

Understand Systems

Understand component or system behavior under various conditions to fuel further enhancements of said system.

Trigger Actions

Trigger specific actions when certain thresholds are identified.

Event Processing

The process of consuming data streams, analyzing them, and deriving actionable insights out of them is called Event Processing and has three distinct components:

Event producer	Examples include sensors or processes that generate data continuously such as a heart rate monitor or a highway toll lane sensor
Event processor	An engine to consume event data streams and deriving insights from them. Depending on the problem space, event processors either process one incoming event at a time (such as a heart rate monitor) or process multiple events at a time (such as a highway toll lane sensor)
Event consumer	An application which consumes the data and takes specific action based on the insights. Examples of event consumers include alert generation, dashboards, or even sending data to another event processing engine

Processing events with Azure Stream Analytics

Microsoft Azure Stream Analytics is an event processing engine. It enables the consumption and analysis of high volumes of streaming data in real time.

Source	Ingestion	Analytical Engine	Destination
• Sensors • Systems • Applications	• Event Hubs • IoT Hubs • Azure Blob Store	• Stream Analytics Query Language • .NET SDK	• Azure Data Lake • Cosmos DB • SQL Database • Blob Store • Power BI

Review Questions

- Q01 – Which of the following technologies typically provide an ingestion point for data streaming in an event processing solution that uses static data as a source?
- A01 – Azure Blob storage

Lesson 02

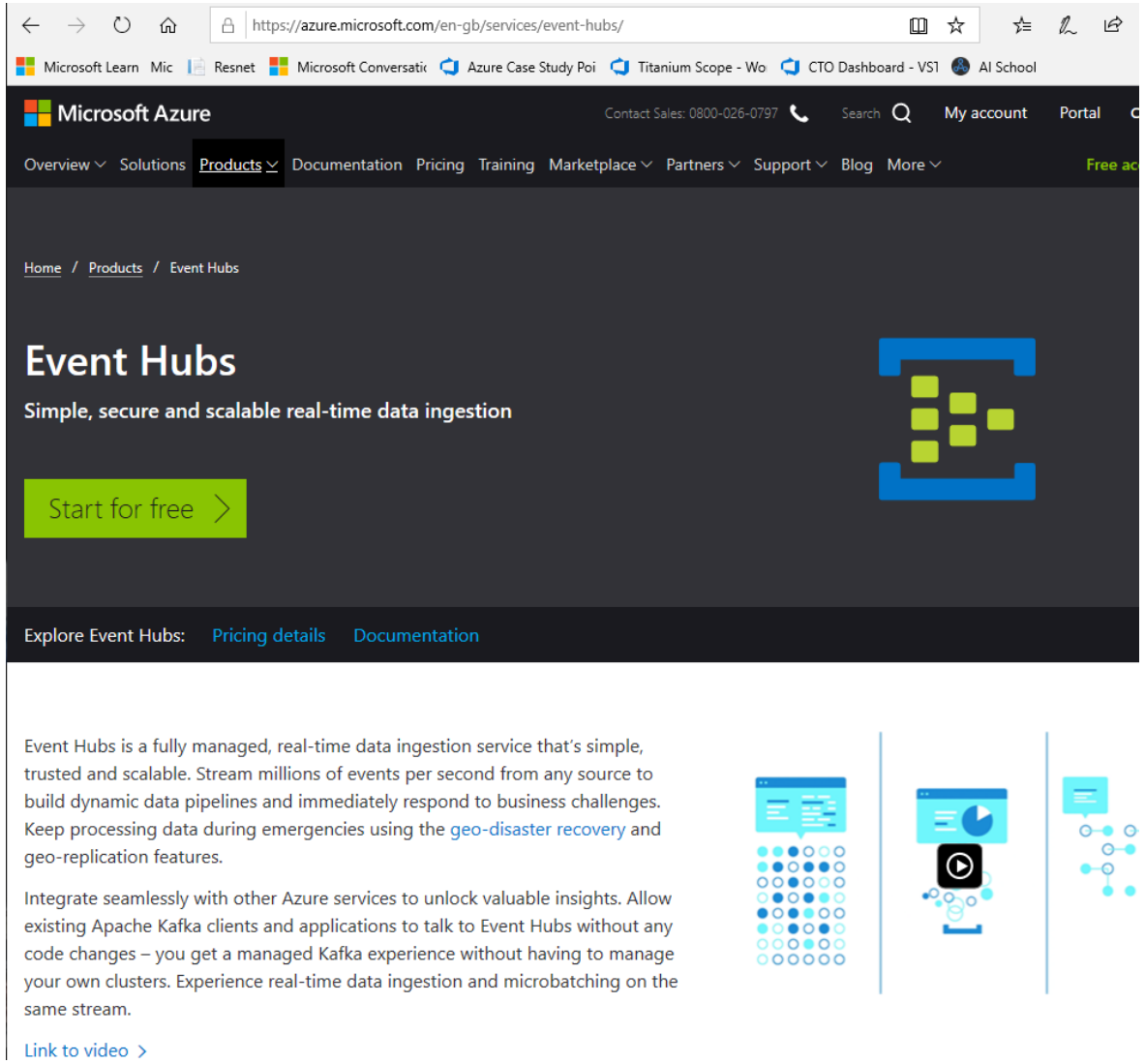
Data Ingestion with Event Hubs

Lesson Objectives

- Describe Azure Event Hubs
- Create an Event Hub
- Evaluate the performance of an Event Hub
- Configure applications to use an Event Hub

Azure Event Hubs

"Azure Event Hubs is a highly scalable publish-subscribe service that can ingest millions of events per second and stream them into multiple applications."



Create an Event Hub

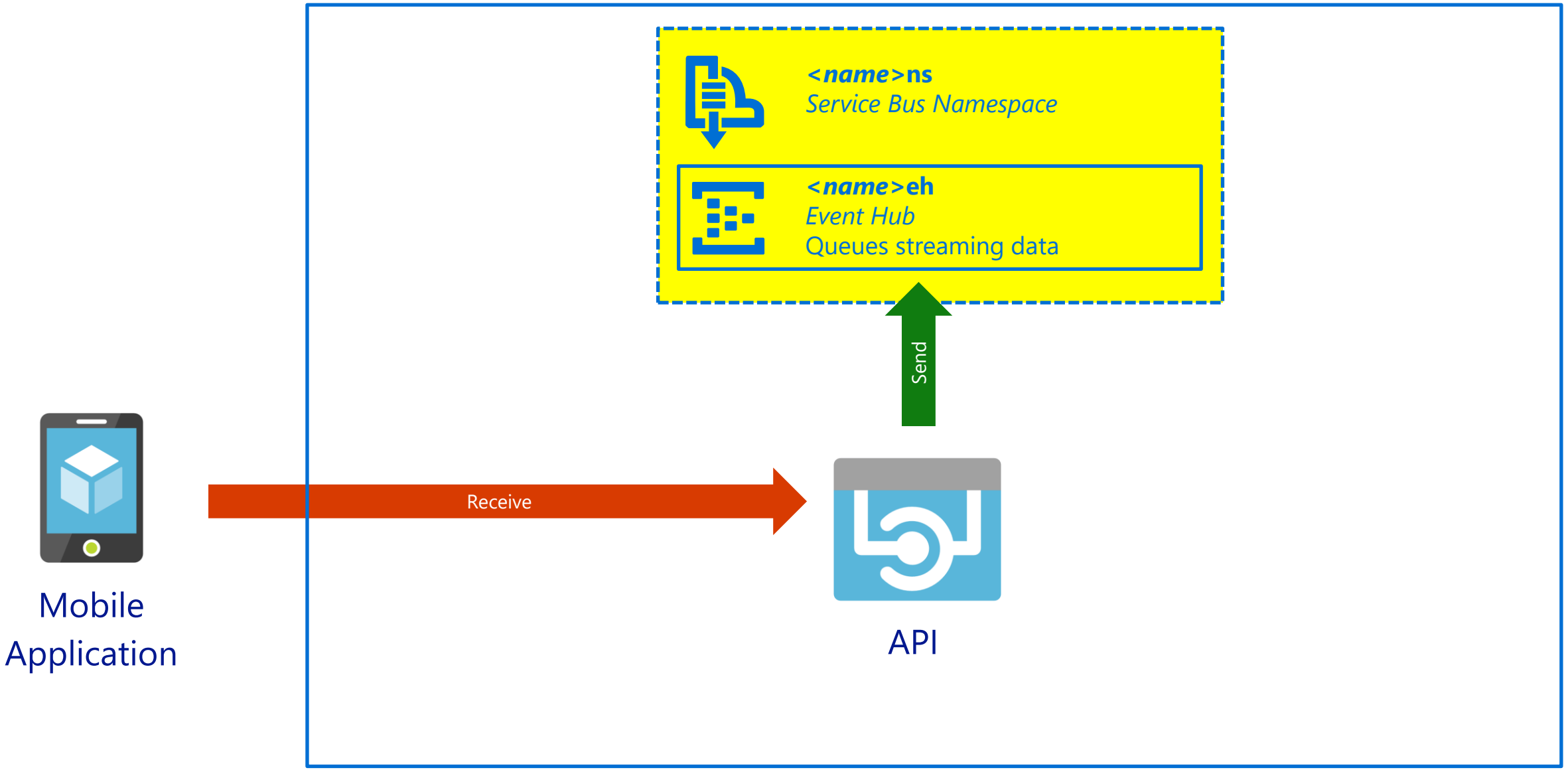
Create an event hub namespace:

1. In the Azure portal, select **NEW**, type **Event Hubs**, and then select **Event Hubs** from the resulting search. Then select **Create**.
2. Provide a name for the event hub, and then create a resource group. Specify **xx-name-eh** and **xx-name-rg** respectively, XX- represent your initials to ensure uniqueness of the Event Hub name and Resource Group name,
3. Click the checkbox to P**in to the dashboard**, then select the **Create** button.

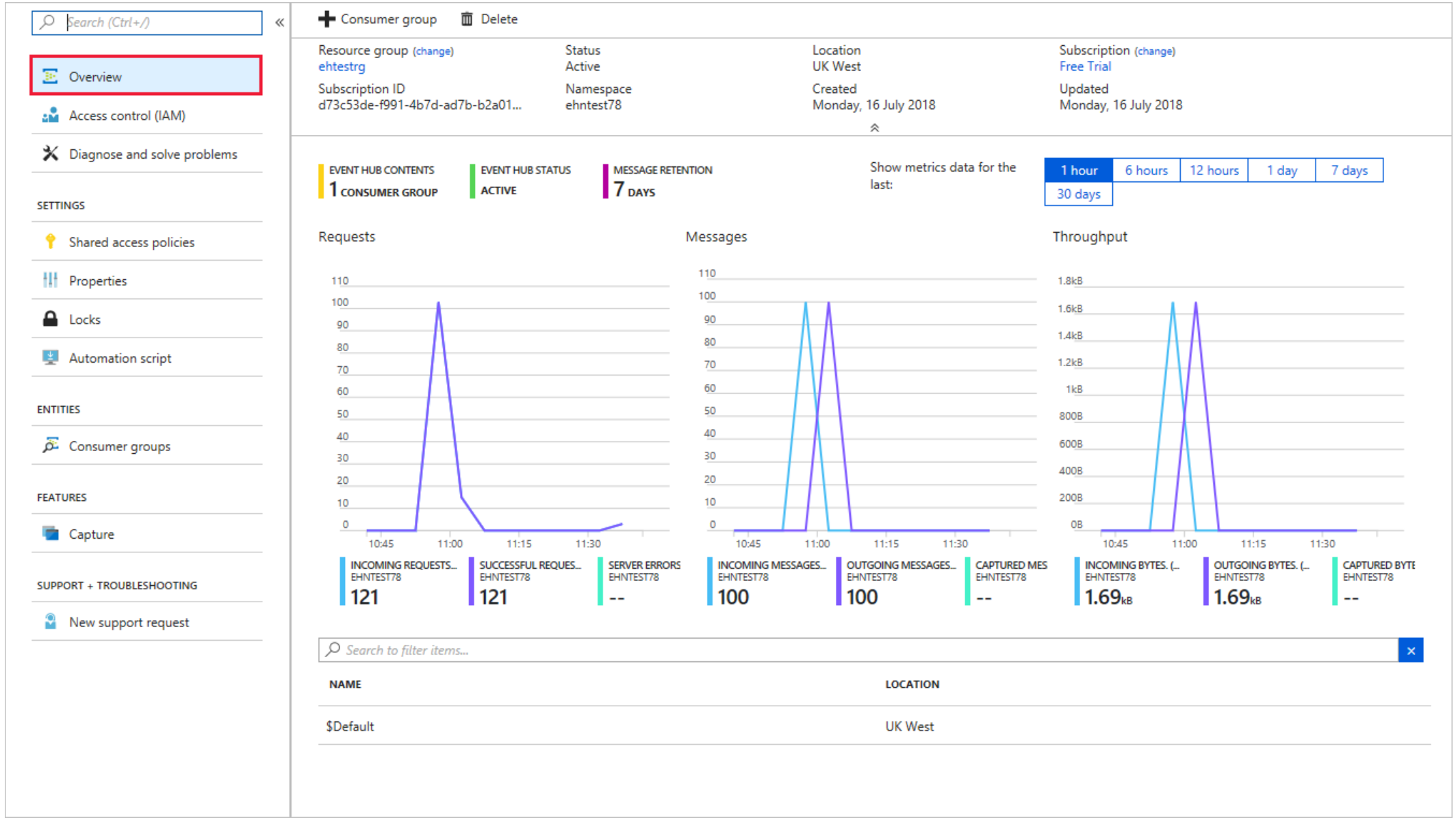
Create an event hub

1. After the deployment is complete, click the **xx-name-eh** event hub on the dashboard.
2. Then, under **Entities**, select **Event Hubs**.
3. To create the event hub, select the **+ Event Hub** button. Provide the name **socialstudy-eh**, and then select **Create**.
4. To grant access to the event hub, we need to create a shared access policy. Select the **socialstudy-eh** event hub when it appears, and then, under **Settings**, select **Shared access policies**.
5. Under **Shared access policies**, create a policy with **MANAGE** permissions by selecting **+ Add**. Give the policy the name of **xx-name-eh-sap** , check **MANAGE**, and then select **Create**.
6. Select your new policy after it has been created, and then select the copy button for the **CONNECTION STRING - PRIMARY KEY** entity.
7. Paste the **CONNECTION STRING - PRIMARY KEY** entity into Notepad, this is needed later in the exercise.
8. Leave all windows open

Configure Applications to use Event Hubs



Evaluating the Performance of Event Hubs



Review Questions

- Q01 - Applications that publish messages to Azure Event Hub very frequently will get the best performance using Advanced Message Queuing Protocol (AMQP) because it establishes a persistent socket. True or False?
- A01 – True

- Q02 - By default, how many partitions will a new Event Hub have?
- A02 – 2

- Q02 - If an Event Hub goes offline before a consumer group can process the events it holds, those events will be lost. True or False?
- A02 – False

Lesson 03

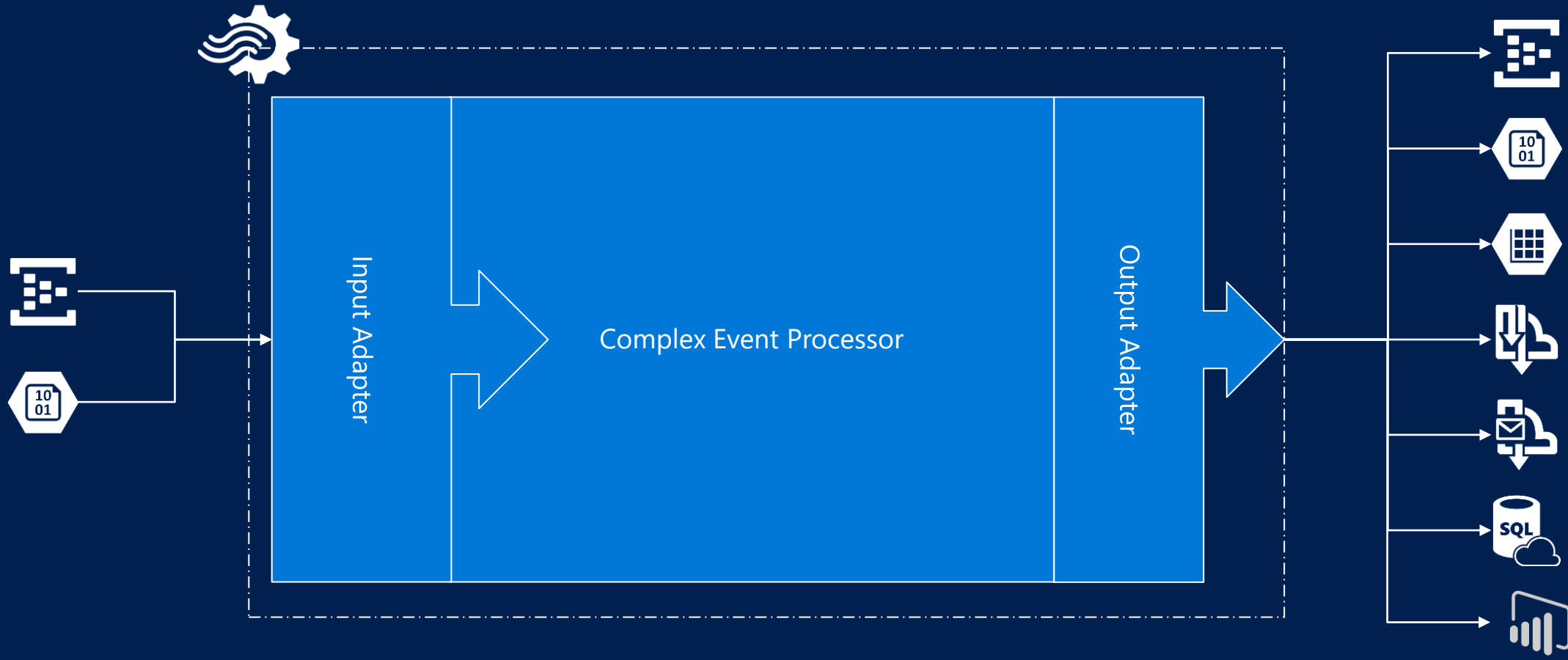
Processing Data with Stream Analytics Jobs

Lesson Objectives

- Explore the Streaming Analytics workflow
- Create a Stream Analytics Job
- Configure a Stream Analytics job input
- Configure a Stream Analytics job output
- Write a transformation query
- Start a Stream Analytics job

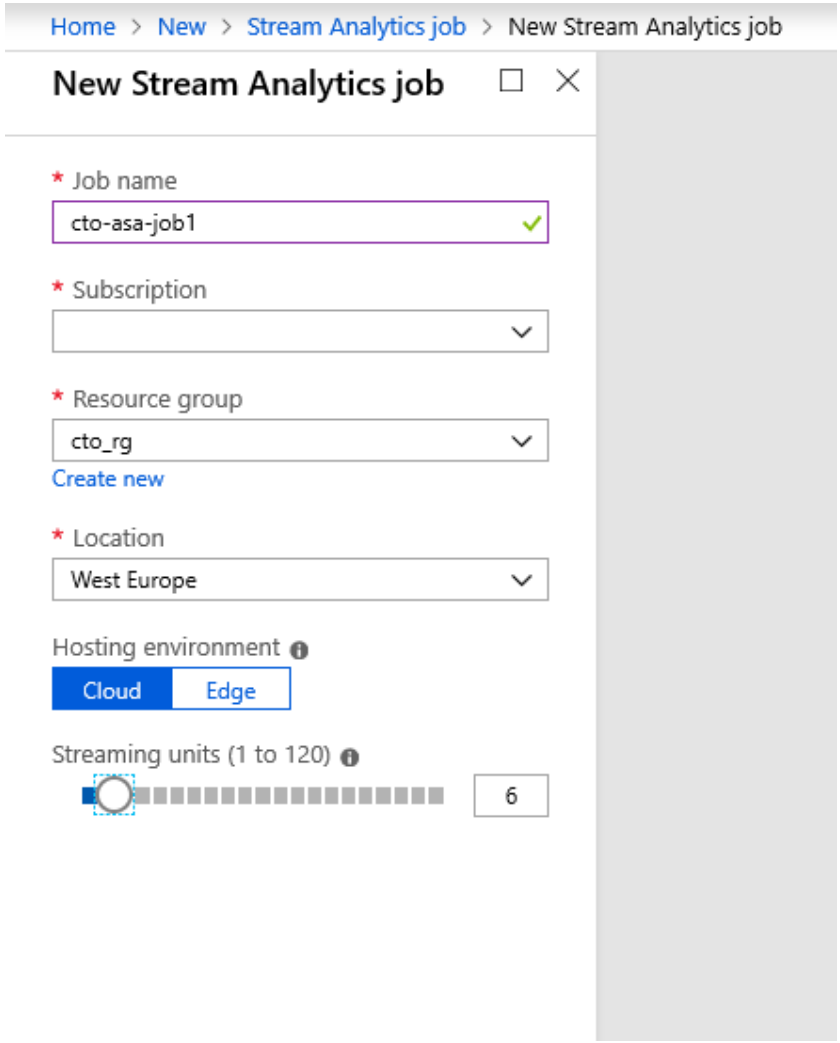
Azure Stream Analytics Workflow

Complex Event Processing of Stream Data in Azure

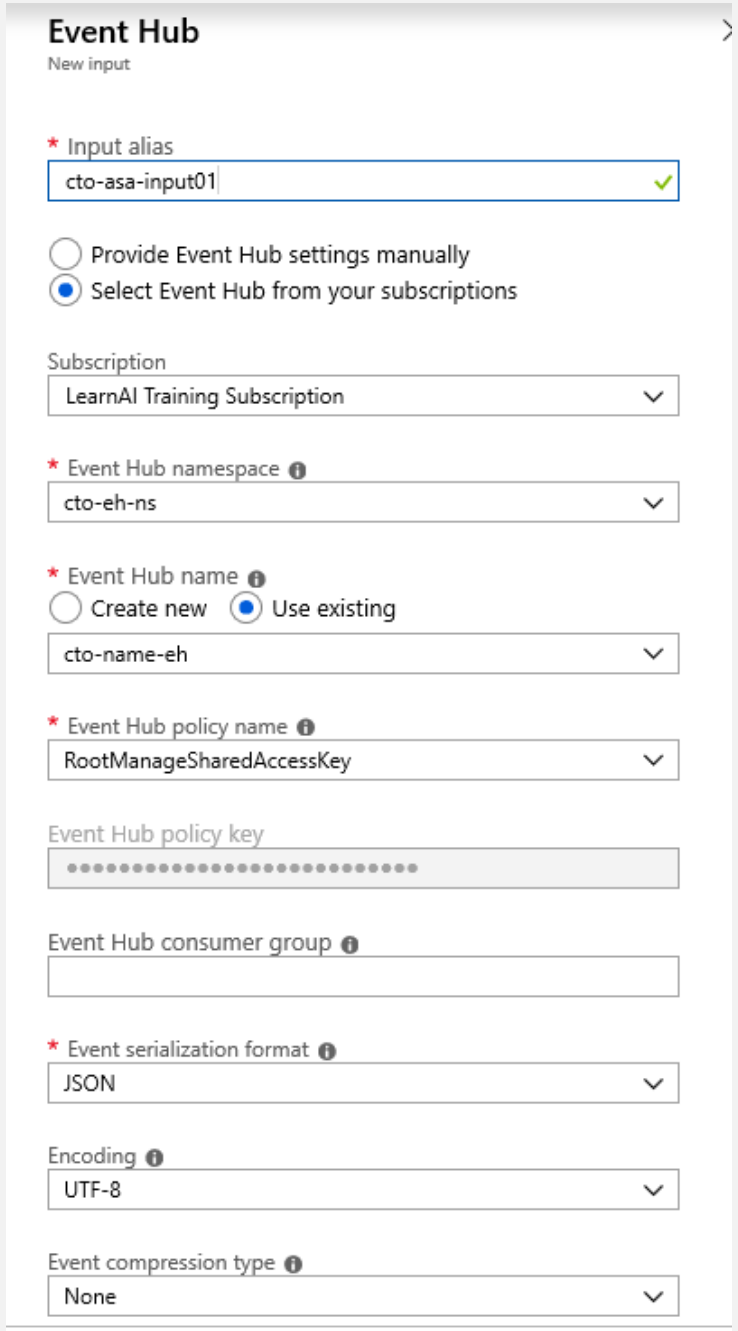


Create Stream Analytics Service

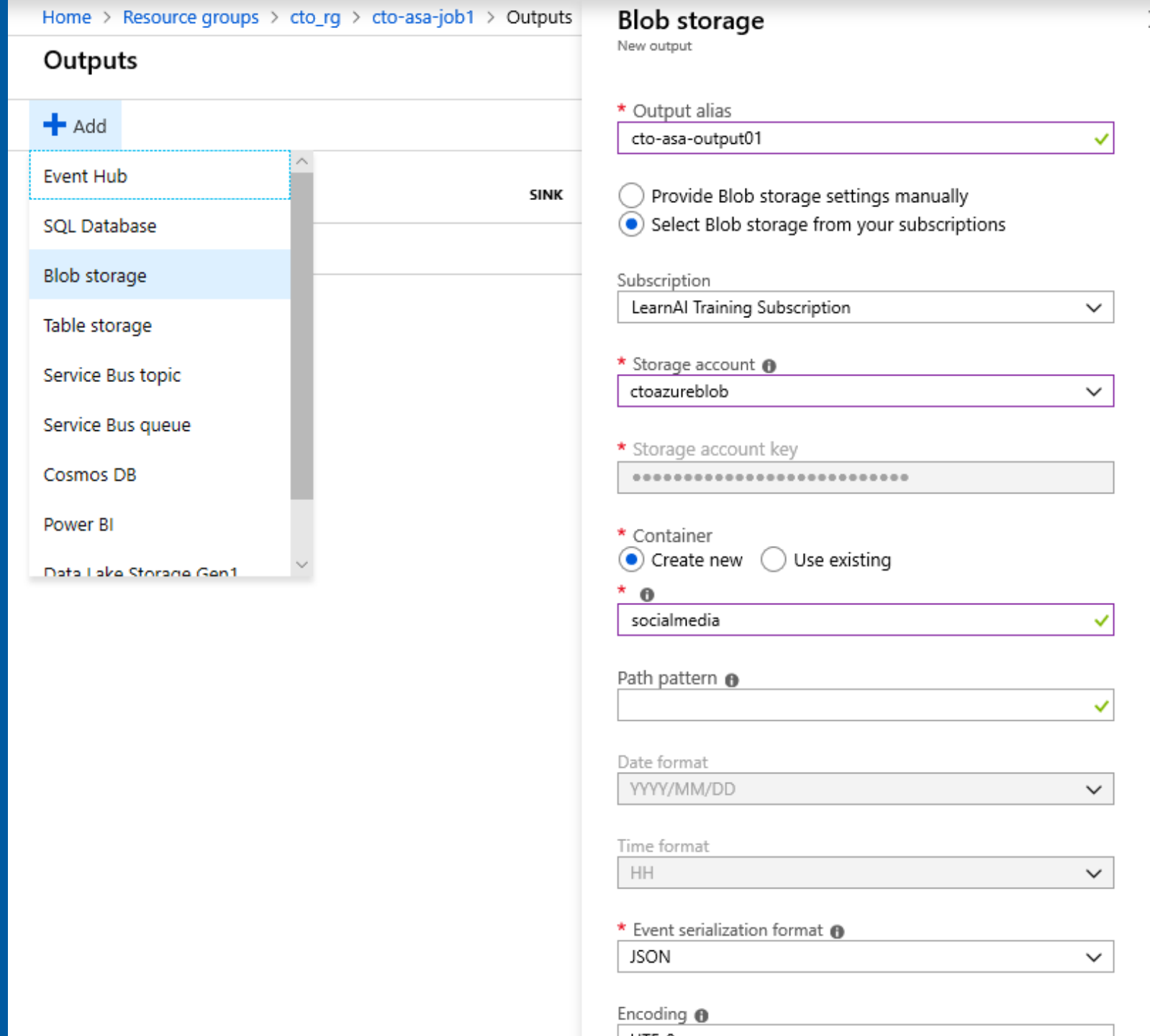
- Job name
- Subscription
- Resource group
- Location



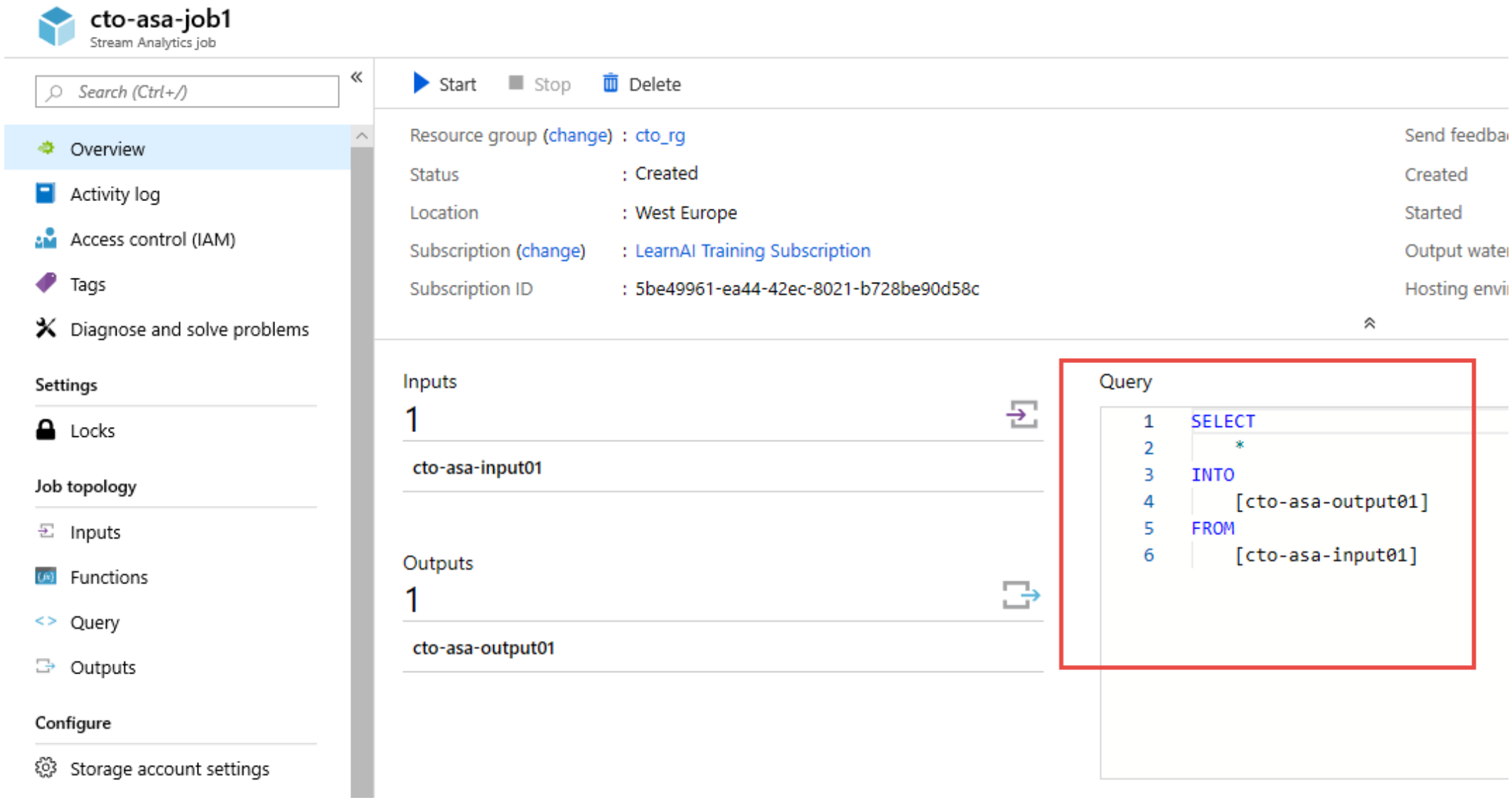
Create a Stream Analytics Job Input.



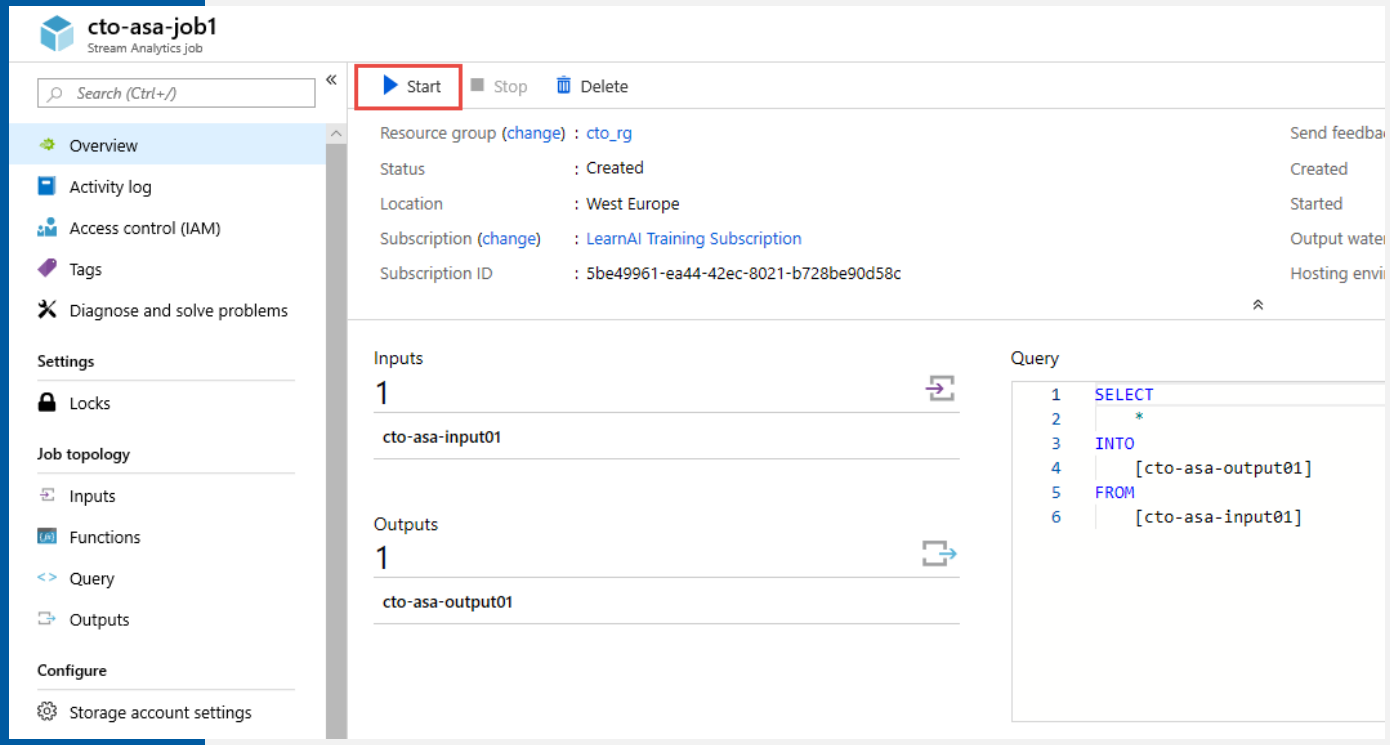
Create a Stream Analytics Job Output.



Write a transformation query



Start a Stream Analytics Job



Review Questions

- Q01 – Which job input consumes data streams from applications at low latencies and high throughput?
- A01 – Event Hubs

- Q02 – Streaming Analytics Query Language is a subset of which query language
- A02 – T-SQL

- Q03 – You are a Data Engineer for Contoso. You want to view key health metrics of your Stream Analytics jobs. Which tool in Streaming Analytics should you use?
- A03 – Dashboards

Lab: Performing Real-Time Analytics with Stream Analytics

Lab overview

The students will be able to describe what data streams are and how event processing works and choose an appropriate data stream ingestion technology for the AdventureWorks case study. They will provision the chosen ingestion technology and integrate this with Stream Analytics to create a solution that works with streaming data.

Lab objectives

After completing this lab, you will be able to:

1. Explain data streams and event processing
2. Data Ingestion with Event Hubs
3. Processing Data with Stream Analytics Jobs

Lab scenario

As part of the digital transformation project, you have been tasked by the CIO to help the marketing departments become more productive with aspects of their work. Over the last few years the marketing department has been using Twitter to amplify marketing message around the bicycle products that are sold.

Whilst the department can provide reach numbers post campaign, they are unable to understand who is interacting with their campaigns in real-time, as the volumes are difficult to track manually. As a result, they would like to implement a system that can track in real-time who is responding to their campaign.

At the end of this lad, you will have:

1. Explain data streams and event processing
2. Data Ingestion with Event Hubs
3. Processing Data with Stream Analytics Jobs

Lab review

- Exercise 1 – In event processing, what would social media sites be classed?
- Exercise 2 – What methods are available for ingesting data? How are they different?
- Exercise 3 – Is it mandatory to define a job output?

Module Summary

In this module, you have learned about:
- Data streams and event processing.
- Data Ingestion with Event Hubs.
- Processing Data with Stream Analytics Jobs.

Next steps

After the course, consider reading the [Reference architecture for real-time event processing with Microsoft Azure Stream Analytics]