

**ΟΙΚΟΝΟΜΙΚΟ  
ΠΑΝΕΠΙΣΤΗΜΙΟ  
ΑΘΗΝΩΝ**



ATHENS UNIVERSITY  
OF ECONOMICS  
AND BUSINESS

MSc in Business Analytics

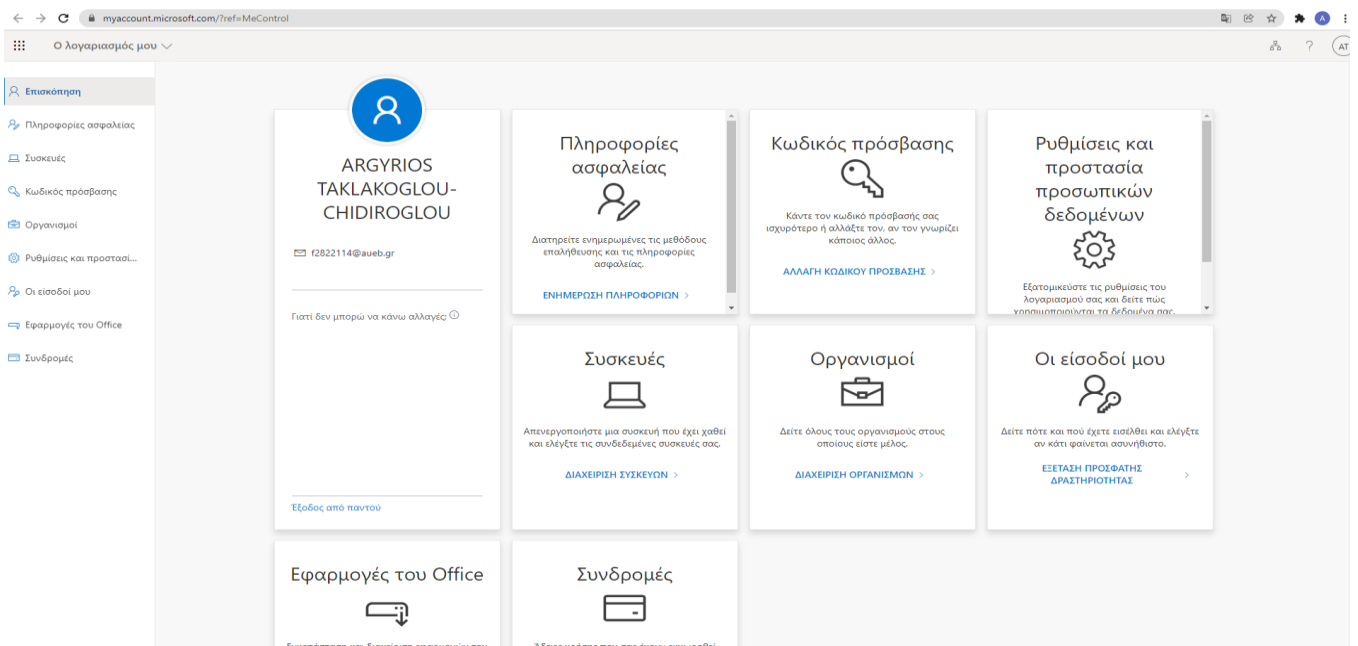
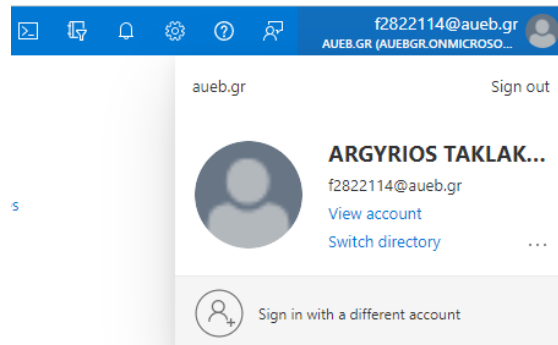
Data Management and Business Intelligence

Assignment 3

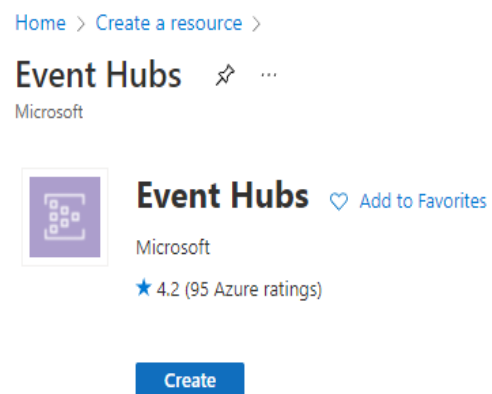
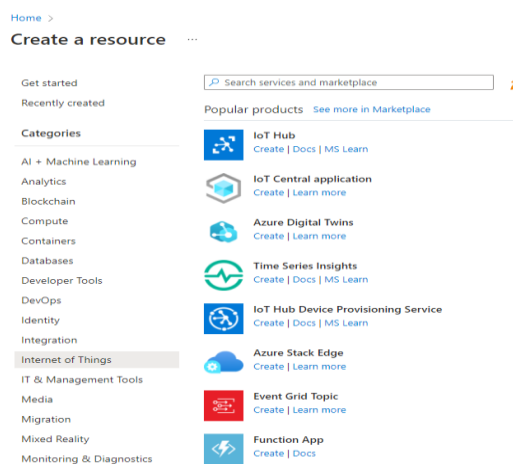
Name: Taklakoglou Chidioglou Argyrios

ID: f2822114

## Step 1. Create a students account



## Step 2. Setup an Event Hub.



[Home](#) > [Create a resource](#) > [Event Hubs](#) >

## Create Namespace ...

Event Hubs

[Basics](#) [Tags](#) [Review + create](#)

### Project Details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*

Resource group \*  [Create new](#)

### Instance Details

Enter required settings for this namespace, including a price tier and configuring the number of units (capacity).

Namespace name \*  ✓  
\_servicebus.windows.net

Location \*  ✓  
i The region selected supports Availability zones. Your namespace will have Availability Zones enabled. [Learn more.](#)

Pricing tier ([View full pricing details](#)) \*  ✓

Throughput Units \*

Enable Auto-Inflate ? ☐

[Home](#) > [Create a resource](#) > [Event Hubs](#) >

## Create Namespace ...

Event Hubs

Validation succeeded.

[Basics](#) [Tags](#) [Review + create](#)

Event Hubs Namespace  
by Microsoft

### Basics

Namespace name	atmsdatastreams
Subscription	Azure for Students
Resource group	BI_3rd_Assignment
Location	West Europe
Pricing tier	Standard
Throughput Units	1
Availability Zones (Zone Redundancy)	Enabled
Auto-Inflate Maximum Throughput Units	Disabled

[Home](#) > [atmsdatastreams](#) > [BI\\_3rd\\_Assignment](#) >

## atmsdatastreams ...

Event Hubs Namespace

[+ Event Hub](#) [Delete](#) [Refresh](#)

### Overview

[Activity log](#) [Access control \(IAM\)](#) [Tags](#) [Diagnose and solve problems](#) [Events](#)

### Settings

[Shared access policies](#) [Scale](#) [Geo-Recovery](#) [Networking](#) [Encryption](#) [Properties](#) [Locks](#)

### Entities

[Event Hubs](#) [Schema Registry](#)

### Monitoring

[Alerts](#) [Metrics](#) [Diagnostic settings](#) [Logs](#)

### Automation

### Essentials

Resource group (Move) : BI\_3rd\_Assignment

Status : Active  
Location : West Europe  
Subscription (Move) : Azure for Students  
Subscription ID : 74a1e746-4322-4c3a-a213-0e49a27b07ab  
Host name : atmsdatastreams.servicebus.windows.net

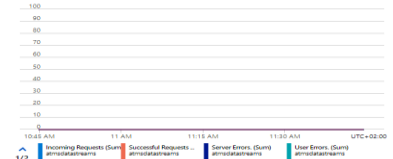
Tags (Edit) : [Click here to add tags](#)

NAMESPACE CONTENTS : SAFARI SURFACE ZONE REDUNDANCY

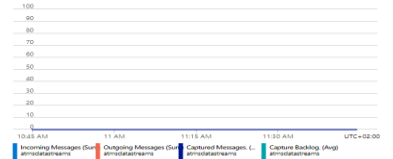
EVENT HUBS : ENABLED DISABLED

Show data for the last: 1 hour 6 hours 12 hours 1 day 7 days 30 days

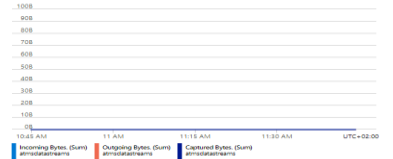
### Requests



### Messages



### Throughput



[Search to filter items...](#)

Microsoft Azure

Home > atmsdatastreams >

## Create Event Hub

Event Hubs

Name \* ⓘ  
eventhubatm ✓

Partition Count ⓘ  
3

Message Retention ⓘ  
1

Capture ⓘ  
On Off

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AUEB.GR (AUEBGR.ONMICROSO...)

✓ Event Hub creation  
Successfully created Event Hub eventhubatm

### Step 3. Generate a Security Access Signature

Home > atmsdatastreams > eventhubatm (atmsdatastreams/eventhubatm)

## eventhubatm (atmsdatastreams/eventhubatm) | Shared access policies

Event Hubs Instance

Search (Ctrl+/) « + Add

Overview

Access control (IAM)

Diagnose and solve problems

Settings

- Shared access policies
- Properties
- Locks

Search to filter items...

Policy

no policies have been set up yet.

Event Hubs

Policy name \*  
MyPolicy ✓

☐ Manage  
☒ Send  
☐ Listen

Event Hubs

Policy name \*  
MyRecPolicy ✓

☐ Manage  
☐ Send  
☒ Listen

SAS Policy: MyPolicy

Save Discard Delete ...

☐ Manage  
☒ Send  
☐ Listen

Primary key  
UuLQB+2G//fq9yjmLF8cdyJKqlcY/LSBSl...

Secondary key  
URH9DqWY7Ol3axe8zQrEWRwxgu7Ff...

Connection string-primary key  
Endpoint=sb://atmsdatastreams.service...

Connection string-secondary key  
Endpoint=sb://atmsdatastreams.service...

Event Hubs - Signature Generator

Hub

Namespace: atmsdatastreams  
Hub Name: eventhubatm  
Publisher: DESKTOP-AE261EB  
Mode: Http

Credentials

Sender Key Name: MyPolicy  
Sender Key: -2G//fq9yjmLF8cdyJKqlcY/LSBSlSeGeR4kwY=  
Token TTL (minutes): 60000

Signature

SharedAccessSignature sr=https%3a%2f%2fatmsdatastreams.servicebus.windows.net%2feventhubatm%2fpublishers%2fdesktop-ae261eb%2fmessages&sig=2E1vCibNDIIG8GhbiLPZJSE%2bAUuLwIYxt2YnodMSY10%3d&se=1645583525&skn=MyPolicy

Generate

#### Step 4. Edit Generator.html and update the CONFIG variables

```
1 //*****  
2 /** CONFIG **/  
3 //*****  
4  
5 //Use the signature generator: https://github.com/sandrinodimattia/RedDog/releases  
6 var sas = "SharedAccessSignature sr=https%3a%2f%2fatmsdatastreams.servicebus.windows.net%2feventhubatm%2fpublishers%2fdesktop-ae261eb%2fmessages&sig=2E1vC1bND1IG8GhbiLPZJSE&2bAUuLwIYxt2YnodMST10%3d&se=1645583525&skn=MyPolicy";  
7 var serviceNameSpace = "atmsdatastreams";  
8 var hubName = "eventhubatm";  
9 var deviceName = "DESKTOP-AE261EB";
```

```
1 //*****  
2 /** CONFIG **/  
3 //*****  
4  
5 //Use the signature generator: https://github.com/sandrinodimattia/RedDog/releases  
6 var sas = "SharedAccessSignature sr=https%3a%2f%2fatmsdatastreams.servicebus.windows.net%2feventhubatm%2fpublishers%2fdesktop-ae261eb%2fmessages&sig=2E1vC1bND1IG8GhbiLPZJSE&2bAUuLwIYxt2YnodMST10%3d&se=1645583525&skn=MyPolicy";  
7 var serviceNameSpace = "atmsdatastreams";  
8 var hubName = "eventhubatm";  
9 var deviceName = "DESKTOP-AE261EB";
```

**Step 5.** Feed the Event Hub with the use of Generator.html (In order to start the Stream Generator, open the Generator.html with a web browser, e.g.: Chrome and press the “Send Data” button.)

← → ↻ ⓘ Αρχείο | C:/Users/argir/Υπολογιστής/datastreams/Assignment\_3/DataGenerator/Generator.html

Sent: { "ATMCode": 12 , "CardNumber": 5893112367133403000 , "Type": 1 , "Amount": 20 }

## Step 6. Setup a Storage account.

[Home](#) > [Storage accounts](#) >

# Create a storage account ...

[Basics](#) [Advanced](#) [Networking](#) [Data protection](#) [Encryption](#) [Tags](#) [Review + create](#)

### Project details

Select the subscription in which to create the new storage account. Choose a new or existing resource group to organize and manage your storage account together with other resources.

Subscription *	<div>Azure for Students</div>
Resource group *	<div>BI_3rd_Assignment</div> <div><a href="#">Create new</a></div>

### Instance details

If you need to create a legacy storage account type, please click [here](#).

Storage account name ⓘ *	<div>storageatm</div>
Region ⓘ *	<div>(Europe) West Europe</div>
Performance ⓘ *	<div><input checked="" type="radio"/> Standard: Recommended for most scenarios (general-purpose v2 account)</div> <div><input type="radio"/> Premium: Recommended for scenarios that require low latency.</div>
Redundancy ⓘ *	<div>Geo-redundant storage (GRS)</div> <div><input checked="" type="checkbox"/> Make read access to data available in the event of regional unavailability.</div>

[Review + create](#)

[< Previous](#)

[Next : Advanced >](#)



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 **Deployment succeeded**

Deployment 'storageatm\_1641991567787' to resource group 'BI\_3rd\_Assignment' was successful.

[Go to resource](#) [Pin to dashboard](#)

storageatm | Containers

Storage account

Search (Ctrl+J)

«

+ Container

Change access level

Restore containers

Refresh

Delete

Search containers by prefix

Show details

Name	Last modified	Public access level
<input type="checkbox"/> Slogs	1/12/2022, 2:46:37 PM	Private

Name \*

atmcontainer

Public access level ⓘ

Private (no anonymous access)

Advanced

New container

Name \*

atmcontainer

Public access level ⓘ

Private (no anonymous access)

Advanced

Step 7. Upload the Reference Data files to your storage account

Home > All resources > storageatm >

atmcontainer

Container

Search (Ctrl+J)

«

Upload

Overview

Authentication

Location

f2822114@aueb.gr

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Upload blob

atmcontainer/

Files ⓘ

"Area.json"

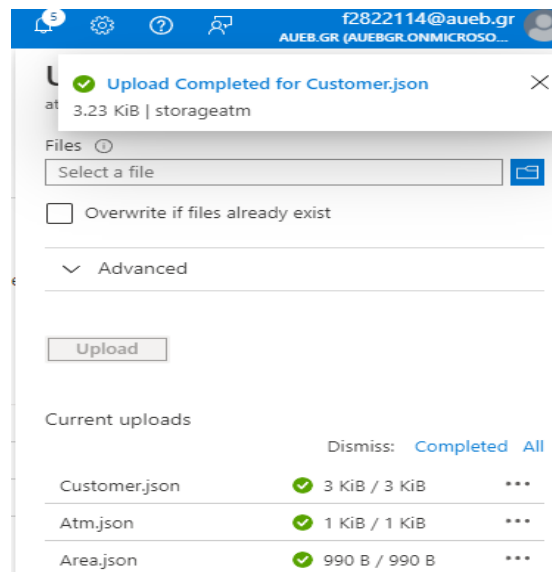
Overwrite if files already exist

Advanced

Upload

Name	Modified	Access tier	Archive status	Blob type
<input type="checkbox"/> Area.json	1/12/2022, 3:05:32 PM	Hot (Inferred)		Block blob
<input type="checkbox"/> Atm.json	1/12/2022, 3:05:42 PM	Hot (Inferred)		Block blob
<input type="checkbox"/> Customer.json	1/12/2022, 3:05:49 PM	Hot (Inferred)		Block blob






## Step 8. Setup a Stream Analytics Job.

Home > Create a resource >

### Stream Analytics job

Microsoft

 **Stream Analytics job** [Add to Favorites](#)

Microsoft

★ 4.0 (185 Azure ratings)

[Create](#)

Home > Create a resource > Stream Analytics job >

### New Stream Analytics job

**i** This will create a new Stream Analytics job. You will be charged ac

Job name \*  
atmstream ✓

Subscription \*  
Azure for Students ▼

Resource group \*  
BI\_3rd\_Assignment ▼  
[Create new](#)

Location \*  
West Europe ▼

Hosting environment ⓘ  
[Cloud](#) [Edge](#)

Streaming units (1 to 192) ⓘ  
 3

☐ Secure all private data assets needed by this job in my Storage account. ⓘ

**Deployment succeeded**

Deployment 'StreamAnalyticsJob' to resource group 'BI\_3rd\_Assignment' was successful.

## Step 9. Use the Event Hub + Reference Data Files as Input.

### Inputs ...

+ Add stream input ▾ + Add reference input ▾ Refresh

Name	Source type	Source
------	-------------	--------

#### Blob storage/ADLS Gen2

New input

Input alias \*

Area ✓

- ☐ Provide Blob storage/ADLS Gen2 settings manually  
☒ Select Blob storage/ADLS Gen2 from your subscriptions

Subscription

Azure for Students ▾

Storage account \*

storageatm ▾

Container \*

- ☐ Create new ☒ Use existing

atmcontainer ▾

Authentication mode

Managed Identity: System assigned ▾

Path pattern \* ⓘ

Area.json ✓

Date format

YYYY/MM/DD ▾

Time format

HH ▾

Event serialization format \* ⓘ

JSON ▾

Encoding ⓘ

UTF-8 ▾

Save

#### Input details

stream

Test Delete

Input alias

stream

- ☒ Provide Event Hub settings manually  
☐ Select Event Hub from your subscriptions

Subscription

Subscription information not needed

Event Hub namespace \* ⓘ

atmsdatastreams

Event Hub name ⓘ

- ☐ Create new ☒ Use existing

eventhubatm

Event Hub consumer group ⓘ

- ☐ Create new ☒ Use existing

atmstream\_consumer\_group

Authentication mode

Managed Identity: System assigned ▾

Managed Identity authentication for Event Hub may need additional steps to work. [Learn more](#)

Partition key ⓘ

Event serialization format \* ⓘ

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## Blob storage/ADLS Gen2

New input

Input alias \*

ATM

☐ Provide Blob storage/ADLS Gen2 settings manually  
☒ Select Blob storage/ADLS Gen2 from your subscriptions

Subscription

Azure for Students

Storage account \*

storageatm

Container \*

☐ Create new ☒ Use existing

atmcontainer

Authentication mode

Managed Identity: System assigned

Path pattern \* ⓘ

Atm.json

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AUEB.GR (AUEBGR.ONMICROSO...

## Blob storage/ADLS Gen2

New input

Input alias \*

Customer

☐ Provide Blob storage/ADLS Gen2 settings manually  
☒ Select Blob storage/ADLS Gen2 from your subscriptions

Subscription

Azure for Students

Storage account \*

storageatm

Container \*

☐ Create new ☒ Use existing

atmcontainer

Authentication mode

Managed Identity: System assigned

Path pattern \* ⓘ

Customer.json

## Inputs ...

+ Add stream input ▾ + Add reference input ▾ ↻ Refresh

Name	Source type	Source
Area	Reference	Blob storage
Atm	Reference	Blob storage
Customer	Reference	Blob storage
stream	Stream	Event Hub

More events in the activity log → Dismiss all ▾

<div><div></div><div>Successful connection test</div><div>Connection to input 'stream' succeeded.</div></div>	×
5 minutes ago	
<div><div></div><div>Waiting for permissions to propagate</div><div>If testing connection fails please try again in a few minutes.</div></div>	×
5 minutes ago	
<div><div></div><div>Added input</div><div>Added input 'stream' to Stream Analytics job 'atmstream'.</div></div>	×
5 minutes ago	
<div><div></div><div>Successful connection test</div><div>Connection to input 'Customer' succeeded.</div></div>	×
22 minutes ago	
<div><div></div><div>Added input</div><div>Added input 'Customer' to Stream Analytics job 'atmstream'.</div></div>	×
22 minutes ago	
<div><div></div><div>Successful connection test</div><div>Connection to input 'Area' succeeded.</div></div>	×
23 minutes ago	

↑

 Upload

🔒

 Change access level

🔄

 Refresh

🗑️

 Delete

↔️

Change access level

Change the access level of container 'atmcontainer'.

Public access level ⓘ  
Container (anonymous read access for containers and blobs) ▼

⚠️ All container and blob data can be read by anonymous request. Clients can enumerate blobs within the container by anonymous request, but cannot enumerate containers within the storage account.

OK

Cancel

More events in the activity log →

Dismiss all ▼

📘

 Sample input 'stream' succeeded for Stream Analytics job 'atmstream' ✕

Sampled events are available to be downloaded.  
Click to download.

**Step 10.** Create a Blob Storage Output.

Outputs  
0

➕ Add ▼

🔄 Refresh

Azure Function

Azure PostgreSQL (preview)

Azure Synapse Analytics

Blob storage/ADLS Gen2

Cosmos DB

Output details

✕

BlobOutput

🔍 Test

🗑️ Delete

Output alias

BlobOutput

☒ Provide Blob storage/ADLS Gen2 settings manually

☐ Select Blob storage/ADLS Gen2 from your subscriptions

Subscription

Subscription information not needed

Storage account \* ⓘ

storageatm

Container \* ⓘ

atmcontainer

Authentication mode

Managed Identity: System assigned ▼

Managed Identity authentication for Blob storage/ADLS Gen2 may need additional steps to work. [Learn more](#)

Path pattern ⓘ

Date format

YYYY/MM/DD ▼

Time format

HH ▼

Event serialization format \* ⓘ

Name

Sink

BlobOutput

Blob storage

# Queries

## Query 1

Show the total “Amount” of “Type = 0” transactions at “ATM Code = 21” of the last 10 minutes. Repeat as new events keep flowing in (use a sliding window).

**Query** ...  
atmstream

Query language docs Open in Visual Studio UserVoice

Inputs (4)  
Area  
ATM  
Customer  
stream

Outputs (1)  
BlobOutput

Test query Save query Discard changes

```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 WHERE [stream].[ATMCode] = 21 AND [stream].[Type] = 0
5 GROUP BY SlidingWindow(minute,10)
```

Input preview Test results

Showing 1 rows from 'bloboutput'.

SUM
473

Microsoft Azure

Search resources, services, and docs (G+)

Home > atmstream Stream Analytics job

Search (Ctrl+F)

Overview

Activity log  
Access control (IAM)  
Tags  
Diagnose and solve problems

Settings

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Inputs  
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Configure

Environment  
Storage account settings  
Scale  
Locale  
Event ordering  
Error policy  
Compatibility level  
Managed identity

General  
Tools

Start Stop Delete Refresh

Subscription ID : 74a1e746-4322-4c3a-a213-0e49a27b07ab Hosting environment : Cloud

Overview

Inputs  
4  
Area Blob storage  
Atm Blob storage

Outputs  
1  
BlobOutput Blob storage

Query

```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 WHERE [stream].[ATMCode] = 21 AND [stream].[Type] = 0
5 GROUP BY SlidingWindow(minute,10)
```

Monitoring

Input Events (Sum) atmstream 5.86k  
Output Events (Sum) atmstream 203  
Runtime Errors (Sum) atmstream 0

Resource utilization

50% Utilization (Max) atmstream 9%

## Query 2

Show the total “Amount” of “Type = 1” transactions at “ATM Code = 21” of the last hour.  
Repeat once every hour (use a tumbling window).

### Query

atmstream

[Query language docs](#) [Open in Visual Studio](#) [UserVoice](#)

#### Inputs (4)

Area  
ATM  
Customer  
stream

#### Outputs (1)

BlobOutput

[Test query](#) [Save query](#) [Discard changes](#)

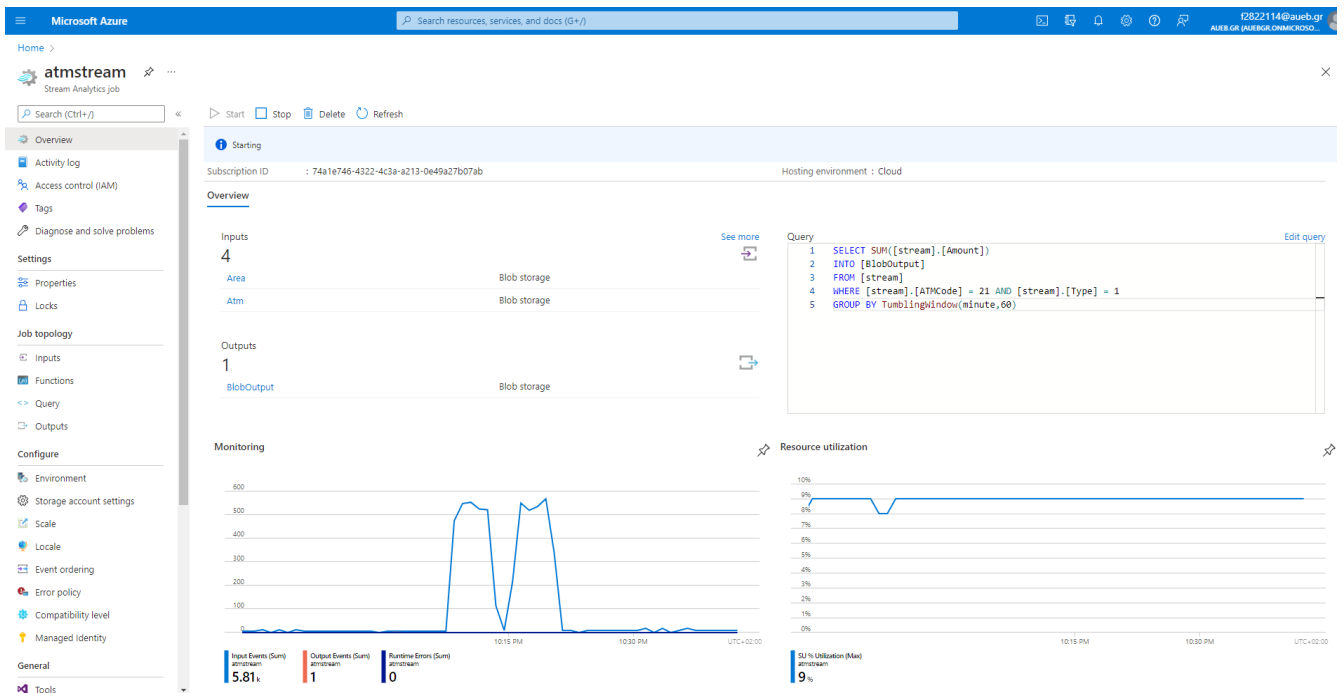
```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 WHERE [stream].[ATMCode] = 21 AND [stream].[Type] = 1
5 GROUP BY TumblingWindow(minute,60)
```

[Input preview](#) [Test results](#)

Showing 1 rows from 'bloboutput'.

SUM

928



### Query 3

Show the total “Amount” of “Type = 1” transactions at “ATM Code = 21” of the last hour. Repeat once every 30 minutes (use a hopping window).

## Query

atmstream

Query language docs Open in Visual Studio UserVoice

Inputs (4)

- Area
- ATM
- Customer
- stream

Outputs (1)

- BlobOutput

Test query Save query Discard changes

```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 WHERE [stream].[ATMCode] = 21 AND [stream].[Type] = 1
5 GROUP BY HoppingWindow(minute, 60, 30)
```

Input preview Test results

Showing 2 rows from 'bloboutput'.

SUM
41
41

Microsoft Azure

atmstream

Stream Analytics job

Search (Ctrl+F)

Start Stop Delete Refresh

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Compatibility level

Managed identity

General

Tools

Running

Subscription ID : 74b1e746-4322-4c3a-a213-0e49a27b07ab

Hosting environment : Cloud

Overview

Inputs

4

Area

ATM

Blob storage

Blob storage

Outputs

1

BlobOutput

Blob storage

Monitoring

Input Events (Sum) atmstream 4.96%

Output Events (Sum) atmstream 2

Runtime Errors (Sum) atmstream 0

Resource utilization

50 % Utilization (Max) atmstream 8%

Query

```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 WHERE [stream].[ATMCode] = 21 AND [stream].[Type] = 1
5 GROUP BY HoppingWindow(minute, 60, 30)
```

## Query 4

Show the total “Amount” of “Type = 1” transactions per “ATM Code” of the last one hour (use a sliding window).

**Query** ...  
atmstream

Query language docs Open in Visual Studio UserVoice

**Inputs (4)**

- Area
- ATM
- Customer
- stream

**Outputs (1)**

- BlobOutput

Test query Save query Discard changes

```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 WHERE [stream].[Type] = 1
5 GROUP BY [stream].[ATMCode], SlidingWindow(minute,60)
```

**Input preview** Test results

Showing 9 rows from 'bloboutput'.

SUM
80
124
221
76
36
77
128
13

Success

Microsoft Azure

atmstream Stream Analytics job

Search (Ctrl+F)

Start Stop Delete Refresh

Subscription ID : 74a1e746-4322-4c3a-a213-0e49a27b07ab Hosting environment : Cloud

**Overview**

**Inputs**

- 4
- Area Blob storage
- ATM Blob storage

**Outputs**

- 1
- BlobOutput Blob storage

**Query**

```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 WHERE [stream].[Type] = 1
5 GROUP BY [stream].[ATMCode], SlidingWindow(minute,60)
```

**Monitoring**

Input Events (Sum) 2.18s Output Events (Sum) 2s Runtime Errors (Sum) 0

**Resource utilization**

9% CPU Utilization (Max)



## Query 5

Show the total “Amount” of “Type = 1” transactions per “Area Code” of the last hour. Repeat once every hour (use a tumbling window).

### Query

atmstream

[Query language docs](#) [Open in Visual Studio](#) [UserVoice](#)

#### Inputs (4)

[Area](#)  
[ATM](#)  
[Customer](#)  
[stream](#)

#### Outputs (1)

[BlobOutput](#)

[Test query](#) [Save query](#) [Discard changes](#)

```
1 SELECT SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 INNER JOIN [ATM]
5 ON [stream].[ATMCode] = [ATM].[atm_code]
6 WHERE [stream].[Type] = 1
7 GROUP BY [ATM].[atm_code], TumblingWindow(minute,60)
```

[Input preview](#) [Test results](#)

Showing 9 rows from 'bloboutput'.

SUM

80

221

77

76

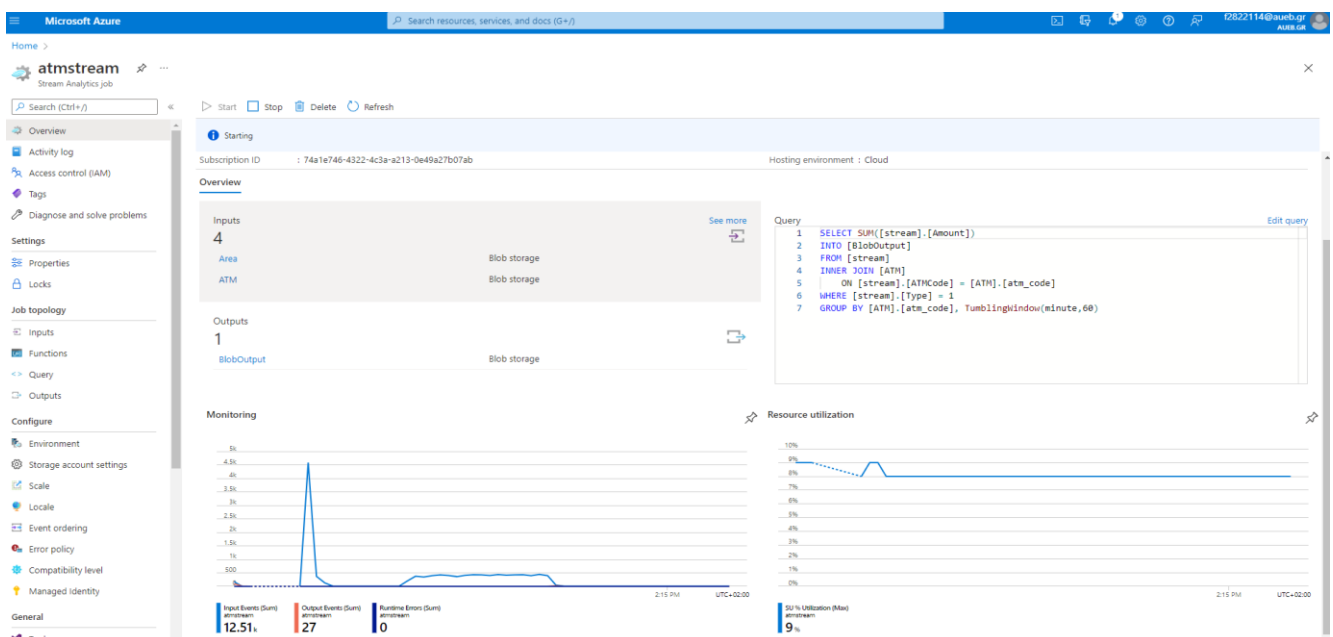
36

13

124

128

Success



## Query 6

Show the total “Amount” per ATM’s “City” and Customer’s “Gender” of the last hour.  
Repeat once every hour (use a tumbling window).

### Query

atmstream

Query language docs Open in Visual Studio UserVoice

#### Inputs (4)

</> Area  
</> ATM  
</> Customer  
</> stream

#### Outputs (1)

</> BlobOutput

Test query Save query Discard changes

```
1 SELECT [Area].[area_city],[Customer].[gender], SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 INNER JOIN [Customer]
5 ON [stream].[CardNumber] = [Customer].[card_number]
6 INNER JOIN [ATM]
7 ON [ATM].[atm_code] = [stream].[ATMCode]
8 INNER JOIN [Area]
9 ON [ATM].[area_code] = [Area].[area_code]
10 GROUP BY [Customer].[gender], [Area].[area_city], TumblingWindow(minute,60)
```

Input preview Test results

Showing 10 rows from 'bloboutput'.

area_city	gender	SUM
"Baltimore"	"Male"	58
"Omaha"	"Male"	237
"Springfield"	"Female"	10
"Schaumburg"	"Male"	20
"Schaumburg"	"Female"	188
"Tacoma"	"Female"	125
"Springfield"	"Male"	251
"Vancouver"	"Male"	36

Success

atmstream Stream Analytics job

Search (Ctrl+/)

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Start Stop Delete Refresh

Running

Subscription ID : 74a1e746-4322-4c3a-a213-0e49a27b07ab

Hosting environment : Cloud

Overview

Inputs

Area Blob storage

ATM Blob storage

Outputs

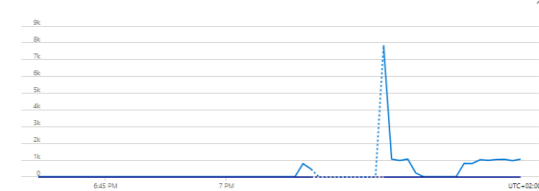
BlobOutput Blob storage

See more

```
1 SELECT [Area].[area_city],[Customer].[gender], SUM([stream].[Amount])
2 INTO [BlobOutput]
3 FROM [stream]
4 INNER JOIN [Customer]
5 ON [stream].[CardNumber] = [Customer].[card_number]
6 INNER JOIN [ATM]
7 ON [ATM].[atm_code] = [stream].[ATMCode]
8 INNER JOIN [Area]
9 ON [ATM].[area_code] = [Area].[area_code]
10 GROUP BY [Customer].[gender], [Area].[area_city], TumblingWindow(minute,60)
```

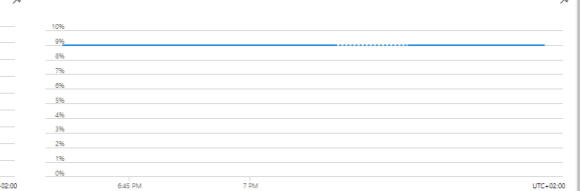
Edit query

Monitoring



Input Events (Sum) 20.93k Output Events (Sum) 0 Running Errors (Sum) 0

Resource utilization



CPU % Utilization (Max) 9%

## Query 7

Alert (Do a simple SELECT “1”) if a Customer has performed two transactions of “Type = 1” in a window of an hour (use a sliding window).

### Query

atmstream

[Query language docs](#) [Open in Visual Studio](#) [UserVoice](#)

**Inputs (4)**

- Area
- ATM
- Customer
- stream

**Outputs (1)**

- BlobOutput

[Test query](#) [Save query](#) [Discard changes](#)

```
1 SELECT [Customer].[card_number], 1 as alert
2 INTO [BlobOutput]
3 FROM [stream]
4 INNER JOIN [Customer]
5 ON [stream].[CardNumber] = [Customer].[card_number]
6 WHERE [stream].[Type] = 1
7 GROUP BY [Customer].[card_number], SlidingWindow(minute, 60)
8 HAVING count(*) = 2
```

[Input preview](#) [Test results](#)

Showing 7 rows from 'bloboutput'.

card_number	alert
5200253312538103	1
560222217915598000	1
5893112367133403000	1
56022176913710210	1
201634601435467	1
5446210381593272	1
3554025590595485	1

Success

**Running**

Subscription ID : 74a1e746-4322-4c3a-a213-0e49a27b07ab Hosting environment : Cloud

**Overview**

**Inputs**

4

- Area Blob storage
- ATM Blob storage

**Outputs**

1

- BlobOutput Blob storage

[See more](#) [Edit query](#)

```
1 SELECT [Customer].[card_number], 1 as alert
2 INTO [BlobOutput]
3 FROM [stream]
4 INNER JOIN [Customer]
5 ON [stream].[CardNumber] = [Customer].[card_number]
6 WHERE [stream].[Type] = 1
7 GROUP BY [Customer].[card_number], SlidingWindow(minute, 60)
8 HAVING count(*) = 2
```

**Monitoring**

Input Events (Sum) atmstream: 1.02  
Output Events (Sum) atmstream: 0  
Runtime Errors (Sum) atmstream: 0

**Resource utilization**

CPU % Utilization (Max) atmstream: 9%

## Query 8

Alert (Do a simple SELECT “1”) if the “Area Code” of the ATM of the transaction is not the same as the “Area Code” of the “Card Number” (Customer’s Area Code) - (use a sliding window)

### Query

Query language docs Open in Visual Studio UserVoice

Inputs (4)  
Area  
ATM  
Customer  
stream

Outputs (1)  
BlobOutput

Test query Save query Discard changes

```
1 SELECT [Customer].[card_number], count(*), 1 as alert
2 INTO [BlobOutput]
3 FROM [stream]
4 INNER JOIN [Customer]
5 ON [stream].[CardNumber] = [Customer].[card_number]
6 INNER JOIN [ATM]
7 ON [ATM].[atm_code] = [stream].[ATMCode]
8 WHERE [ATM].[area_code] <> [Customer].[area_code]
9 GROUP BY [Customer].[card_number], SlidingWindow(minute, 60)
```

Input preview Test results

Showing 20 rows from 'bloboutput'.

card_number	count	alert
5610827137784218	52	1
5200253312538103	21	1
50383945269330136	48	1
3534633361736454	45	1
4026567514157759	53	1
5602238863017460	58	1
3542024987623740	34	1
5602246755688900	33	1

Success

Start Stop Delete Refresh

Starting

Subscription ID : 74a1e746-4322-4c3a-a213-0e49a27b07ab

Hosting environment : Cloud

#### Overview

##### Inputs

4

Area	Blob storage
ATM	Blob storage

##### Outputs

1

BlobOutput	Blob storage
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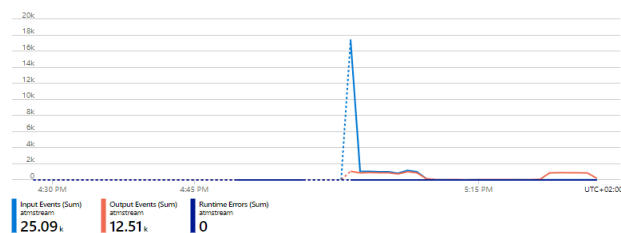
See more

Query

Edit query

```
1 SELECT [Customer].[card_number], count(*), 1 as alert
2 INTO [BlobOutput]
3 FROM [stream]
4 INNER JOIN [Customer]
5 ON [stream].[CardNumber] = [Customer].[card_number]
6 INNER JOIN [ATM]
7 ON [ATM].[atm_code] = [stream].[ATMCode]
8 WHERE [ATM].[area_code] <> [Customer].[area_code]
9 GROUP BY [Customer].[card_number], SlidingWindow(minute, 60)
```

#### Monitoring



#### Resource utilization

