

Azure Stream Analytics Project

On-demand real-time analytics



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BDSMasters

Microsoft Azure



Open, flexible, enterprise-grade cloud computing platform

Microsoft Azure is a cloud computing service created by Microsoft for building, deploying, and managing applications and services through a global network of Microsoft-managed data centers. It provides software as a service, platform as a service and infrastructure as a service and supports many different programming languages, tools and frameworks, including both Microsoft-specific and third-party software and systems.

Microsoft Azure: Azure Stream Analytics



On-demand real-time analytics service to power intelligent action

Key capabilities and benefits

- **Ease of use:** Stream Analytics supports a simple, declarative query model for describing transformations.
- **Scalability:** Stream Analytics is capable of handling high event throughput of up to 1GB/second.
- **Reliability, repeatability and quick recovery:** A managed service in the cloud, Stream Analytics helps prevent data loss and provides business continuity in the event of failures through built-in recovery capabilities.
- **Low cost:** As a cloud service, Stream Analytics is optimized to provide users a very low cost to get going and maintain real-time analytics solutions.
- **Reference data:** Stream Analytics provides users the ability to specify and use reference data.
- **User Defined Functions:** Stream Analytics has integration with Azure Machine Learning to define function calls in the Machine Learning service as part of a Stream Analytics query.
- **Connectivity:** Stream Analytics connects directly to Azure Event Hubs and Azure IoT Hubs for stream ingestion, and the Azure Blob service to ingest historical data.

From theory to practice

Tools

jupyter



ANACONDA®

Power BI

GitHub

Azure Stream Analytics Configuration [1] – Create Namespace

Microsoft Azure Create namespace

Create namespace Event Hubs - PREVIEW

Name: .servicebus.windows.net

Pricing tier: Standard

Subscription: Free Trial

Resource group: Create new (radio button selected) Use existing (radio button unselected)
No resource groups exist

Location: Australia East

Pin to dashboard:

Create Automation options

Notifications

Dismiss: Informational Completed All

€170.00 credit remaining 5:33 PM
Subscription 'Free Trial' has a remaining credit of €170.00

Azure Stream Analytics Configuration [2] – Create Namespace

Microsoft Azure Create namespace > Choose your pricing tier

New

Dashboard

All resources

Resource groups

App Services

Function Apps

SQL databases

Azure Cosmos DB

Virtual machines

Load balancers

Storage accounts

Virtual networks

More services >

Create namespace Event Hubs - PREVIEW

Name: bdsmasters.servicebus.windows.net

Pricing tier: Standard

Subscription: Free Trial

Resource group: Create new (BDSMasters)

Location: West Europe

Pin to dashboard:

Create Automation options

Choose your pricing tier

Browse the available plans and their features - PREVIEW

Basic

1	Consumer group
100	Brokered connections
 \$0.028 per million	Ingress events
 1 day	Message retention

11.00 USD/MONTH/TU (ESTIMATED)

Standard

20	Consumer groups
1000	Brokered connections
 \$0.028 per million	Ingress events
 1 day	Message retention
 Up to 7 days	Additional storage
 Publisher policies	Publisher policies

22.00 USD/MONTH/TU (ESTIMATED)

Select

Azure Stream Analytics Configuration [3] – Create Namespace

Microsoft Azure

Search resources

Dashboard + New New dashboard Edit dashboard Share Fullscreen

All resources ALL SUBSCRIPTIONS

No resources to display Try changing your filters if you don't see what you're looking for. [Learn more](#)

Create resources

Quickstart tutorials

Windows Virtual Machines Provision Windows Server, SQL Server

Linux Virtual Machines Provision Ubuntu, Red Hat, CentOS

App Service Create Web Apps using .NET, Java, Node.js

Functions Process events with a serverless code

SQL Database Managed relational SQL Database

Azure Health MY RESOURCES

Marketplace

Notifications

Dismiss: [Informational](#) [Completed](#) All

✓ Deployments succeeded 5:41 PM Deployment to resource group 'BDSMasters' was successful.

ℹ €170.00 credit remaining 5:33 PM Subscription 'Free Trial' has a remaining credit of €170.00

The screenshot shows the Microsoft Azure dashboard. On the left, a sidebar lists various services: New, Dashboard, All resources, Resource groups, App Services, Function Apps, SQL databases, Azure Cosmos DB, Virtual machines, Load balancers, Storage accounts, Virtual networks, and More services. The main area is titled 'Dashboard' and shows a message 'No resources to display'. It includes a 'Create resources' button and sections for 'Quickstart tutorials' (Windows Virtual Machines, Linux Virtual Machines, App Service, Functions, SQL Database) and 'Azure Health' (MY RESOURCES). A notifications bar at the top right shows two items: 'Deployments succeeded' (5:41 PM) and '€170.00 credit remaining' (5:33 PM). The top right also shows the user's email address: bdsmastersdmst@gmail.com.

Azure Stream Analytics Configuration [4] – Setup an Event Hub

Microsoft Azure

Search resources

Dashboard

New

Dashboard

All resources ALL SUBSCRIPTIONS

bdsmasters Event Hub

Quickstart tutorials

Windows Virtual Machines Provision Windows Server, SQL Server, SharePoint VMs

Linux Virtual Machines Provision Ubuntu, Red Hat, CentOS, SUSE, CoreOS VMs

App Service Create Web Apps using .NET, Java, Node.js, Python, PHP

Functions Process events with a serverless code architecture

SQL Database Managed relational SQL Database as a Service

bdsmasters EVENTHUB

Active

Azure Health MY RESOURCES

Marketplace

More services >

9

Azure Stream Analytics Configuration [5] – Setup an Event Hub

Microsoft Azure bdsmasters

bdsmasters Event Hub - PREVIEW

Search (Ctrl+ /)

+ Event Hub Delete

Essentials ▾

Resource group ([change](#))
BDSMasters

Status
Active

Location
West Europe

Subscription name ([change](#))
Free Trial

Subscription ID
c885008c-b53b-4ac6-a359-9b379088ac92

Connection Strings
[Connection Strings](#)

Throughput Units
1

NAMESPACE CONTENTS
0 EVENT HUBS

PRICING TIER
STANDARD

NAMESPACE STATUS
ACTIVE

THROUGHPUT UNITS
1 UNIT

Metrics

100
90
80
70
60
50

Edit

☰

Overview

Access control (IAM)

Tags

Diagnose and solve problems

SETTINGS

Shared access policies

Scale

Properties

Locks

Automation script

ENTITIES

Event Hubs

Azure Stream Analytics Configuration [6] – Setup an Event Hub

Microsoft Azure bdsmasters > Create Event Hub

Create Event Hub
bdsmasters - PREVIEW

* Name: eventhubbdsmasters

Partition Count: 3

Message Retention: 1

Archive: Off

Time window (minutes): 5

Size window (MB): 300

Create

bdsmastersdmst@gmail.com
BDSMASTERSDMSTGMAIL (DE...)

Azure Stream Analytics Configuration [7] – Setup an Event Hub

Microsoft Azure

Search resources

Dashboard + New Edit dashboard Share Fullscreen

All resources ALL SUBSCRIPTIONS

bdsmasters Event Hub

Quickstart tutorials

Windows Virtual Machines Provision Windows Server, SQL Server

Linux Virtual Machines Provision Ubuntu, Red Hat, CentOS

App Service Create Web Apps using .NET, Java, Node.js

Functions Process events with a serverless code

SQL Database Managed relational SQL Database

Azure Health MY RESOURCES

Marketplace

Notifications Dismiss: Informational Completed All

Event Hub creation 5:45 PM
Successfully created Event Hub eventhubbdsmasters

Deployments succeeded 5:41 PM
Deployment to resource group 'BDSMasters' was successful.

€170.00 credit remaining 5:33 PM
Subscription 'Free Trial' has a remaining credit of €170.00

The screenshot shows the Microsoft Azure dashboard with a search bar at the top. Below the search bar are navigation links: '+ New', 'Edit dashboard', 'Share', 'Fullscreen', and a 'Cloud Shell' icon. A 'Notifications' section on the right lists recent activity: 'Event Hub creation' (5:45 PM) and 'Deployments succeeded' (5:41 PM). The main dashboard area displays 'All resources ALL SUBSCRIPTIONS' under the 'bdsmasters' subscription, which includes an 'Event Hub' section. To the right, there are 'Quickstart tutorials' for 'Windows Virtual Machines', 'Linux Virtual Machines', 'App Service', 'Functions', and 'SQL Database'. At the bottom left, there are links for 'Azure Health MY RESOURCES' and 'Marketplace'. On the far left, a sidebar lists various Azure services: 'Dashboard', 'All resources', 'Resource groups', 'App Services', 'Function Apps', 'SQL databases', 'Azure Cosmos DB', 'Virtual machines', 'Load balancers', 'Storage accounts', 'Virtual networks', and 'More services >'. Each service item has a corresponding icon next to its name.

Azure Stream Analytics Configuration [8] – Create a Send Policy

Microsoft Azure All resources > bdsmasters - Event Hubs

bdsmasters - Event Hubs Event Hub - PREVIEW

Event Hub

NAME	STATUS	MESSAGE RETENTION	PARTITION COUNT
eventhubbdsmasters	Active	1	3

Search (Ctrl+/)

Overview

Access control (IAM)

Tags

Diagnose and solve problems

SETTINGS

Shared access policies

Scale

Properties

Locks

Automation script

ENTITIES

Event Hubs

bdsmastersdmst@gmail.com
BDSMASTERSDMSTGMAIL (DE...)

13

Azure Stream Analytics Configuration [9] – Create a Send Policy

Microsoft Azure < eventhubbdsmasters - Shared access policies > Add new shared access policy

PREVIEW

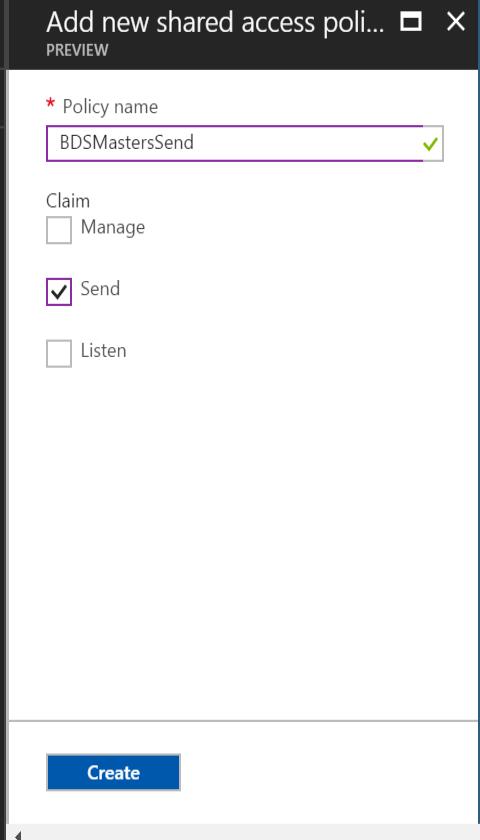
* Policy name
BDSMastersSend ✓

Claim
 Manage

Send

Listen

Create



14

Azure Stream Analytics Configuration [10] – Create a Send Policy

Microsoft Azure bdsmasters - Event Hubs > eventhubbdsmasters - Shared access policies

eventhubbdsmasters - Shared access policies

+ Add

Event Hub SAS key creation
Successfully created Event Hub SAS key BDSMastersSend

6:13 PM

Shared access policies

Search to filter items...

POLICY	CLAIMS
BDSMastersSend	Send

Search (Ctrl+ /)

Overview

Diagnose and solve problems

SETTINGS

- Shared access policies
- Properties
- Locks
- Automation script

ENTITIES

- Consumer groups

SUPPORT + TROUBLESHOOTING

- New support request

The screenshot shows the Azure portal interface for managing Event Hubs. The left sidebar lists various service icons, and the main navigation bar shows 'eventhubbdsmasters - Shared access policies'. On the right, a modal window is open for creating a new policy. The 'POLICY' column contains 'BDSMastersSend' and the 'CLAIMS' column contains 'Send'. A success message at the top right indicates that the 'Event Hub SAS key creation' was successful at 6:13 PM, with the key name 'BDSMastersSend'.

Azure Stream Analytics Configuration [11] – Create a Send Policy

Microsoft Azure bdsmasters - Event Hubs > eventhubbdsmasters - Shared access policies > Policy: BDSMastersSend

PREVIEW

Save changes Discard changes Regen prim key Regen sec key More

Policy name: BDSMastersSend

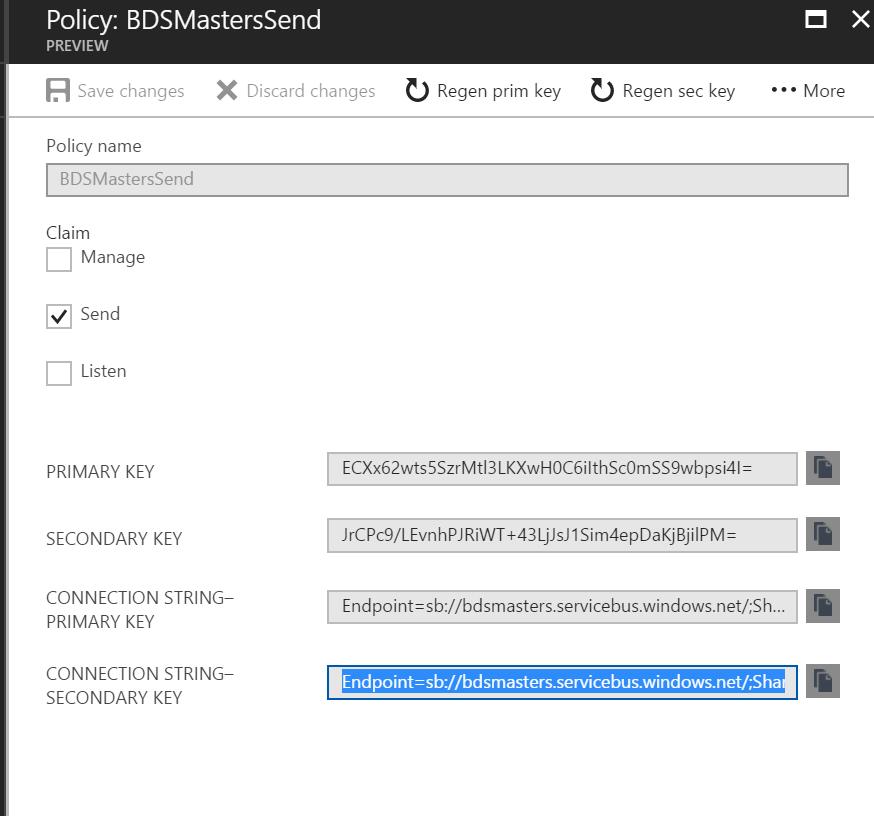
Claim: Manage (unchecked), Send (checked), Listen (unchecked)

PRIMARY KEY: ECXx62wts5SzrMtI3LKXwH0C6ilthSc0mSS9wbpsi4I= (Copy)

SECONDARY KEY: JrCPc9/LEvnhPJRiWT+43LjJsJ1Sim4epDaKjBjiPM= (Copy)

CONNECTION STRING – PRIMARY KEY: Endpoint=sb://bdsmasters.servicebus.windows.net;/Sh... (Copy)

CONNECTION STRING – SECONDARY KEY: Endpoint=sb://bdsmasters.servicebus.windows.net;/Sha... (Copy)



Azure Stream Analytics Configuration [12] – Create a Security Access Signature

Event Hubs - Signature Generator

Hub

Namespace	bdsmasters
Hub Name	eventhubbdsmasters
Publisher	Laptop
Mode	Http

Credentials

Sender Key Name	BDSMastersSend
Sender Key	62wts5SzrMtI3LKXwH0CGilthSc0mSS9wbpsi4l=
Token TTL (minutes)	43200

Signature

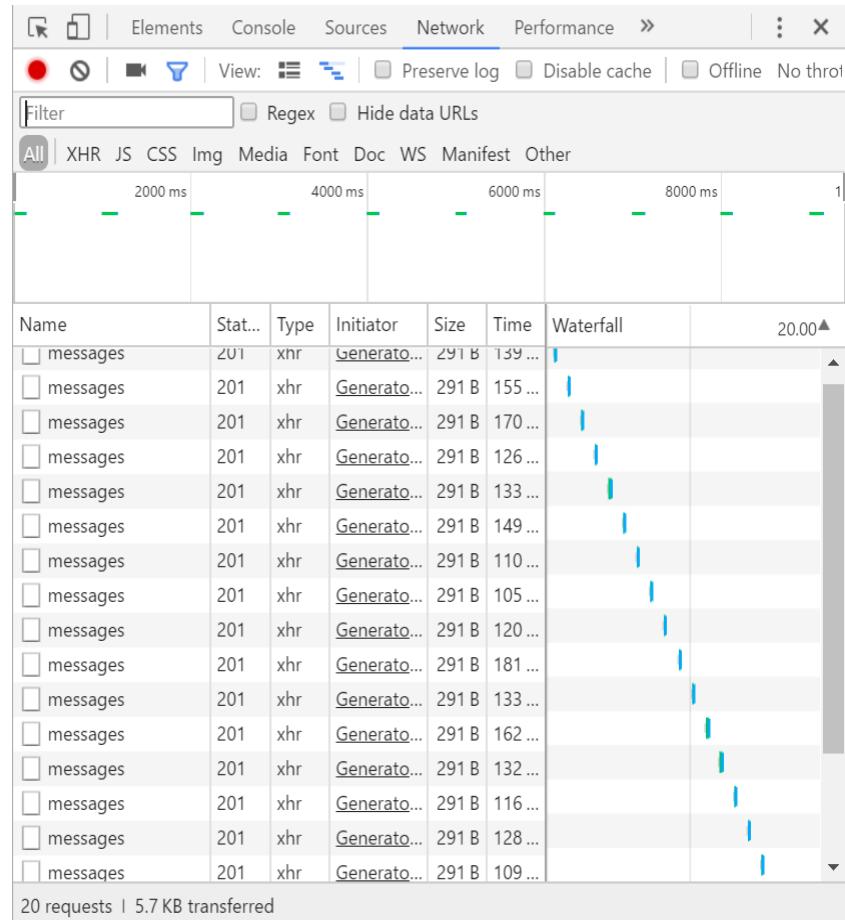
```
SharedAccessSignature sr=https%3a%2f%2fbdsmasters.servicebus.windows.net%2feventhubbdsmasters%2fpublishers%2flaptop%2fmessages&sig=%2bodltpkLnFX32W7zhq2hZ35Gf1rcxtyOKIUfhvpSM0w%3d&se=1497798957&skn=BDSMastersSend
```

Generate

Azure Stream Analytics Configuration [13] – Update the Data Generator

Azure Stream Analytics Configuration [14] – Feed the Event Hub with Data

Send Data Sent: { "ATMCode": 19 , "CardNumber": 5602246755688900 , "Type": 1 , "Amount": 47 }



Azure Stream Analytics Configuration [15] – Create a Listen Policy

Microsoft Azure < eventhubbdsmasters - Shared access policies > Add new shared access policy

BDSMastersSend - PREVIEW

* Policy name
BDSMastersListen ✓

Claim

Manage

Send

Listen

Create

bdsmastersdmst@gmail.com
BDSMASTERSDMSTGMAIL (DE...)

Azure Stream Analytics Configuration [16] – Create a Listen Policy

Microsoft Azure bdsmasters - Event Hubs > eventhubbdsmasters - Shared access policies

eventhubbdsmasters - Shared access policies

+ Add

Event Hub SAS key creation 6:18 PM
Successfully created Event Hub SAS key BDSMastersListen

Shared access policies

POLICY CLAIMS

POLICY	CLAIMS
BDSMastersListen	Listen
BDSMastersSend	Send

Search (Ctrl+ /)

Overview

Diagnose and solve problems

SETTINGS

- Shared access policies
- Properties
- Locks
- Automation script

ENTITIES

- Consumer groups

SUPPORT + TROUBLESHOOTING

- New support request

The screenshot shows the Azure Stream Analytics Configuration interface. On the left, there's a sidebar with various icons for different services like Storage, Blob, and Queue. The main area is titled 'eventhubbdsmasters - Shared access policies'. It shows a table with two rows: 'BDSMastersListen' under 'POLICY' and 'Listen' under 'CLAIMS'. A success message at the top right says 'Event Hub SAS key creation' and 'Successfully created Event Hub SAS key BDSMastersListen' at 6:18 PM. The 'Shared access policies' option in the sidebar is highlighted.

Azure Stream Analytics Configuration [17] – Create a Listen Policy

Microsoft Azure bdsmasters - Event Hubs > eventhubbdsmasters - Shared access policies > Policy: BDSMastersListen

Policy: BDSMastersListen PREVIEW

Save changes Discard changes Regen prim key Regen sec key More

Policy name: BDSMastersListen

Claim:

- Manage
- Send
- Listen

PRIMARY KEY: ZeHoaWZuqhclUeHuagXaiHbfjuqnt2liz6RdDm7N8Gs=

SECONDARY KEY: Y3JFqsYzbM6pO7FLPHWN9xdXVvpujz5a1oAVHYv6UE...

CONNECTION STRING– PRIMARY KEY: Endpoint=sb://bdsmasters.servicebus.windows.net;/Sh...

CONNECTION STRING– SECONDARY KEY: Endpoint=sb://bdsmasters.servicebus.windows.net;/Sh...



bdsmastersdmst@gmail.com
BDSMMASTERSDMSTGMAIL (DE...)

Azure Stream Analytics Configuration [18] – Setup a Storage Account

Microsoft Azure New > Storage > Create storage account

Create storage account

The cost of your storage account depends on the usage and the options you choose below.
[Learn more](#)

* Name .core.windows.net

Deployment model Resource manager Classic

Account kind

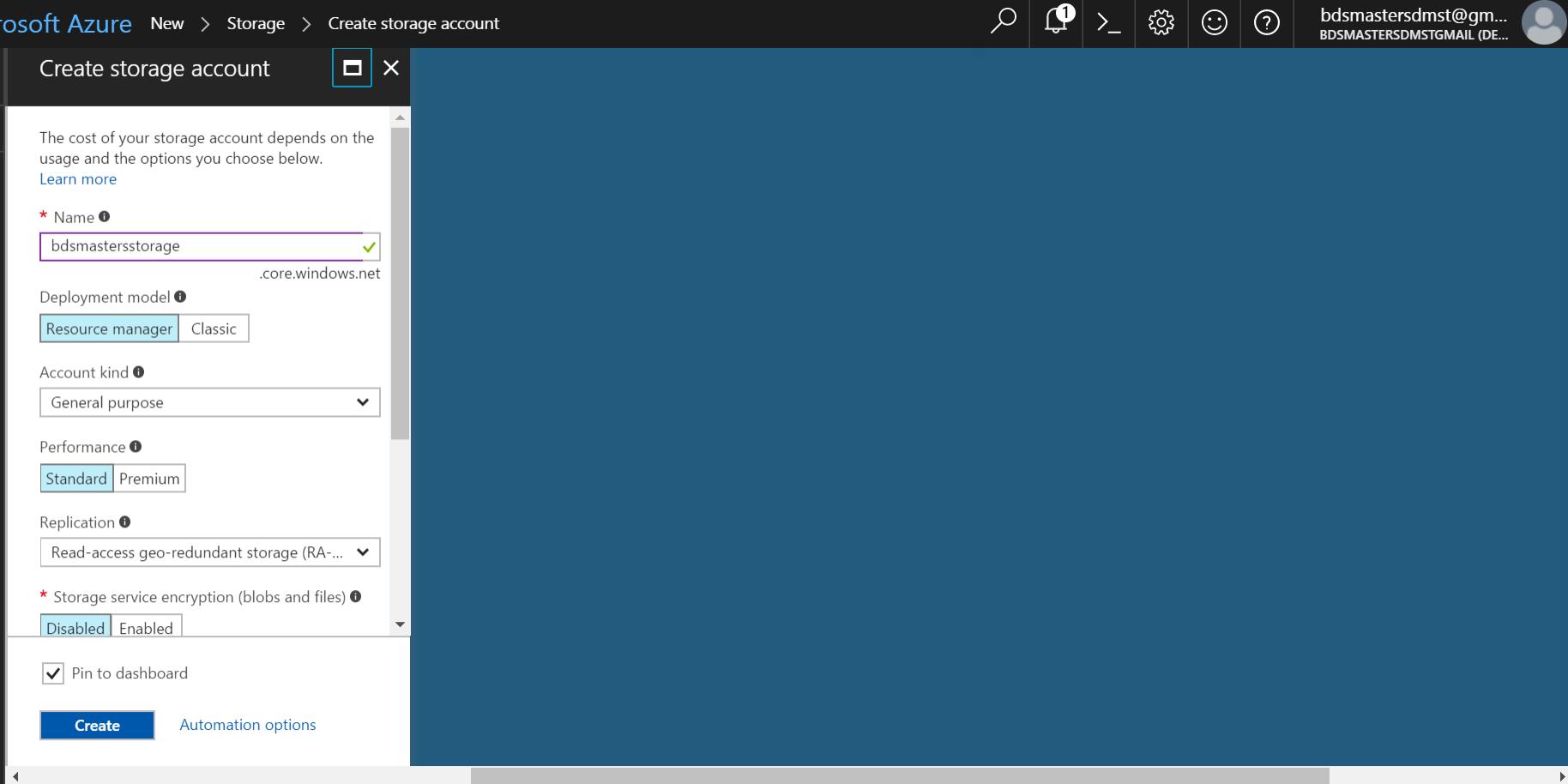
Performance Standard Premium

Replication

* Storage service encryption (blobs and files) Disabled Enabled

Pin to dashboard

Create Automation options



bdsmastersdmst@gmail.com
BDSMASTERSDMSTGMAIL (DE...)

Azure Stream Analytics Configuration [19] – Setup a Storage Account

Microsoft Azure

Search resources

Dashboard

New

Dashboard

All resources ALL SUBSCRIPTIONS

bdsmastersStream Stream Analytics job

bdsmasters Event Hub

bdsmastersstorage Storage account

bdsmasters EVENTHUB Active

bdsmastersstorage Available

bdsmastersStream STREAMING JOB

Azure Health MY RESOURCES

Marketplace

bdsmastersdmst@gmail.com BDSMASTERSDMSTGMAIL (DE...)

The screenshot shows the Microsoft Azure dashboard with a search bar at the top. Below the search bar are various navigation and action buttons. The main area displays a grid of resource cards. One card for 'bdsmastersstorage' is highlighted, showing it is an 'Available' storage account. Another card for 'bdsmastersStream' is shown as a 'STREAMING JOB'. At the bottom left, there's a 'More services' section. On the far right, the user's email address and profile picture are visible.

Azure Stream Analytics Configuration [20] – Import the Reference Data

Microsoft Azure All resources > bdsmastersstorage > Blob service

blob service
bdsmastersstorage

+ Container Refresh

New container

* Name Access type ⓘ
bdsmasterscontainer Private

OK Cancel

c885008c-b53b-4ac6-a359-9b379088ac92

Search containers by prefix

NAME	LAST MODIFIED	ACCESS TYPE	LEASE STATE
You don't have any containers yet. Click '+ Container' to get started.			

Azure Stream Analytics Configuration [21] – Import the Reference Data

Microsoft Azure All resources > bdsmastersstorage > Blob service > bdsmasterscontainer > Upload blob

blobstoragecontainer

bdsmasterscontainer

Container

Upload blob

bdsmastersdmst@gmail.com
BDSMASTERSDMSTGMAIL (DE...)

+

Container Refresh

Essentials

Search containers by prefix

NAME

bdsmasterscontainer ...

Upload Refresh Delete container Properties Access

Location: bdsmasterscontainer

Search blobs by prefix (case-sensitive)

NAME

No blobs found.

Files "Area.json"

Block blob

Block size 4 MB

Upload

The screenshot shows the Microsoft Azure portal interface for managing a Blob service container. The left sidebar lists various Azure services like Storage, Functions, and Logic Apps. The main area is focused on the 'bdsmastersstorage' account, specifically the 'bdsmasterscontainer'. The 'Upload blob' section is active, with a file named 'Area.json' selected for upload. The blob type is set to 'Block blob' and the block size is set to '4 MB'. A large blue 'Upload' button is visible at the bottom of the form.

Azure Stream Analytics Configuration [22] – Import the Reference Data

Microsoft Azure All resources > bdsmastersstorage > Blob service > bdsmasterscontainer > Upload blob

Blob service bdsmastersstorage Container bdsmasterscontainer

Upload blob

Upload Completed for Area.json 6:45 PM

Files 1 990 B | https://bdsmastersstorage.blob.core.windows.net/bdsmasters...

Selected

Location: bdsmasterscontainer

Search blobs by prefix (case-sensitive)

NAME

NAME

Area.json

Block blob

Block size 4 MB

Upload

bdsmastersdmst@gmail.com
BDSMMASTERSDMSTGMAIL (DE...)

The screenshot shows the Microsoft Azure Blob service interface. On the left, there's a sidebar with various icons for other services like Storage, Functions, and Logic Apps. The main area has a breadcrumb navigation path: Microsoft Azure > All resources > bdsmastersstorage > Blob service > bdsmasterscontainer > Upload blob. The current view is for the 'bdsmasterscontainer'. On the right, there's a modal window titled 'Upload blob' showing the status of an upload for 'Area.json'. The file is a 'Block blob' with a 'Block size' of '4 MB'. The upload was completed at '6:45 PM'. The file size is listed as '990 B' and its URL is provided as 'https://bdsmastersstorage.blob.core.windows.net/bdsmasters...'. Below the modal, there are sections for 'Location' (set to 'bdsmasterscontainer') and 'NAME' (set to 'Area.json').

Azure Stream Analytics Configuration [23] – Setup a Stream Analytics Job

Microsoft Azure New > Internet of Things > New Stream Analytics Job

New Stream Analytics Job

* Job name: bdsmastersStream

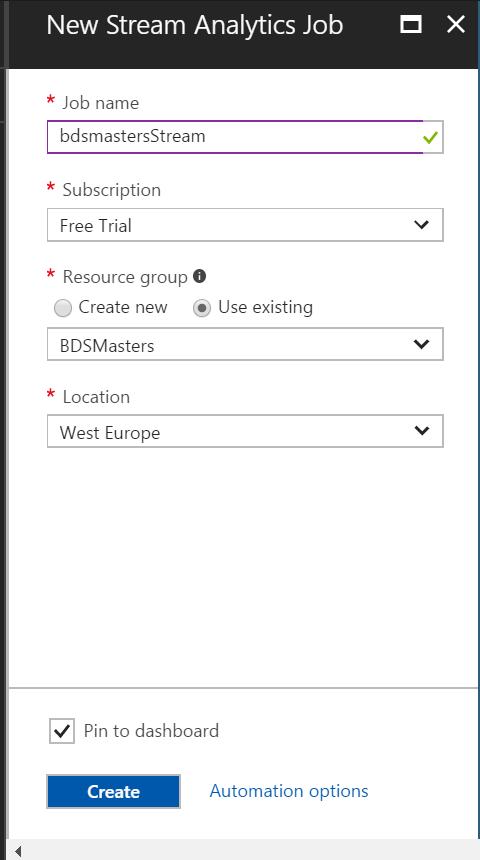
* Subscription: Free Trial

* Resource group: Create new Use existing: BDSMasters

* Location: West Europe

Pin to dashboard

Create Automation options



bdsmastersdmst@gmail.com
BDSMMASTERSDMSTGMAIL (DE...)

Azure Stream Analytics Configuration [24] – Setup a Stream Analytics Job

The screenshot shows the Microsoft Azure dashboard with the following details:

- Left sidebar:** Lists various Azure services: New, Dashboard, All resources, Resource groups, App Services, Function Apps, SQL databases, Azure Cosmos DB, Virtual machines, Load balancers, Storage accounts, Virtual networks, and More services >.
- Top bar:** Includes a search bar labeled "Search resources", a notifications icon, and user information for "bdsmastersdmst@gmail.com" and "BDSMASTERSDMSTGMAIL (DE)".
- Dashboard area:** Shows "All resources ALL SUBSCRIPTIONS" and a list of resources:
 - bdsmastersStream Stream Analytics job
 - bdsmasters Event Hub
- Notifications panel:** Displays two items:
 - Deployments succeeded** (6:25 PM): Deployment to resource group 'BDSMasters' was successful.
 - €170.00 credit remaining** (6:19 PM): Subscription 'Free Trial' has a remaining credit of €170.00.
- Bottom navigation:** Includes links for Azure Health, My Resources, and Marketplace.

Azure Stream Analytics Configuration [25] – Setup a Stream Analytics Job

Microsoft Azure bdsmastersStream

Search (Ctrl+ /)

Start Stop Delete

Created

Resource group (change)
BDSMasters

Status
Created
Location
West Europe

Subscription name (change)
Free Trial

Subscription ID
c885008c-b53b-4ac6-a359-9b379088ac92

Send feedback
[UserVoice](#)

Created
Friday, May 19, 2017, 6:24:40 PM

Started
-

Last output
-

Job Topology

Inputs	Query	Outputs
0	<>	0
No results.		No results.

Inputs Functions Query Outputs

bdsmastersdmst@gmail.com
BDSMMASTERSDMSTGMAIL (DE...)

Azure Stream Analytics Configuration [26] – Setup a Stream Analytics Job

Microsoft Azure bdsmastersStream > Inputs > New input

Inputs
bdsmastersStream

+ Add

NAME	SOURCE TYPE	SOURCE
Empty		

New input

* Input alias
arearef

* Source Type ⓘ
Reference data

* Import option
Use blob storage from current subscription

Storage account
bdsmastersstorage

Storage account key

Container
bdsmasterscontainer

Path pattern ⓘ
Area.json

Date format
yyyy-MM-dd

Create

The screenshot shows the Azure Stream Analytics configuration interface. On the left, there's a sidebar with various icons for different services like Blob Storage, Queue Storage, and Event Grid. The main area shows the 'Inputs' section for a stream named 'bdsmastersStream'. A 'New input' dialog is open, prompting for an 'Input alias' (set to 'arearef'), 'Source Type' (set to 'Reference data'), and 'Import option' (set to 'Use blob storage from current subscription'). It also requires 'Storage account' ('bdsmastersstorage'), 'Storage account key' (redacted), 'Container' ('bdsmasterscontainer'), and 'Path pattern' ('Area.json'). At the bottom of the dialog is a 'Create' button.

Azure Stream Analytics Configuration [27] – Setup a Stream Analytics Job

The screenshot shows the Microsoft Azure Stream Analytics configuration interface. On the left, there's a sidebar with various icons for different services like Blob Storage, Queue Storage, and Event Grid. The main area is titled "Inputs" under the stream "bdsmastersStream". It lists one input named "arearef" which is a "Reference" type source from "Blob storage". A "..." button is available for more options. To the right, a notifications panel displays three messages: a successful connection test for "arearef", the addition of the input to the job, and a credit status update.

Microsoft Azure bdsmastersStream > Inputs

Inputs
bdsmastersStream

+ Add

NAME	SOURCE TYPE	SOURCE	...
arearef	Reference	Blob storage	...

Notifications

Dismiss: [Informational](#) [Completed](#) [All](#)

i Successful connection test 6:48 PM
Connection to input 'arearef' succeeded.

i Added input 6:48 PM
Added input 'arearef' to Stream Analytics Job 'bdsmastersStream'.

i €170.00 credit remaining 6:46 PM
Subscription 'Free Trial' has a remaining credit of €170.00

Azure Stream Analytics Configuration [28] – Setup a Stream Analytics Job

Microsoft Azure bdsmastersStream > Inputs

Inputs
bdsmastersStream

+ Add

Inputs can't be edited while a job is running. You can stop the job to add or edit inputs.

NAME	SOURCE TYPE	SOURCE	...
areaRef	Reference	Blob storage	...
atmRef	Reference	Blob storage	...
BDSMastersInput	Stream	Event hub	...
customerRef	Reference	Blob storage	...

Azure Stream Analytics Configuration [29] – Setup a Stream Analytics Job

Microsoft Azure bdsmastersStream > Outputs > New output

Outputs
bdsmastersStream

+ Add

NAME	SINK
Empty	

New output

* Output alias
BDSMastersOutput

* Sink ⓘ
Blob storage

* Import option
Use blob storage from current subscription

Storage account
bdsmastersstorage

Storage account key

Container
bdsmasterscontainer

Path pattern ⓘ
/output/

Date format
yyyy-MM-dd HH:mm:ss

Create

The screenshot shows the Microsoft Azure Stream Analytics configuration interface. On the left, there's a sidebar with various icons for different services like Storage, Functions, and Logic Apps. The main area shows the 'Outputs' section for a stream named 'bdsmastersStream'. A 'New output' dialog is open, prompting for an 'Output alias' (set to 'BDSMastersOutput'), a 'Sink' (set to 'Blob storage'), and an 'Import option' (set to 'Use blob storage from current subscription'). It also asks for a 'Storage account' ('bdsmastersstorage'), a 'Storage account key' (redacted), a 'Container' ('bdsmasterscontainer'), a 'Path pattern' ('/output/'), and a 'Date format' ('yyyy-MM-dd HH:mm:ss'). At the bottom of the dialog is a 'Create' button.

Azure Stream Analytics Configuration [30] – Setup a Stream Analytics Job

Microsoft Azure bdsmastersStream > Outputs

Outputs
bdsmastersStream

+ Add

NAME	SINK	...
BDSMastersOutput	Blob storage	...

Notifications

Dismiss: Informational Completed All

Informational

- Successful connection test* 6:52 PM
Connection to output 'BDSMastersOutput' succeeded.
- Added output* 6:52 PM
Added output 'BDSMastersOutput' to Stream Analytics Job 'bdsmastersStream'.
- Successful connection test* 6:48 PM
Connection to input 'arearef' succeeded.
- Added input* 6:48 PM
Added input 'arearef' to Stream Analytics Job 'bdsmastersStream'.
- €170.00 credit remaining* 6:46 PM
Subscription 'Free Trial' has a remaining credit of €170.00

Azure Stream Analytics Configuration [31] – Setup a Stream Analytics Job

Microsoft Azure bdsmastersStream

bdsmastersStream Stream Analytics job

Search (Ctrl+ /)

Start Stop Delete

Stopped

Resource group (change)
BDSMasters

Status
Stopped

Location
West Europe

Subscription name (change)
Free Trial

Subscription ID
c885008c-b53b-4ac6-a359-9b379088ac92

Send feedback
[UserVoice](#)

Created
Friday, May 19, 2017, 6:56:50 PM

Started
Sunday, May 21, 2017, 5:40:28 PM

Last output
Sunday, May 21, 2017, 6:01:09 PM

Job Topology

Inputs	Query	Outputs
4 ↗	<>	2 ↘
areaRef		BDSMastersOutput
atmRef		BDSMastersPowerBI
See more		

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

SETTINGS

Locks

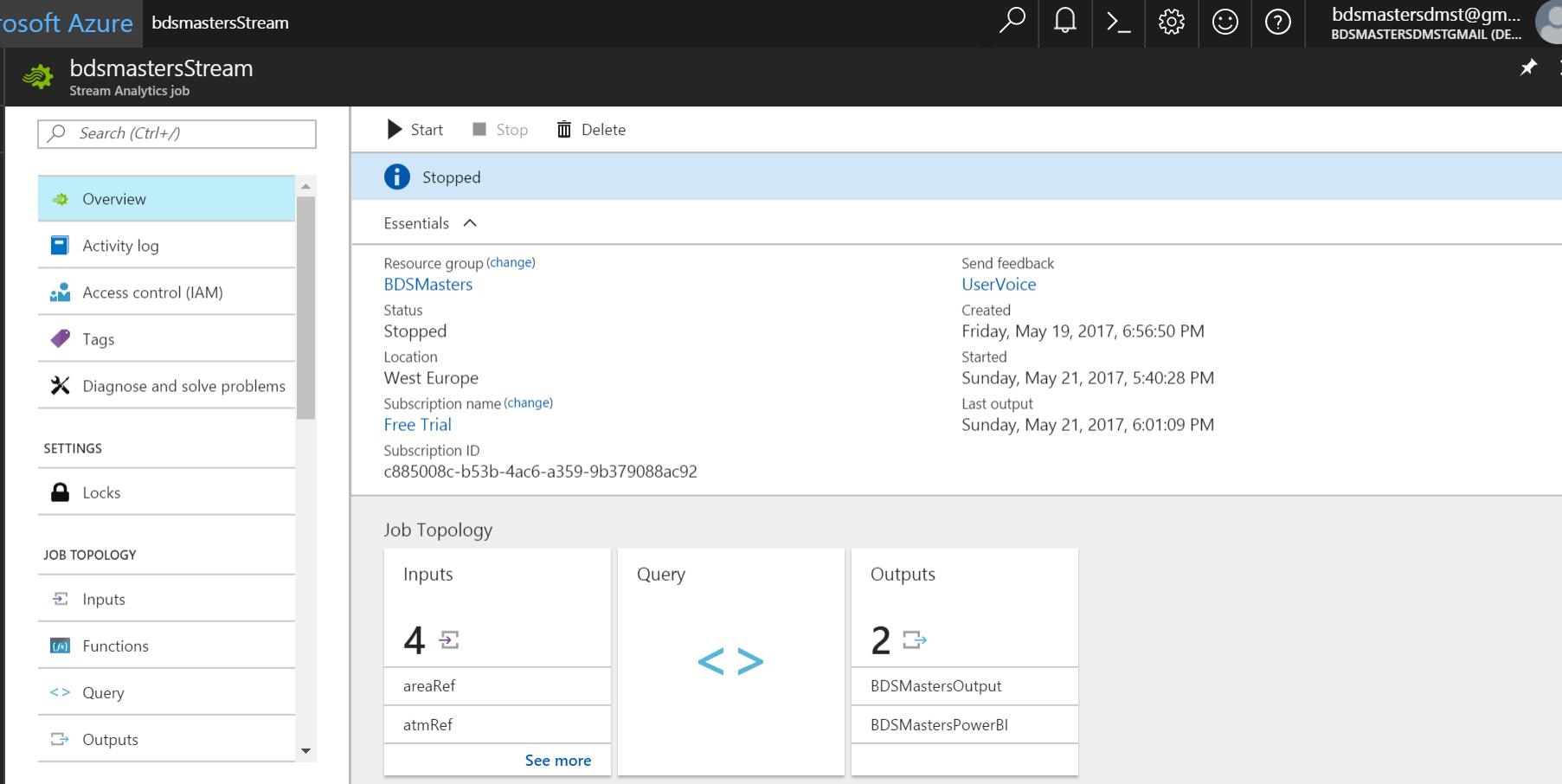
JOB TOPOLOGY

Inputs

Functions

Query

Outputs



Azure Stream Analytics Configuration [32] – Run a Stream Analytics Job

Microsoft Azure bdsmastersStream > bdsmastersStream

bdsmastersStream Query

Save Discard Test

Inputs (4)

- areaRef
- atmRef
- BDSMastersInput
- customerRef

Outputs (2)

- BDSMastersOutput
- BDSMastersPowerBI

Need help with your query? Check out some of the most common Stream Analytics query patterns [here](#).

```
1 SELECT
2     CAST([atmRef].[area_code] AS BIGINT) AS AtmAreaCode,
3     CAST([customerRef].[area_code] AS BIGINT) AS CustomerAreaCode,
4     COUNT (*),
5     System.Timestamp AS Time
6 INTO
7     [BDSMastersPowerBI]
8 FROM
9     BDSMastersInput
10 INNER JOIN [customerRef]
11     ON CAST([customerRef].[card_number] AS BIGINT) = CAST([BDSMastersInput].[CardNumber] AS BIGINT)
12 INNER JOIN [atmRef]
13     ON CAST([atmRef].[atm_code] AS BIGINT) = CAST([BDSMastersInput].[ATMCode] AS BIGINT)
14 WHERE CAST([atmRef].[area_code] AS BIGINT) != CAST([customerRef].[area_code] AS BIGINT)
15 GROUP BY CAST([atmRef].[area_code] AS BIGINT), CAST([customerRef].[area_code] AS BIGINT), SlidingWindow(h
```

Your query could be put in logs that are in a potentially different geography.
Missing some language constructs? [Let us know!](#) (Powered by [UserVoice](#) - [Privacy Policy](#))

Azure Stream Analytics Configuration [33] – Run a Stream Analytics Job

The screenshot shows the Microsoft Azure Stream Analytics configuration interface. The top navigation bar includes 'Microsoft Azure', the workspace name 'bdsmastersStream', and the path 'Start job'. On the right side of the header are icons for search, notifications, and account management, along with the email address 'bdsmastersdmst@gmail.com' and the text 'BDSMASTERSDMSTGMAIL (DE...)'.

The main window title is 'Start job' under 'bdsmastersStream'. It features a 'Job output start time' dropdown with three options: 'Now' (which is selected), 'Custom', and 'When last stopped'. At the bottom left is a large blue 'Start' button.

The left sidebar contains a vertical list of service icons, including:

- Cloud icon
- Table icon
- Graph icon
- Lightbulb icon
- SQL Database icon
- Global icon
- Virtual Machine icon
- Map icon
- File icon
- Cloud icon

Azure Stream Analytics Configuration [34] – Run a Stream Analytics Job

Microsoft Azure bdsmastersStream

bdsmastersStream Stream Analytics job

Start Stop Delete

Starting

Resource group (change) **BDSMasters**
Status Starting
Location West Europe
Subscription name (change) **Free Trial**
Subscription ID c885008c-b53b-4ac6-a359-9b379088ac92

Send feedback [UserVoice](#)
Created Friday, May 19, 2017, 6:56:50 PM
Started Friday, May 26, 2017, 5:45:10 PM
Last output Sunday, May 21, 2017, 6:01:09 PM

Job Topology

Inputs	Query	Outputs
4 ↗	<>	2 ↘
areaRef		BDSMastersOutput
atmRef		BDSMastersPowerBI
See more		

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

Locks

Inputs Functions Query Outputs

Azure Stream Analytics Configuration [35] – Run a Stream Analytics Job

Microsoft Azure bdsmastersStream

bdsmastersStream Stream Analytics job

Search (Ctrl+ /)

Start Stop Delete

Running

Essentials

Resource group (change) **BDSMasters**
Status Running
Location West Europe
Subscription name (change) **Free Trial**
Subscription ID c885008c-b53b-4ac6-a359-9b379088ac92

Send feedback UserVoice
Created Friday, May 11
Started Friday, May 11
Last output Sunday, May 13

Job Topology

Inputs	Query	Outputs
4 ↗	<>	2 ↘
areaRef		BDSMastersOutput
atmRef		BDSMastersPowerBI
See more		

Notifications

Dismiss: Informational Completed All

Streaming Job started successfully. 5:46 PM
Started Streaming Job 'bdsmastersStream' successfully.

1 new update 5:41 PM
The following updates are now available: DocumentDB customers, welcome to Azure Cosmos DB

€165.52 credit remaining 5:41 PM
Subscription 'Free Trial' has a remaining credit of €165.52

40

From **software configuration** to **coding**

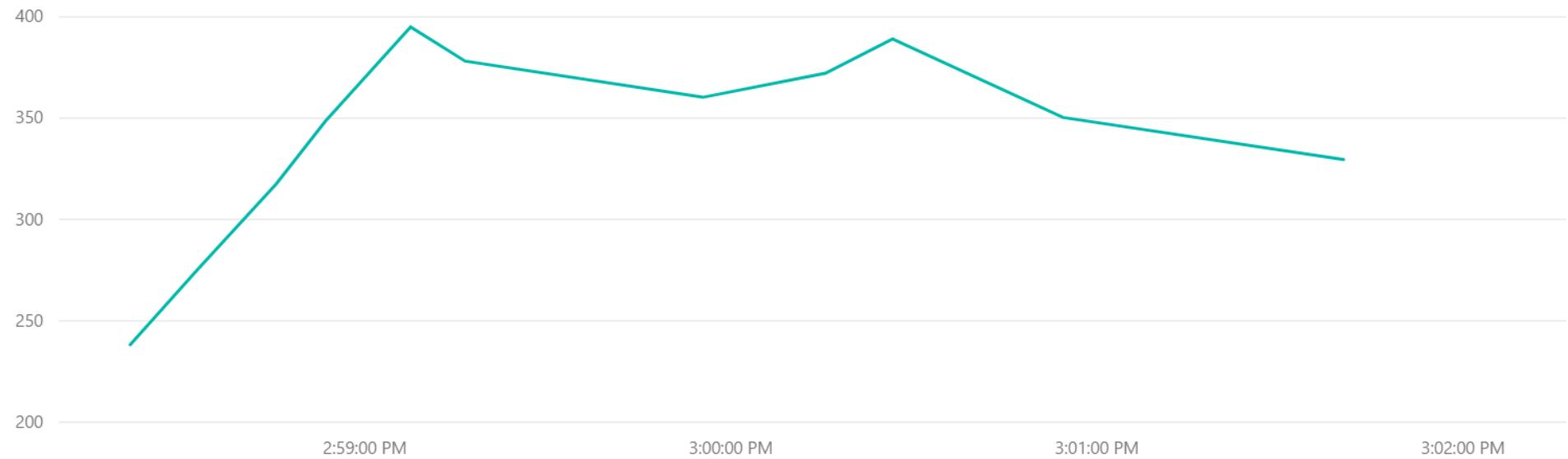
Queries' Execution [1]

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).

```
SELECT
    SUM(CAST([BDSMastersInput].[Amount] AS BIGINT)) AS TotalAmount,
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
WHERE CAST([BDSMastersInput].[Type] AS BIGINT) = 0 AND
    CAST([BDSMastersInput].[ATMCode] AS BIGINT) = 21
GROUP BY SlidingWindow(minute, 10)
```

```
[  
  {  
    "totalamount": 376,  
    "time": "2017-05-21T10:24:23.9850000Z"  
  },  
  {  
    "totalamount": 392,  
    "time": "2017-05-21T10:24:30.0030000Z"  
  },  
  {  
    "totalamount": 382,  
    "time": "2017-05-21T10:24:57.7490000Z"  
  },  
  {  
    "totalamount": 422,  
    "time": "2017-05-21T10:26:04.0340000Z"  
  },  
  {  
    "totalamount": 398,  
    "time": "2017-05-21T10:26:05.7910000Z"  
  }  
]
```

Queries' Execution [2] – Query 1



Queries' Execution [3]

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).

```
SELECT
    SUM(CAST([BDSMastersInput].[Amount] AS BIGINT)) AS TotalAmount,
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
WHERE CAST([BDSMastersInput].[Type] AS BIGINT) = 1 AND
      CAST([BDSMastersInput].[ATMCode] AS BIGINT) = 21
GROUP BY TumblingWindow(hour, 1)
```

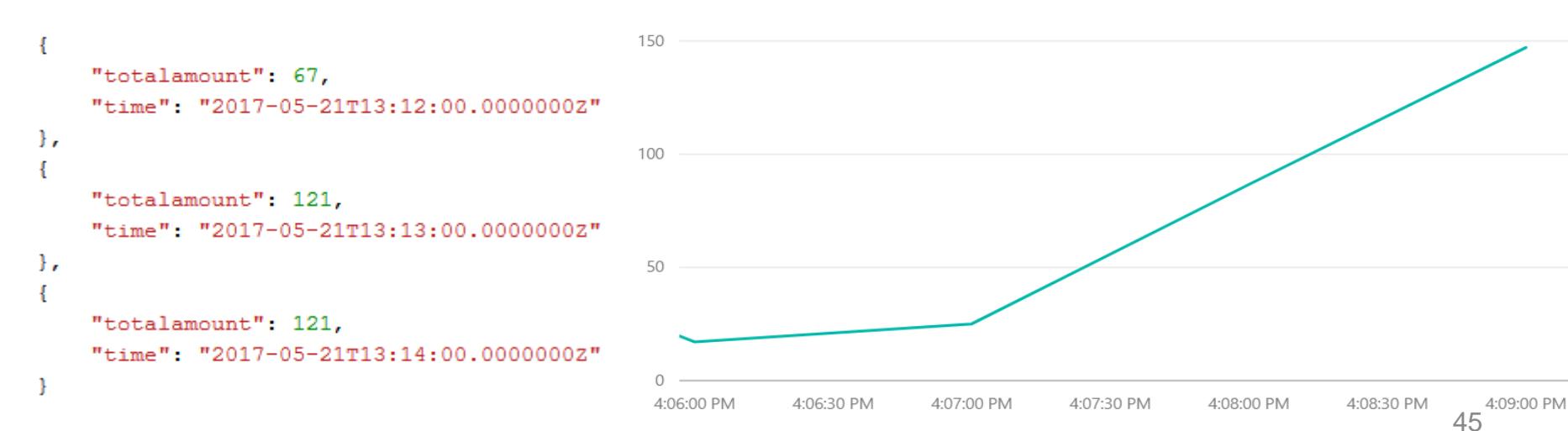
```
[{"totalamount": 128, "time": "2017-05-21T12:51:00.0000000Z"}, {"totalamount": 132, "time": "2017-05-21T12:54:00.0000000Z"}, {"totalamount": 110, "time": "2017-05-21T12:57:00.0000000Z"}, {"totalamount": 139, "time": "2017-05-21T1:00:00.0000000Z"}]
```



Queries' Execution [4]

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).

```
SELECT
    SUM(CAST([BDSMastersInput].[Amount] AS BIGINT)) AS TotalAmount,
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
WHERE CAST([BDSMastersInput].[Type] AS BIGINT) = 1 AND
    CAST([BDSMastersInput].[ATMCode] AS BIGINT) = 21
GROUP BY HoppingWindow(minute, 60, 30)
```



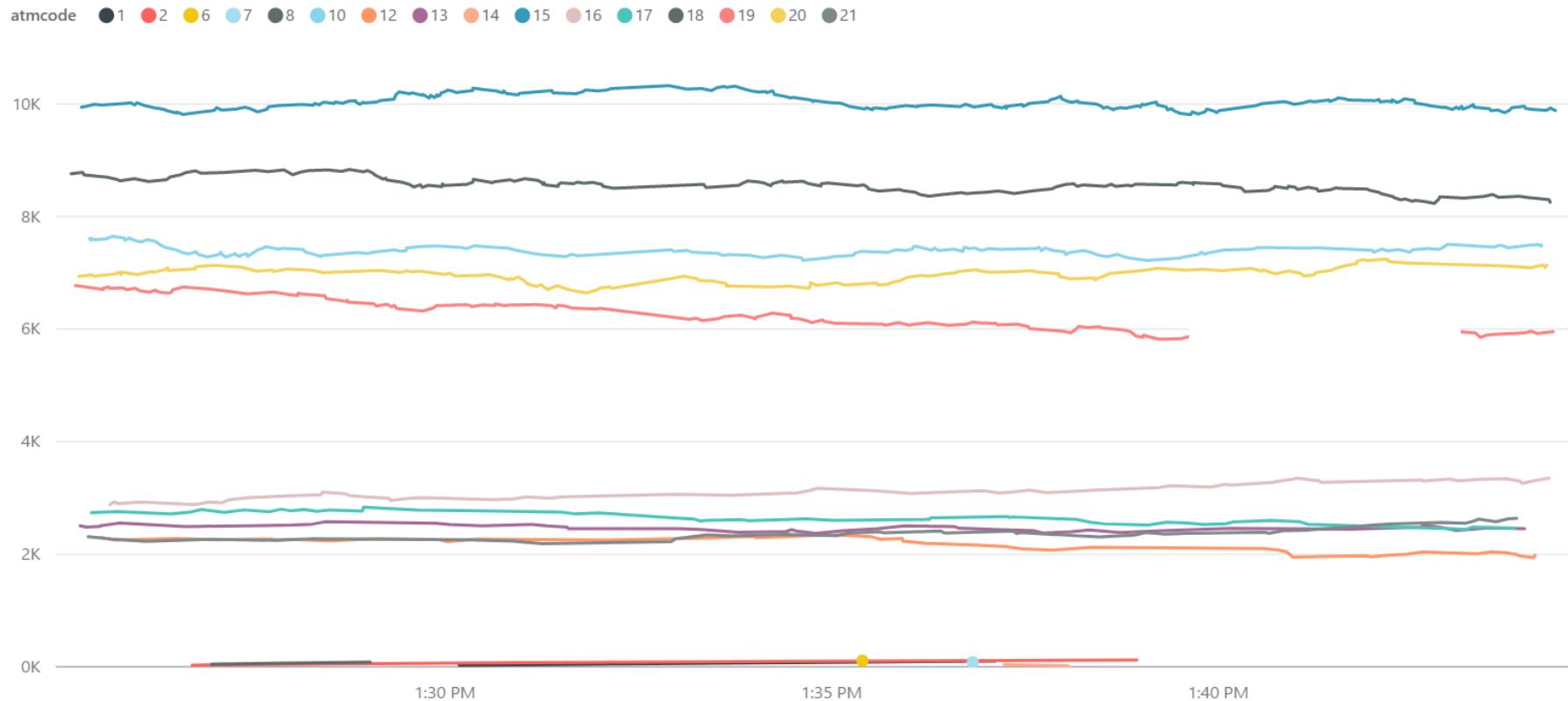
Queries' Execution [5]

Query 4: Show the total 'Amount' of 'Type = 1' transactions per 'ATM Code' of the last one hour (use a sliding window).

```
SELECT
    CAST([BDSMastersInput].[ATMCode] AS BIGINT) AS AtmCode,
    SUM(CAST([BDSMastersInput].[Amount] AS BIGINT)) AS TotalAmount,
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
WHERE CAST([BDSMastersInput].[Type] AS BIGINT) = 1
GROUP BY CAST([BDSMastersInput].[ATMCode] AS BIGINT), SlidingWindow(hour, 1)
```

```
[{"atmcode": 19, "totalamount": 76, "time": "2017-05-21T12:01:01.0010000Z"}, {"atmcode": 15, "totalamount": 143, "time": "2017-05-21T12:01:01.0010000Z"}, {"atmcode": 12, "totalamount": 65, "time": "2017-05-21T12:01:01.0010000Z"}, {"atmcode": 18, "totalamount": 235, "time": "2017-05-21T12:01:01.0010000Z"}, {"atmcode": 16, "totalamount": 21, "time": "2017-05-21T12:01:01.0010000Z"}]
```

Queries' Execution [6] – Query 4



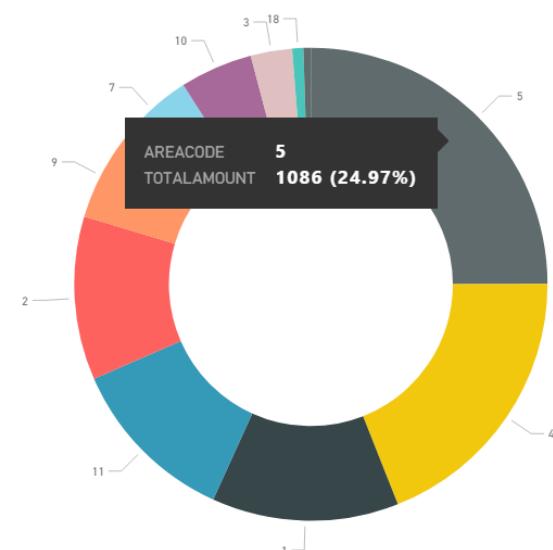
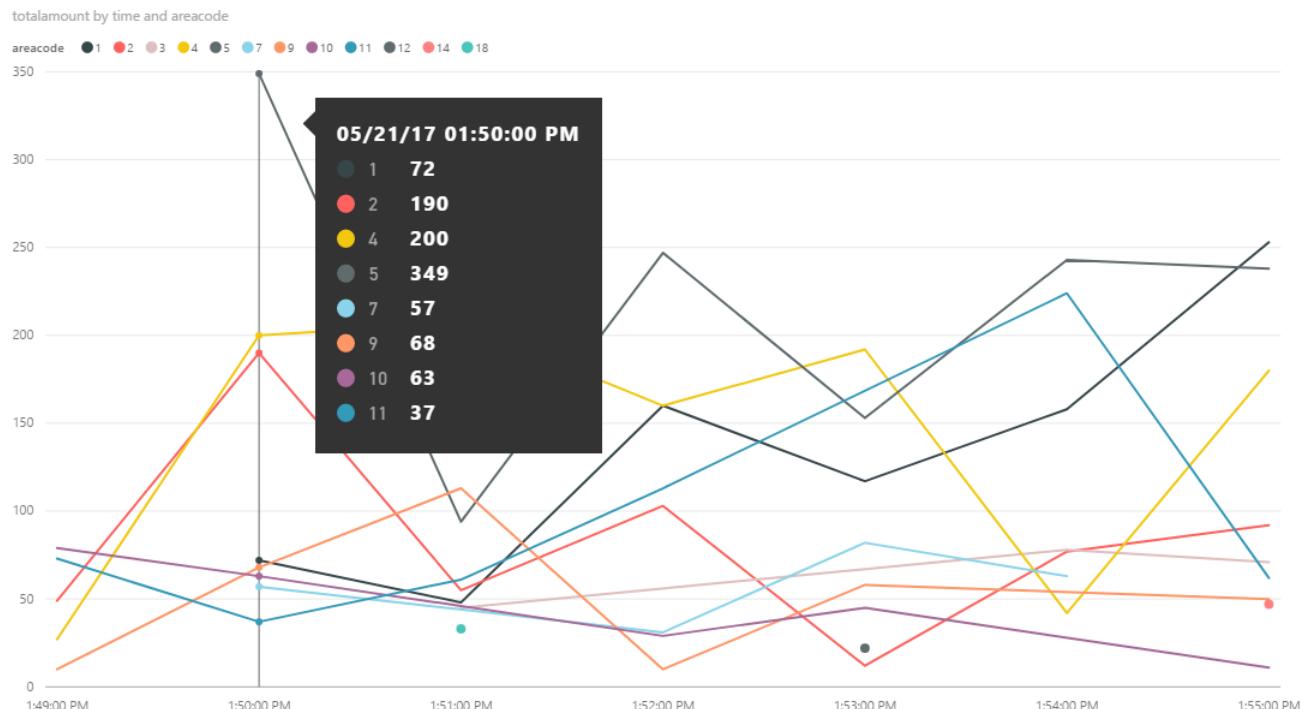
Queries' Execution [7]

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).

```
SELECT
    CAST([atmRef].[area_code] AS BIGINT) AS AreaCode,
    SUM(CAST([BDSMastersInput].[Amount] AS BIGINT)) AS TotalAmount,
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
INNER JOIN [atmRef]
    ON CAST([atmRef].[atm_code] AS BIGINT) = CAST([BDSMastersInput].[atmCode] AS BIGINT)
WHERE CAST([BDSMastersInput].[Type] AS BIGINT) = 1
GROUP BY CAST([atmRef].[area_code] AS BIGINT), TumblingWindow(hour, 1)
```

```
[  
  {  
    "areacode": 2,  
    "totalamount": 76,  
    "time": "2017-05-21T13:00:00.0000000Z"  
  },  
  {  
    "areacode": 4,  
    "totalamount": 235,  
    "time": "2017-05-21T13:00:00.0000000Z"  
  },  
  {  
    "areacode": 9,  
    "totalamount": 65,  
    "time": "2017-05-21T13:00:00.0000000Z"  
  },  
  {  
    "areacode": 11,  
    "totalamount": 112,  
    "time": "2017-05-21T13:00:00.0000000Z"  
  },  
  {  
    "areacode": 5,  
    "totalamount": 143,  
    "time": "2017-05-21T13:00:00.0000000Z"  
}
```

Queries' Execution [8] – Query 5



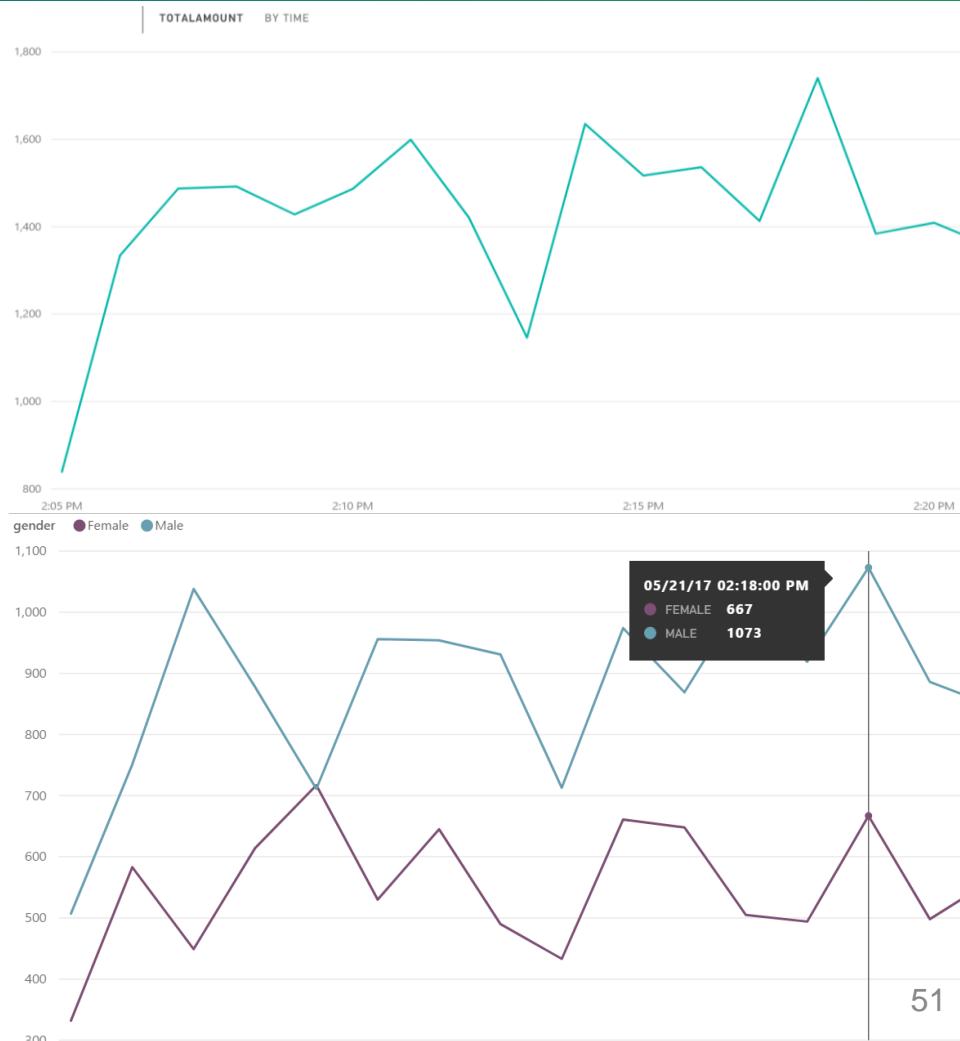
Queries' Execution [9]

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).

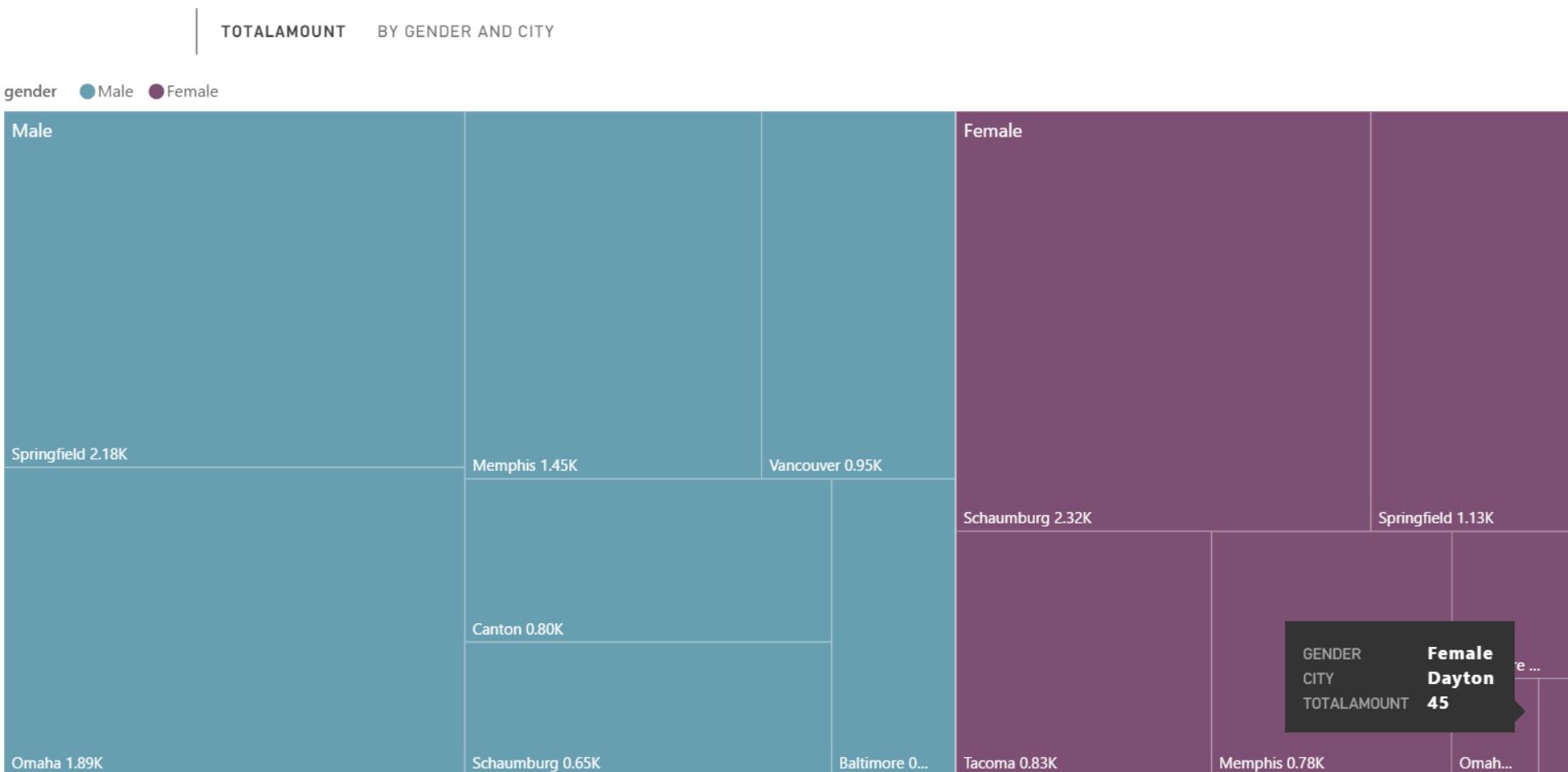
```
SELECT
    [areaRef].[area_city] AS City,
    [customerRef].[gender] AS Gender,
    SUM(CAST([BDSMastersInput].[Amount] AS BIGINT)) AS TotalAmount,
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
INNER JOIN [customerRef]
    ON CAST([customerRef].[card_number] AS BIGINT) = CAST([BDSMastersInput].[CardNumber] AS BIGINT)
INNER JOIN [atmRef]
    ON CAST([atmRef].[atm_code] AS BIGINT) = CAST([BDSMastersInput].[ATMCode] AS BIGINT)
INNER JOIN [areaRef]
    ON CAST([areaRef].[area_code] AS BIGINT) = CAST([atmRef].[area_code] AS BIGINT)
GROUP BY [areaRef].[area_city], [customerRef].[gender], TumblingWindow(hour, 1)
```

Queries' Execution [10] – Query 6

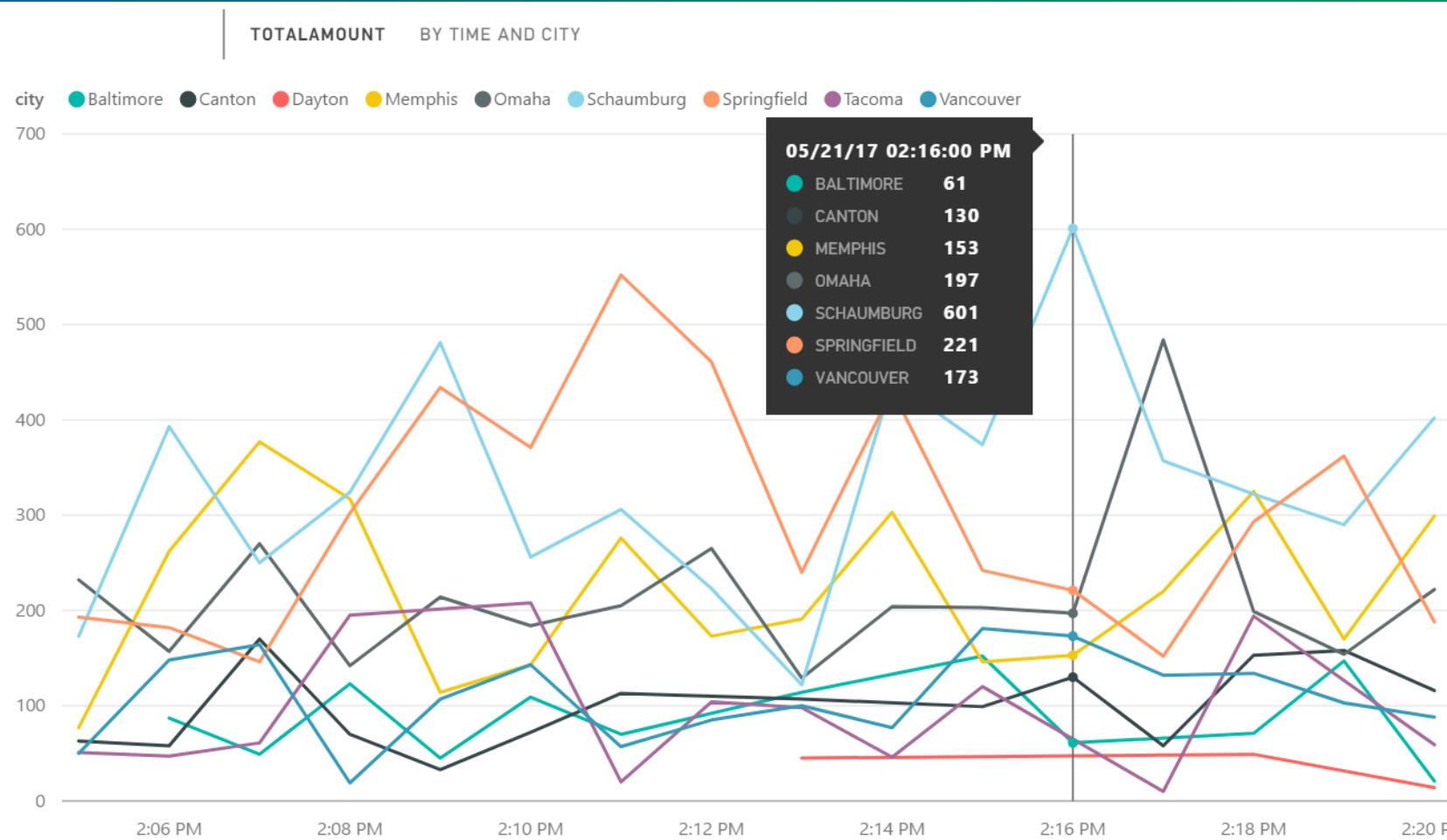
```
[  
  {  
    "city": "Springfield",  
    "gender": "Male",  
    "totalamount": 297,  
    "time": "2017-05-21T13:00:00.0000000Z"  
  },  
  {  
    "city": "Baltimore",  
    "gender": "Male",  
    "totalamount": 19,  
    "time": "2017-05-21T13:00:00.0000000Z"  
  },  
  {  
    "city": "Omaha",  
    "gender": "Male",  
    "totalamount": 245,  
    "time": "2017-05-21T13:00:00.0000000Z"  
  }  
]
```



Queries' Execution [11] – Query 6



Queries' Execution [12] – Query 6



Queries' Execution [13]

Query 7: Alert (SELECT '1') if a Customer has performed two transactions of 'Type = 1' in a window of an hour (use a sliding window).

```
SELECT
    [customerRef].[first_name] AS Name,
    [customerRef].[last_name] AS Surname,
    CAST([BDSMastersInput].[CardNumber] AS BIGINT) AS CardNo,
    COUNT(*) AS Transactions,
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
INNER JOIN [customerRef]
    ON CAST([customerRef].[card_number] AS BIGINT) = CAST([BDSMastersInput].[CardNumber] AS BIGINT)
WHERE CAST([BDSMastersInput].[Type] AS BIGINT) = 1
GROUP BY [customerRef].[first_name], [customerRef].[last_name], CAST([BDSMastersInput].[CardNumber] AS BIGINT), SlidingWindow(hour, 1)
HAVING Transactions = 2
```

Queries' Execution [14] – Query 7

```
[  
  {  
    "name": "Angela",  
    "surname": "Moreno",  
    "cardno": 3534633361736454,  
    "transactions": 2,  
    "time": "2017-05-21T12:01:01.0010000Z"  
  },  
  {  
    "name": "Gerald",  
    "surname": "Young",  
    "cardno": 50384191807294800,  
    "transactions": 2,  
    "time": "2017-05-21T12:01:01.0010000Z"  
  },  
  {  
    "name": "Richard",  
    "surname": "Russell",  
    "cardno": 5200253312538103,  
    "transactions": 2,  
    "time": "2017-05-21T12:01:01.0010000Z"  
  },  
  {  
    "name": "Bruce",  
    "surname": "Morrison",  
    "cardno": 5602246755688900,  
    "transactions": 2,  
    "time": "2017-05-21T12:01:01.0010000Z"  
  }]  
]
```

Queries' Execution [15]

Query 8: Alert (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).

```
SELECT
    CAST([atmRef].[area_code] AS BIGINT) AS AtmAreaCode,
    CAST([customerRef].[area_code] AS BIGINT) AS CustomerAreaCode,
    COUNT (*),
    System.Timestamp AS Time
INTO
    [BDSMastersOutput]
FROM
    BDSMastersInput
    INNER JOIN [customerRef]
        ON CAST([customerRef].[card_number] AS BIGINT) = CAST([BDSMastersInput].[CardNumber] AS BIGINT)
    INNER JOIN [atmRef]
        ON CAST([atmRef].[atm_code] AS BIGINT) = CAST([BDSMastersInput].[ATMCode] AS BIGINT)
WHERE CAST([atmRef].[area_code] AS BIGINT) != CAST([customerRef].[area_code] AS BIGINT)
GROUP BY CAST([atmRef].[area_code] AS BIGINT), CAST([customerRef].[area_code] AS BIGINT), SlidingWindow(hour, 1)
```

Queries' Execution [16] – Query 8

```
[  
  {  
    "atmareaocode": 10,  
    "customerareacode": 1,  
    "count": 1,  
    "time": "1970-01-01T12:01:01.0010000Z"  
  },  
  {  
    "atmareaocode": 4,  
    "customerareacode": 2,  
    "count": 11,  
    "time": "1970-01-01T12:01:01.0010000Z"  
  },  
  {  
    "atmareaocode": 3,  
    "customerareacode": 4,  
    "count": 1,  
    "time": "1970-01-01T12:01:01.0010000Z"  
  },  
  {  
    "atmareaocode": 9,  
    "customerareacode": 10,  
    "count": 3,  
    "time": "1970-01-01T12:01:01.0010000Z"  
  },  
  {  
    "atmareaocode": 10,  
    "customerareacode": 6,  
    "count": 1,  
    "time": "1970-01-01T12:01:01.0010000Z"  
  }]  
]
```

Queries' Execution [17] – Alert: Queries 7 + 8

Microsoft Azure bdsmastersStream - Alert rules > Edit Alert

Edit Alert

Save Discard Disable Delete

Name
Alert Two Transactions

Description
Alert

Source
Alert on Metrics

Criteria
Subscription Free Trial

Resource group BDSMasters

Resource bdsmastersStream

Metric !
Output Events
6,000

bdsmastersStream - Alert rules

Search (Ctrl+ /)

Locate Event ordering Error policy

GENERAL Tools Properties

MONITORING Metrics Alert rules Selected Diagnostics logs

SUPPORT + TROUBLESHOOTING Resource health

Microsoft Azure bdsmastersStream - Alert rules > Edit Alert

Edit Alert

Save Discard Disable Delete

Condition
Greater than or equal to

* Threshold
1 count

Period !
Over the last 5 minutes

bdsmastersdmst@gmail.com... BDSMastersDMSTGMAIL (DE...)

bdsmastersStream - Alert rules

Columns Add metric alert Add activity log alert

Subscription ! Source ! Resource group ! Resource type ! Resource

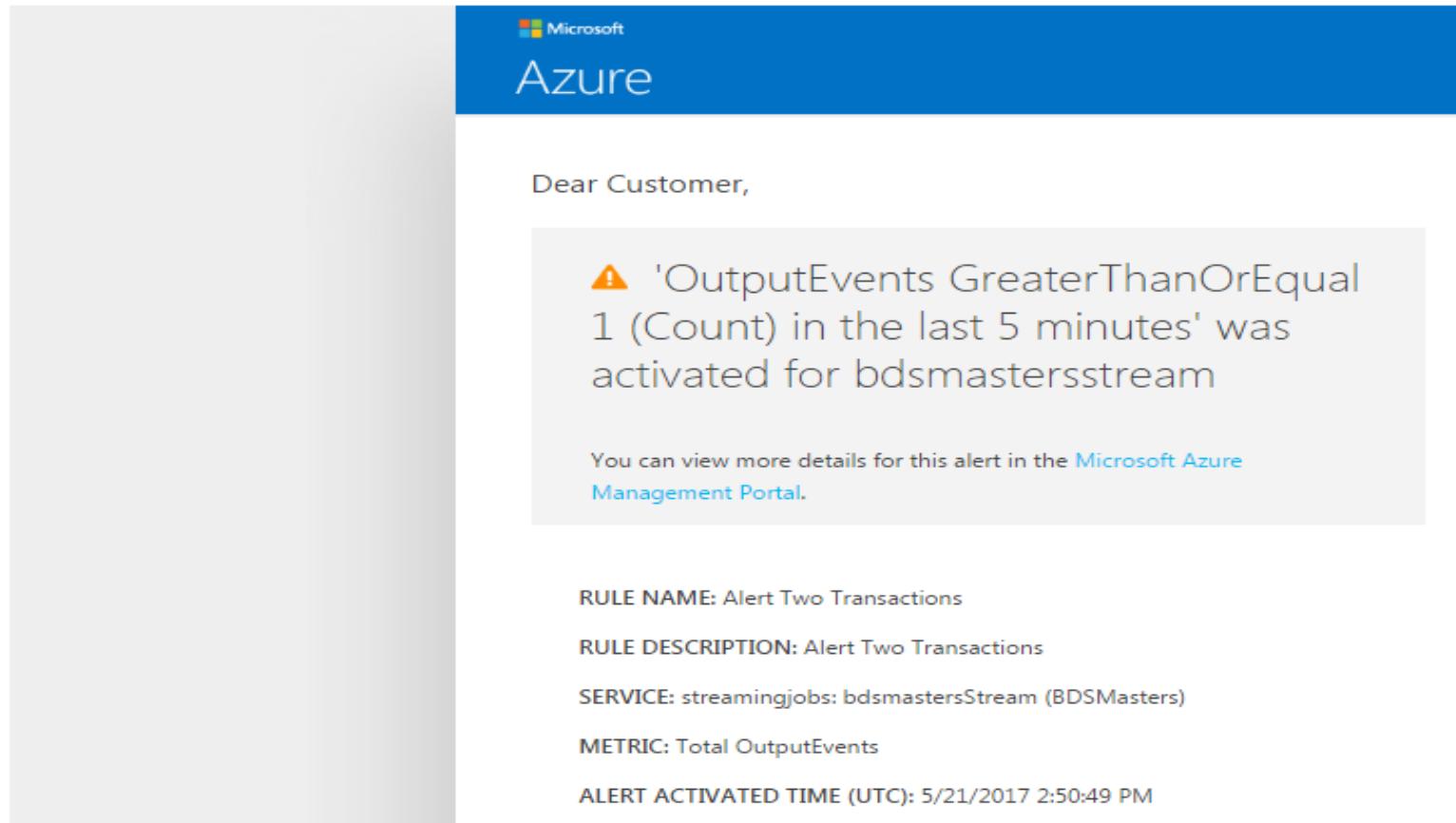
Free Trial > BDSMasters > bdsmastersStream

Diagnostics settings

NAME	STATUS	CONDITION	RESOURCE GROUP	RESOURCE	LAST FIRED
Alert Two Transactions	Warning	Output Events \geq 1 ...	BDSMasters	bdsmastersStream	16 min ago

Queries' Execution [18] – Alert: Queries 7 + 8

Microsoft Azure Alerts <alerts-noreply@mail.windowsazure.com>
to me



The screenshot shows an email from Microsoft Azure Alerts. The subject line is "Microsoft Azure Alerts <alerts-noreply@mail.windowsazure.com>". The recipient is "to me" with an unchecked checkbox. The email body starts with the Microsoft logo and the word "Azure". Below this, it says "Dear Customer," followed by a yellow warning icon and the message: "'OutputEvents GreaterThanOrEqual 1 (Count) in the last 5 minutes' was activated for bdsmastersstream". At the bottom, there is a link: "You can view more details for this alert in the [Microsoft Azure Management Portal](#)". Below the email content, there are several metadata fields: RULE NAME: Alert Two Transactions, RULE DESCRIPTION: Alert Two Transactions, SERVICE: streamingjobs: bdsmastersStream (BDSMasters), METRIC: Total OutputEvents, and ALERT ACTIVATED TIME (UTC): 5/21/2017 2:50:49 PM.

Microsoft

Azure

Dear Customer,

⚠ 'OutputEvents GreaterThanOrEqual 1 (Count) in the last 5 minutes' was activated for bdsmastersstream

You can view more details for this alert in the [Microsoft Azure Management Portal](#).

RULE NAME: Alert Two Transactions

RULE DESCRIPTION: Alert Two Transactions

SERVICE: streamingjobs: bdsmastersStream (BDSMasters)

METRIC: Total OutputEvents

ALERT ACTIVATED TIME (UTC): 5/21/2017 2:50:49 PM

References

- [1] En.wikipedia.org. (n.d.). Microsoft Azure. [online] Available at: https://en.wikipedia.org/wiki/Microsoft_Azure [Accessed 21 May 2017].
- [2] Docs.microsoft.com. (n.d.). Introduction to Stream Analytics. [online] Available at: <https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-introduction> [Accessed 21 May 2017].