



Microsoft Azure

# History

Los Angeles,  
27 October 2008



Windows Azure™

# History

February 2010



*php*



2011

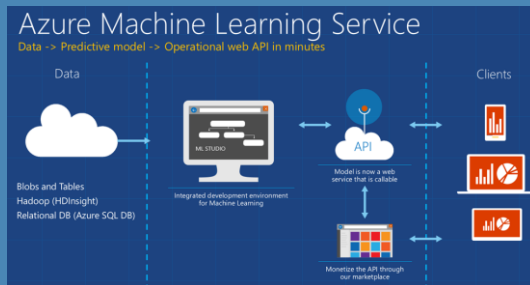


2012



# History

2014



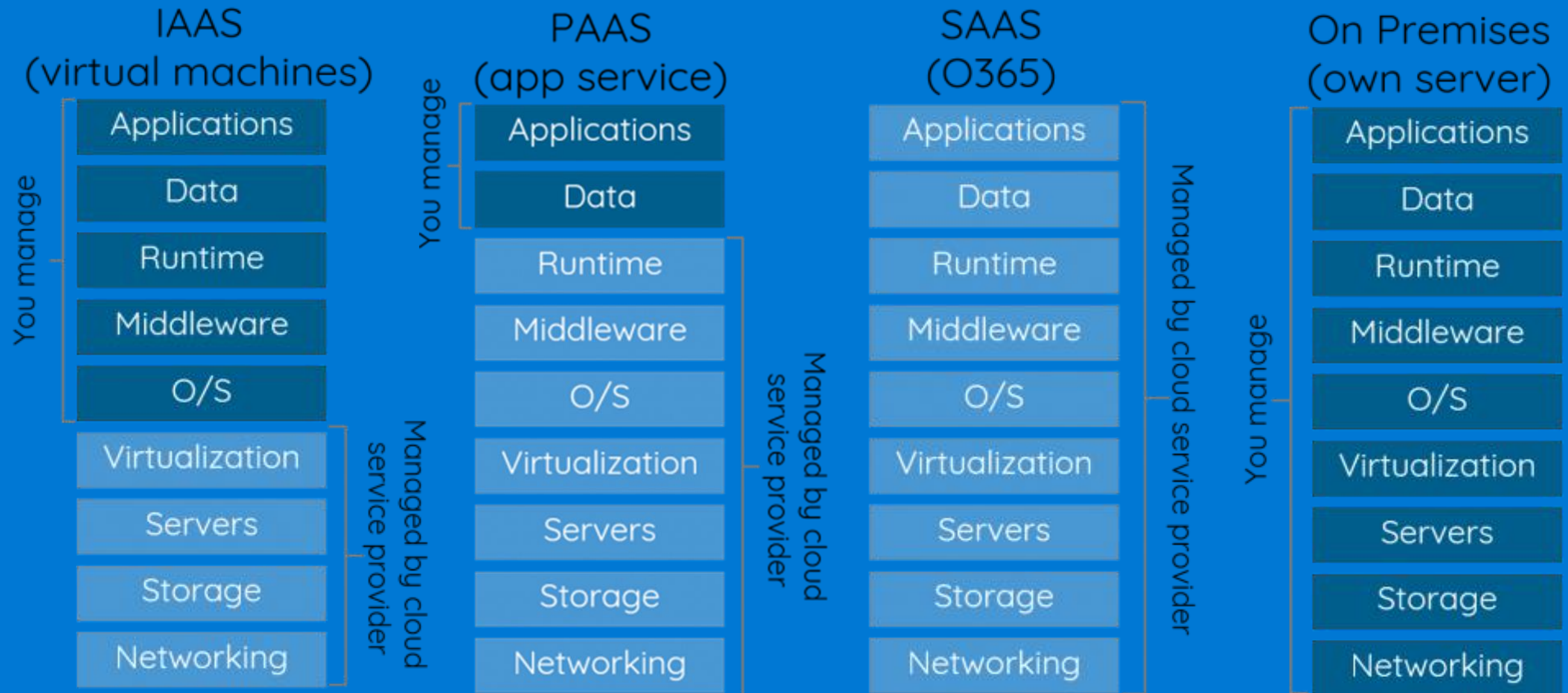
2015 - 2017



2018



# Cloud computing



# Cloud computing



Virtual Machines



Virtual Machine Scale Sets



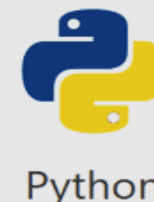
Containers



App Services



Serverless

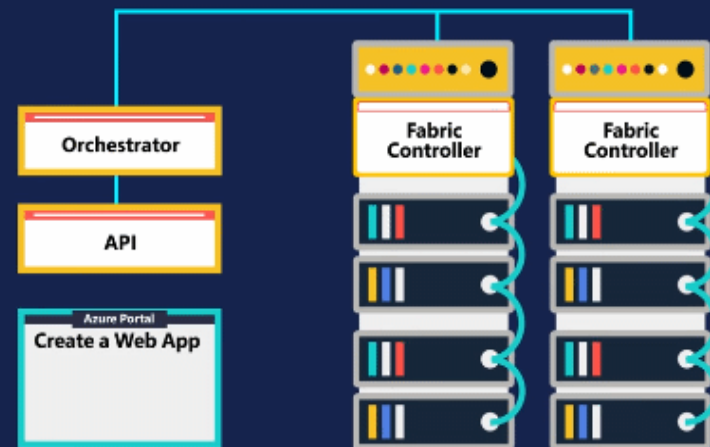
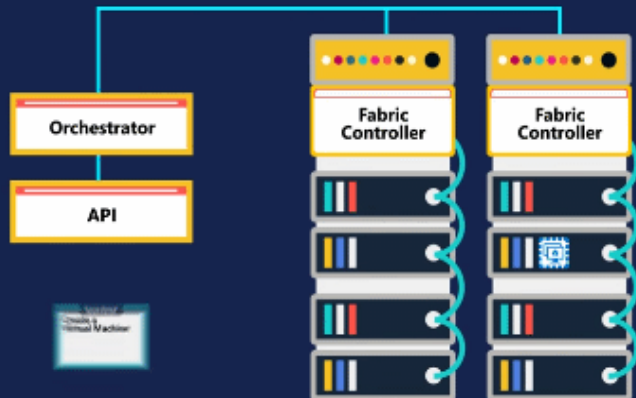
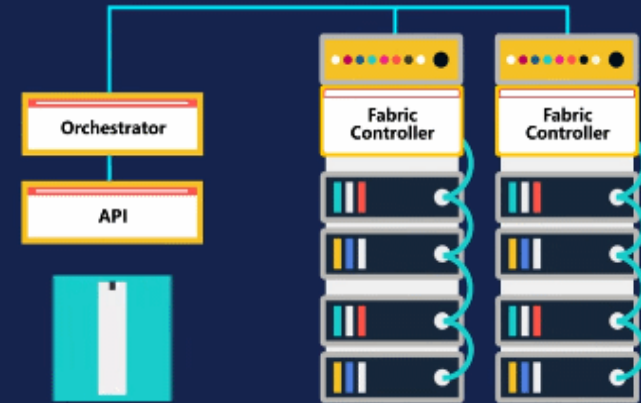


More OPS  
/ Control



Less OPS  
/ Control

# Cloud computing





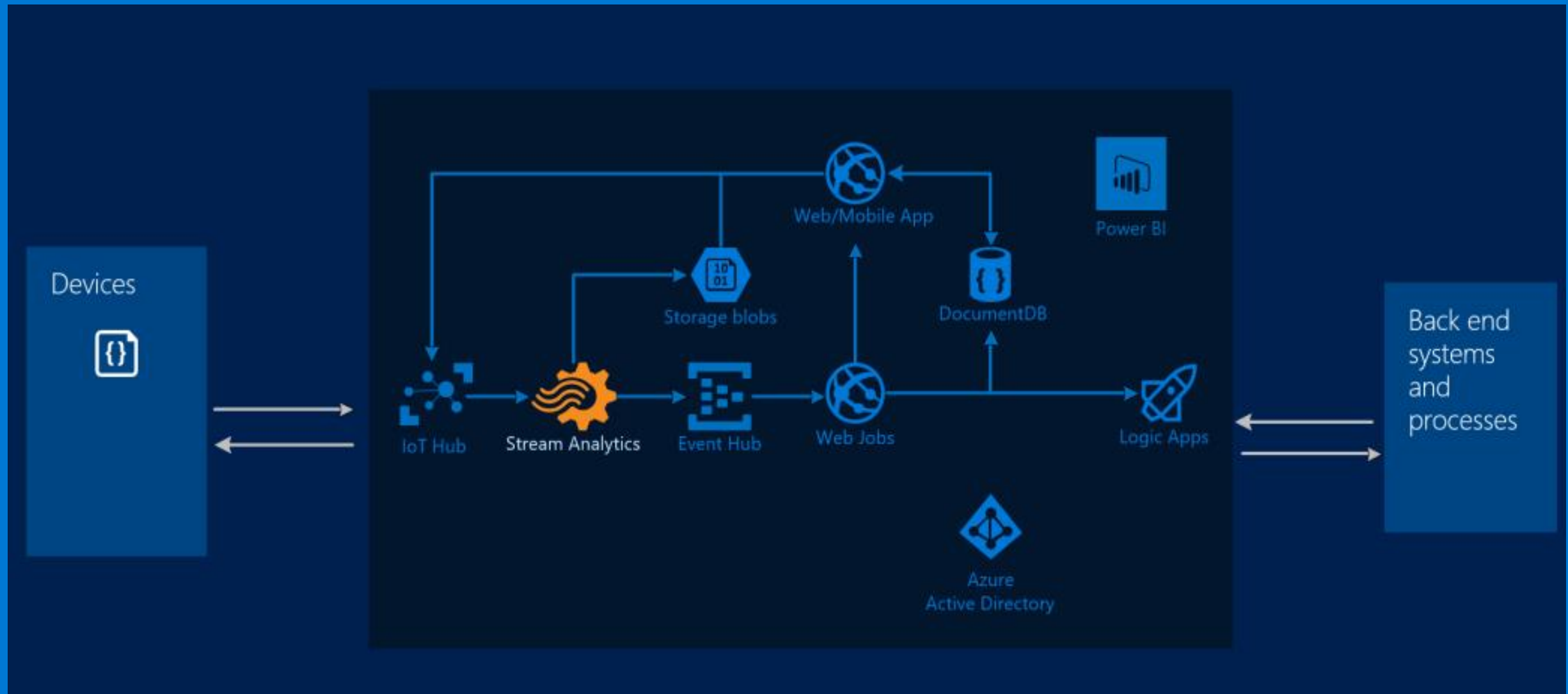
## Azure IoT Suite

*Capture and analyze untapped data to transform your business*
























# IoT suite



## Microsoft Azure IoT Services

Devices	Device Connectivity	Storage	Analytics	Presentation & Action
	 Event Hubs	 SQL Database	 Machine Learning	 App Service
	 Service Bus	 Table/Blob Storage	 Stream Analytics	 Power BI
	 External Data Sources	 DocumentDB	 HDInsight	 Notification Hubs
		 External Data Sources	 Data Factory	 Mobile Services
				 BizTalk Services



**Azure  
IoT Hub**

- **Connecting device to the cloud**
- **Bi-directional communication between app and device**
- **Secure communication**
- **Messages routing**

# More about IoT services



Azure  
IoT Hub

Basic tier			
EDITION TYPE	PRICE PER UNIT (PER MONTH)	TOTAL NUMBER OF MESSAGES/DAY PER UNIT	MESSAGE METER SIZE
B1	\$10	400.000	4 KB
B2	\$50	6.000.000	4 KB
B3	\$500	300.000.000	4 KB
Standard tier			
EDITION TYPE	PRICE PER UNIT (PER MONTH)	TOTAL NUMBER OF MESSAGES/DAY PER UNIT	MESSAGE METER SIZE
Free	Free	8.000	0,5 KB
S1	\$25	400.000	4 KB
S2	\$250	6.000.000	4 KB
S3	\$2.500	300.000.000	4 KB

# More about IoT services



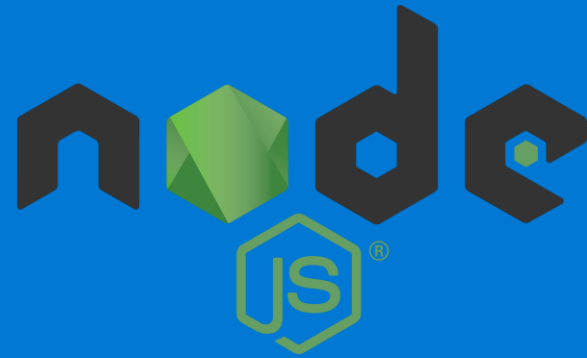
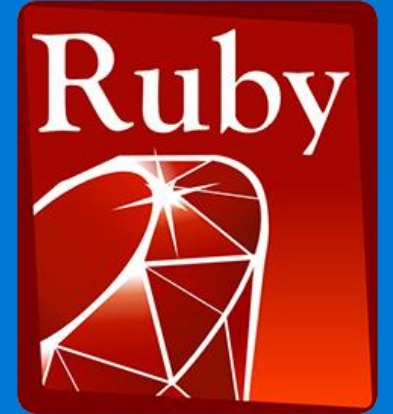
## Azure IoT Hub

FEATURE	BASIC	STANDARD
Device-to-cloud telemetry	✓	✓
Per-device identity	✓	✓
Message Routing, Event Grid Integration	✓	✓
HTTP, AMQP, MQTT Protocols	✓	✓
DPS Support	✓	✓
Monitoring and diagnostics	✓	✓
Cloud-to-device messaging		✓
Device Management, Device Twin, Module Twin		✓
IoT Edge		✓

# More about IoT services



Azure  
Web Apps







## Azure Web Apps

- **Global scale with high availability**
- **Connections to SaaS platforms and on-premises data**
- **Security and compliance**
- **Application templates**
- **Visual Studio integration**
- **API and mobile features**
- **Serverless code**

# More about IoT services



## Azure Web Apps

	<b>FREE</b> Try for free	<b>SHARED</b> Environment for dev/test	<b>BASIC</b> Dedicated environment for dev/test	<b>STANDARD</b> Run production workloads	<b>PREMIUM</b> Enhanced performance and scale	<b>ISOLATED</b> High-Performance, Security and Isolation
Web, mobile, or API apps	10	100	Unlimited	Unlimited	Unlimited	Unlimited
Disk space	1 GB	1 GB	10 GB	50 GB	250 GB	1 TB
Maximum instances	–	–	Up to 3	Up to 10	Up to 20	Up to 100*
Custom domain	–	Supported	Supported	Supported	Supported	Supported
Auto Scale	–	–	–	Supported	Supported	Supported
VPN hybrid connectivity	–	–	–	Supported	Supported	Supported
Network Isolation						Supported
Price per hour	Free	\$0.013	\$0.075	\$0.10	\$0.20	\$0.30



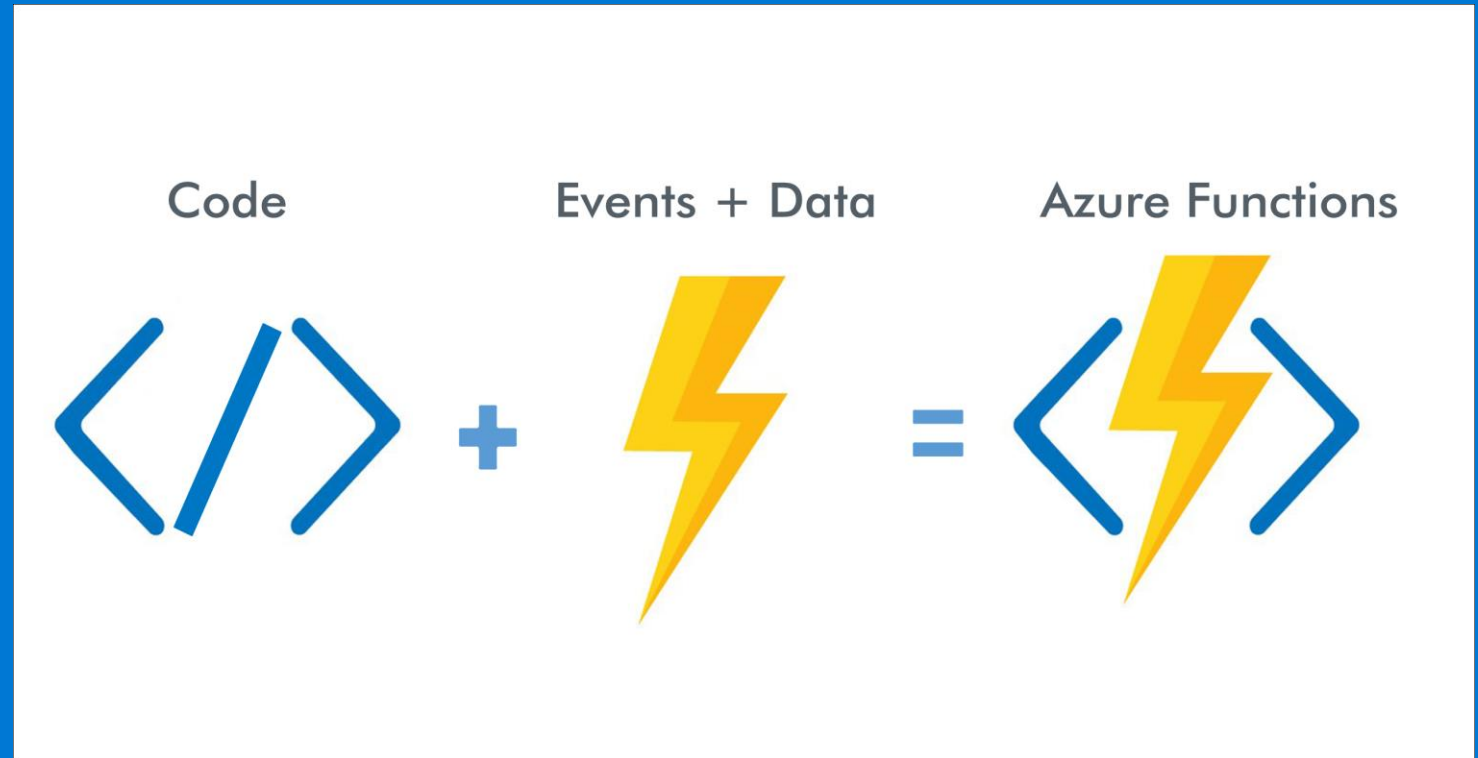
## Azure Functions

### Triggering:

- Azure Cosmos DB
- Azure Event Hubs
- Azure Event Grid
- Azure Notification Hubs
- Azure Service Bus (queues and topics)
- Azure Storage (blob, queues, and tables)
- Twilio (SMS messages)



Azure  
Functions



# More about IoT services



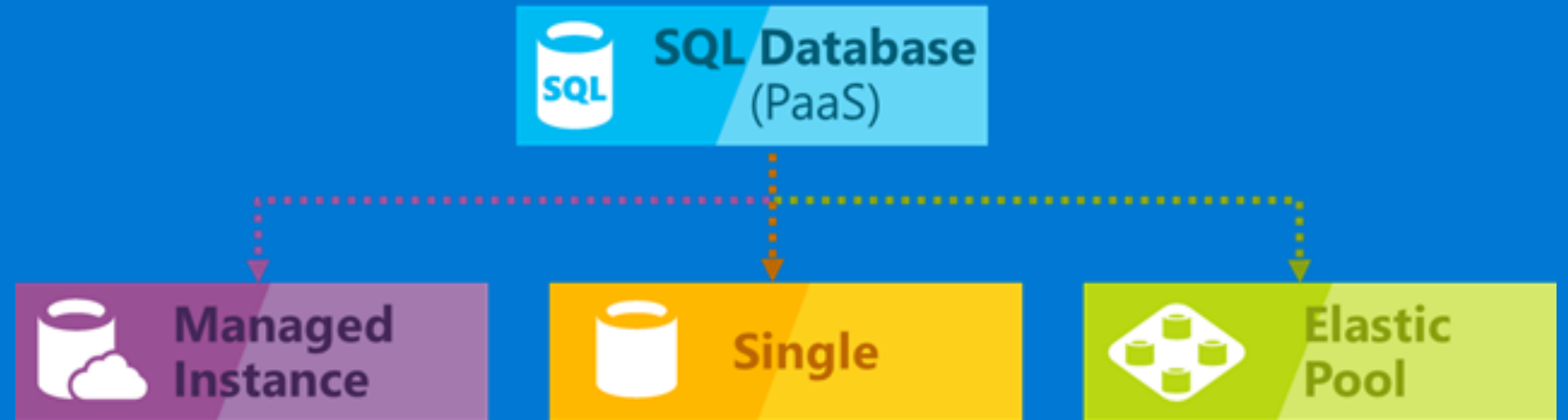
## Azure Functions

METER	PRICE	FREE GRANT (PER MONTH)
Execution Time*	\$0.000016/GB-s	400,000 GB-s
Total Executions*	\$0.20 per million executions	1 million executions

# More about IoT services



Azure  
SQL DB

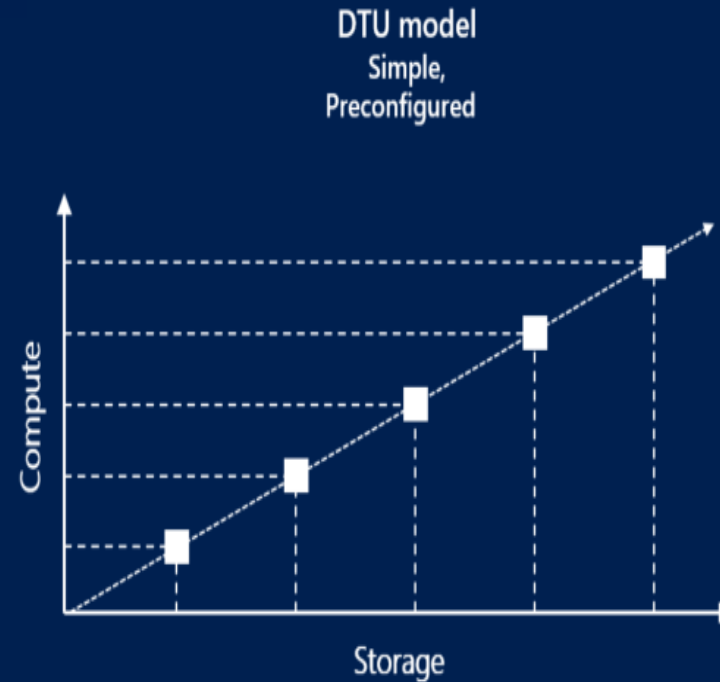




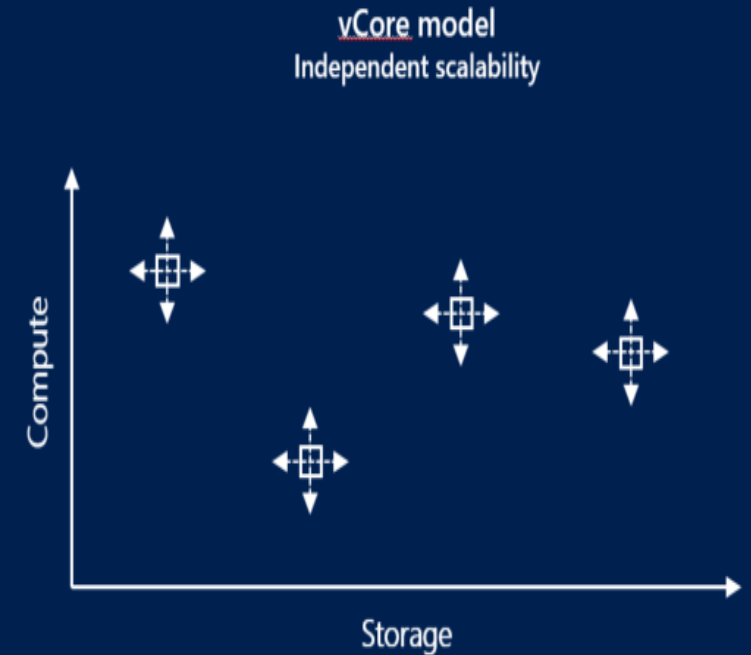
# More about IoT services



## Azure SQL DB



OR



### Database Transaction Unit (DTU)-based model

- Bundled measure of compute, storage and IO resources
- Best for customers who want simple, pre-configured resource options.

### vCore-based model

- Independent scaling of compute, storage and IO resources
- Best for customers who value flexibility, control and transparency
- Use with Azure Hybrid Benefit for SQL Server to gain cost savings

# More about IoT services



**Azure  
SQL DB**

<https://azure.microsoft.com/en-us/pricing/details/sql-database/managed/>

# More about IoT services



Azure  
Cosmos DB



# More about IoT services



## Azure Cosmos DB

GRANULARITY OF PROVISIONING	MINIMUM THROUGHPUT (RU/S)		SCALE UP/DOWN INCREMENTS (RU/S)		MAXIMUM THROUGHPUT	SCOPE
	SINGLE REGION WRITE	MULTIPLE REGION WRITE	SINGLE REGION WRITE	MULTIPLE REGION WRITE		
Container*	400	400	100	100	Unlimited	The partitioned container for which the throughput is provisioned
Database**	10K	10K	1,000	1,000	Unlimited	All the throughput is <b>shared</b> among all the partitioned-containers within the database (excluding the containers for which the throughput is explicitly provisioned for)

Pricing details	
UNIT	PRICE
SSD Storage (per GB)	\$0.25 GB/month
Reserved RUs/second (per 100 RUs, 400 RUs minimum)	\$0.008/hour
Provisioned Throughput (multiple write regions) - 100 RU/sec	\$0.016/hour

# More about IoT services



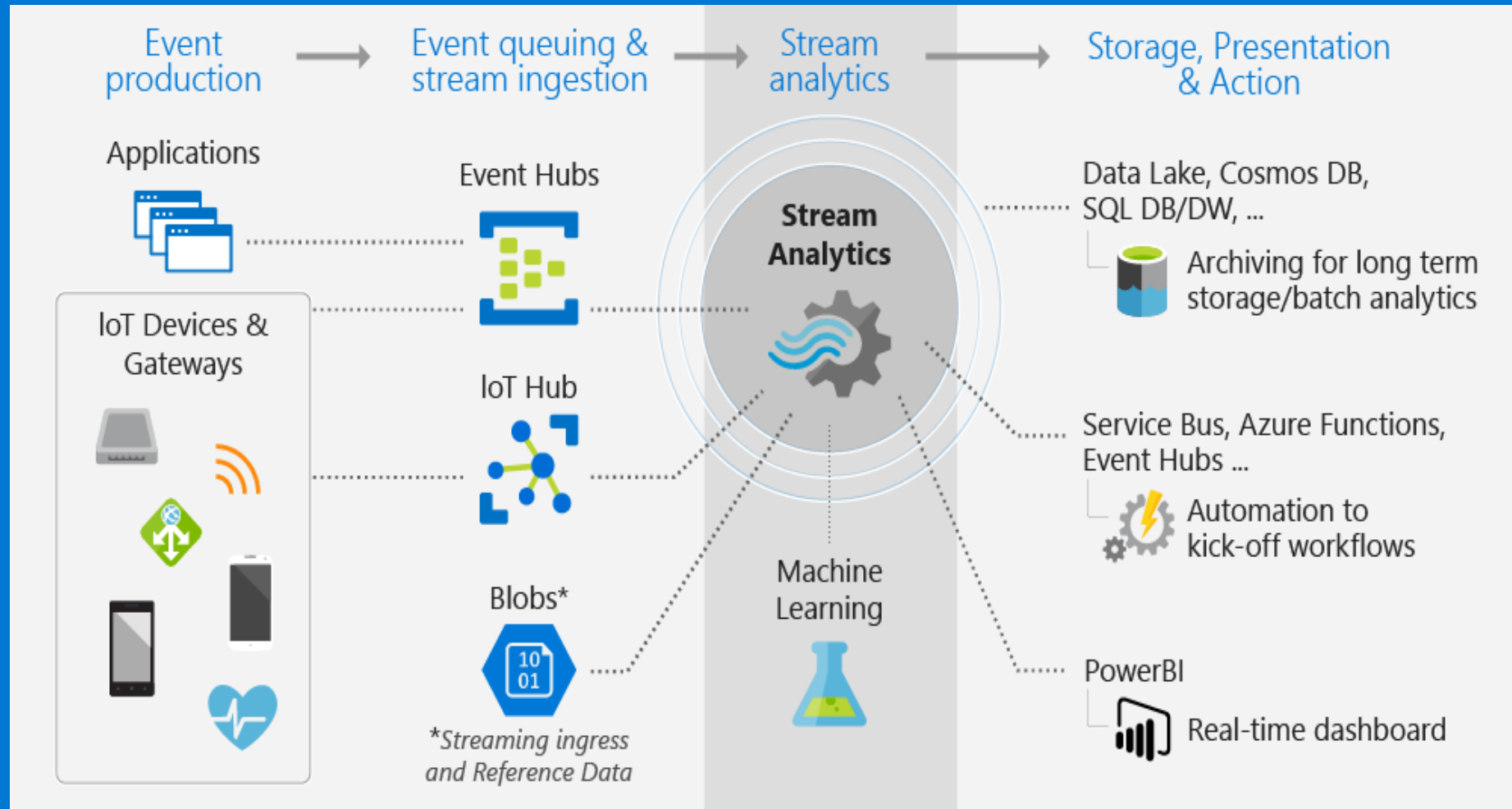
**Azure  
Stream  
Analytics**

- **Internet of Things(IoT) Sensor fusion and real-time analytics on device telemetry**
- **Web logs/clickstream analytics**
- **Geospatial analytics for fleet management and driverless vehicles**
- **Remote monitoring and predictive maintenance of hi-value assets**
- **Real-time analytics on Point of Sale data for inventory control and anomaly detection**

# More about IoT services



## Azure Stream Analytics





# More about IoT services

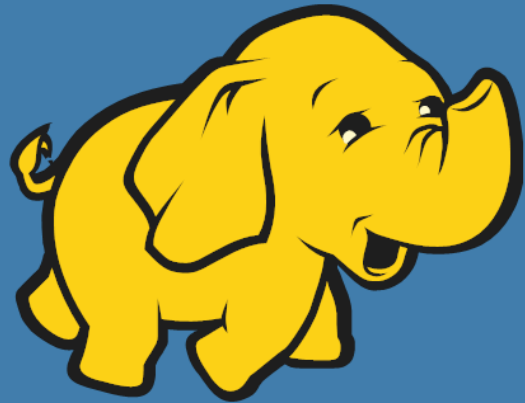


Azure  
Stream  
Analytics

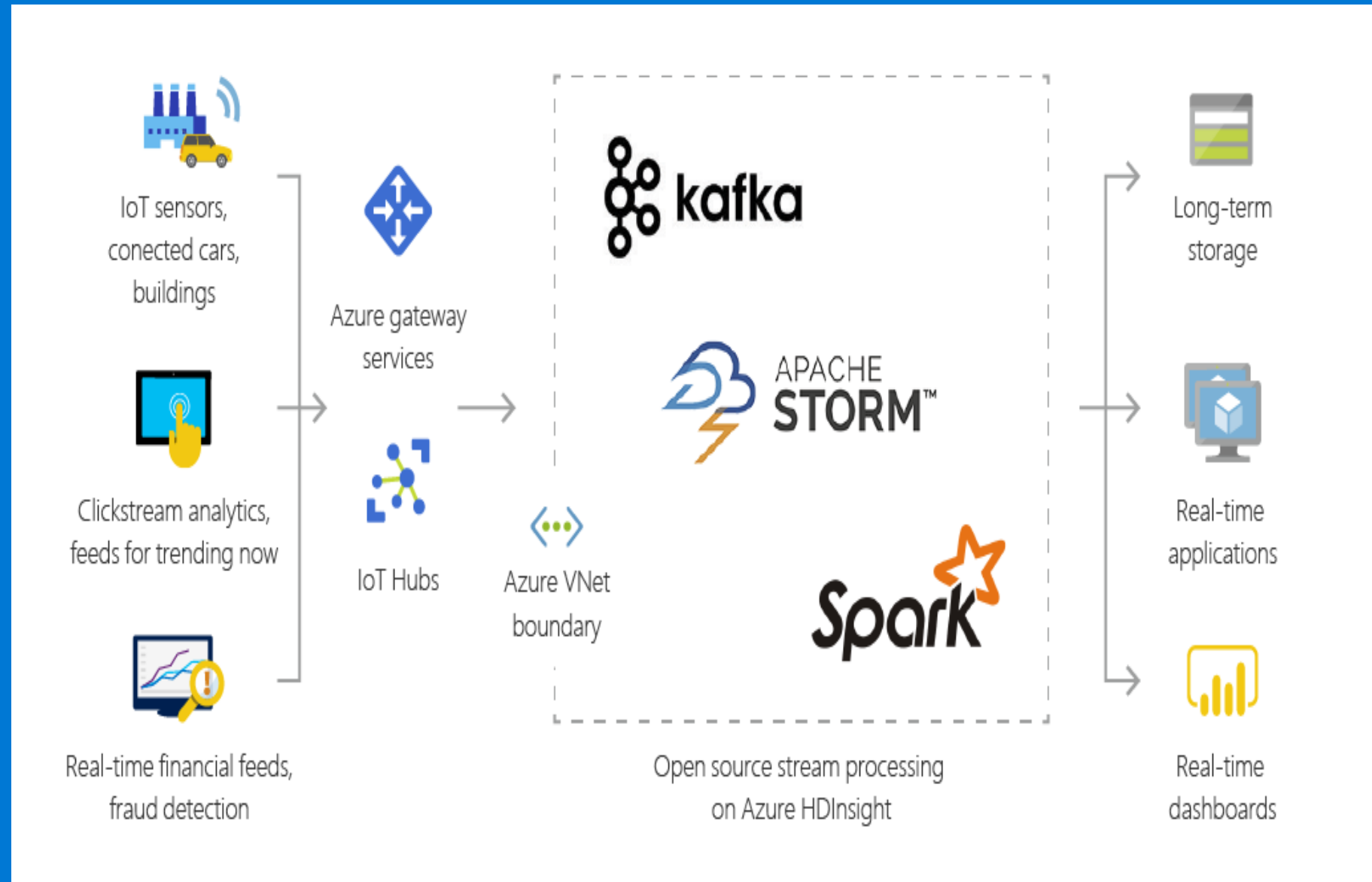
## Standard streaming unit

USAGE	PRICE
Streaming unit	\$0.11/hour

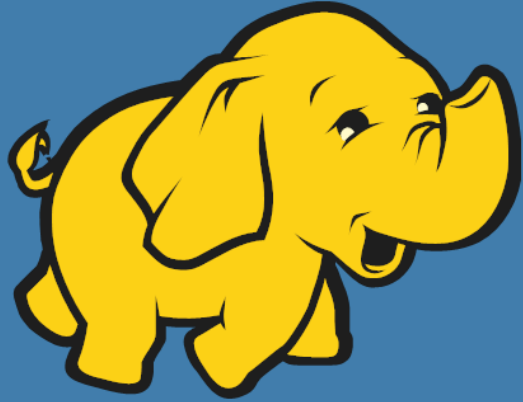
# More about IoT services



**Azure  
HDInsights**



# More about IoT services



## Azure HDInsights

COMPONENT	PRICING
Hadoop, Spark, Interactive Query, Kafka*, Storm, HBase	Base price/node-hour
HDInsight Machine Learning Services**	Base price/node-hour + \$0.016/core-hour
Enterprise Security Package	Base price/node-hour + \$0.01/core-hour

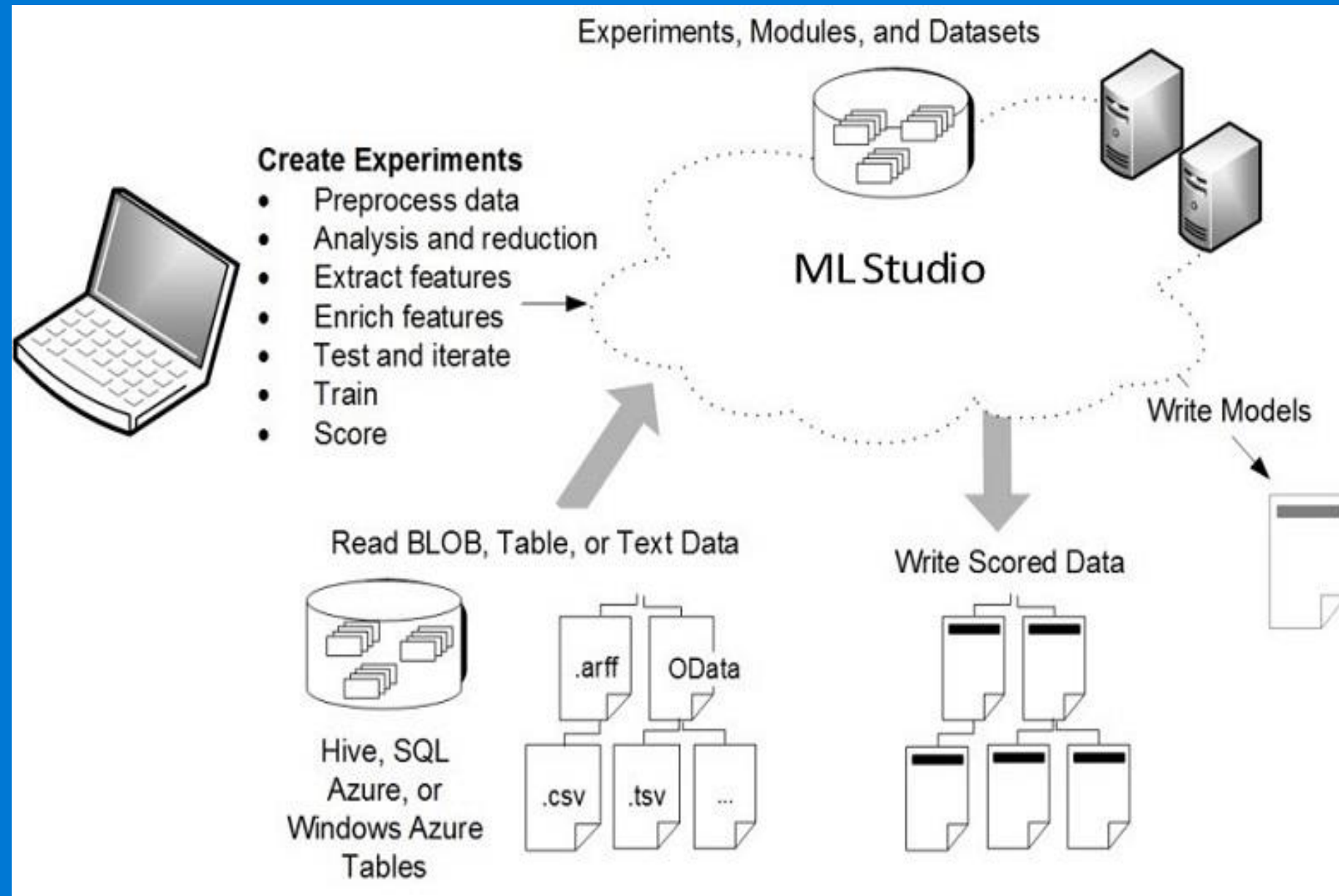
### Memory Optimized nodes for HDInsight

INSTANCE	CPU	RAM	OS	HDINSIGHT PRICE	TOTAL PRICE++
D11 v2	2	14 GB	\$0.149/hour	\$0.038/hour	\$0.187/hour
D12 v2	4	28 GB	\$0.299/hour	\$0.075/hour	\$0.374/hour
D13 v2	8	56 GB	\$0.598/hour	\$0.15/hour	\$0.748/hour
D14 v2	16	112 GB	\$1.196/hour	\$0.30/hour	\$1.496/hour

# More about IoT services



## Azure Machine Learning



# More about IoT services



## Azure Machine Learning

	FREE	STANDARD
Price	Free	\$9.99 per seat per month \$1 per studio experimentation hour
Azure subscription	Not required	Required
Max number of modules per experiment	100	Unlimited
Max experiment duration	1 hour per experiment	Up to 7 days per experiment with a maximum of 24 hours per module
Max storage space	10 GB	Unlimited - BYO
Read data from On-Premises SQL <small>Preview</small>	No	Yes
Execution/performance	Single node	Multiple nodes
Production Web API	No	Yes
SLA	No	Yes

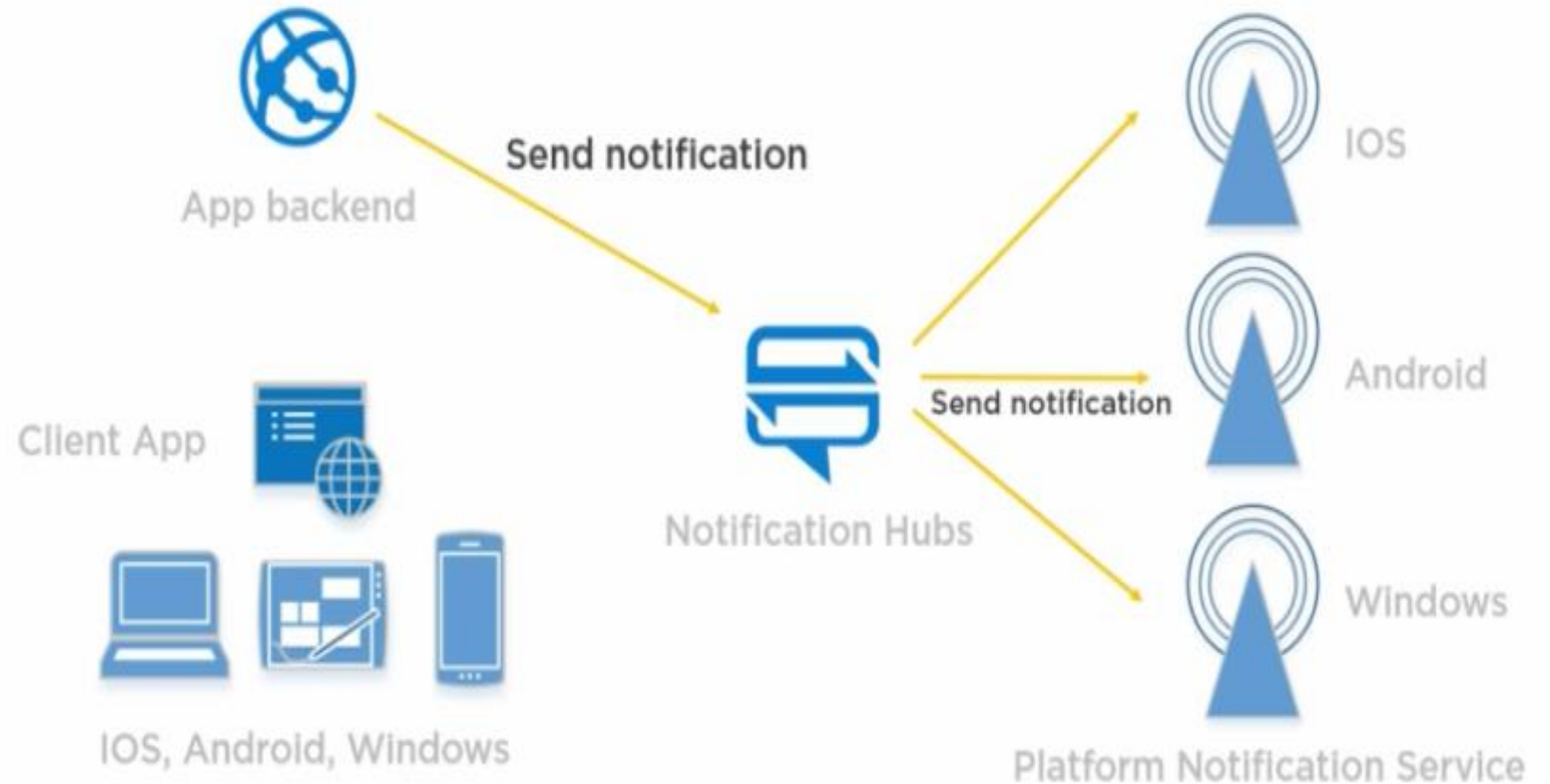
	DEV/TEST*	STANDARD S1	STANDARD S2	STANDARD S3
Tier Price per month	\$0	\$100.13	\$1,000.06	\$9,999.98
<b>Features</b>				
Included transactions (per month)	1,000	100,000	2,000,000	50,000,000
Included compute hours (per month)	2	25	500	12,500
Total number of web services <sup>1</sup>	2	10	100	500
Overage rates	N/A	\$0.50 per 1,000 transactions	\$0.25 per 1,000 transactions	\$0.10 per 1,000 transactions
		\$2 per API compute hour	\$1.50 per API compute hour	\$1 per API compute hour

# More about IoT services



## Azure Notification Hub

### Push Notifications with Notification Hubs

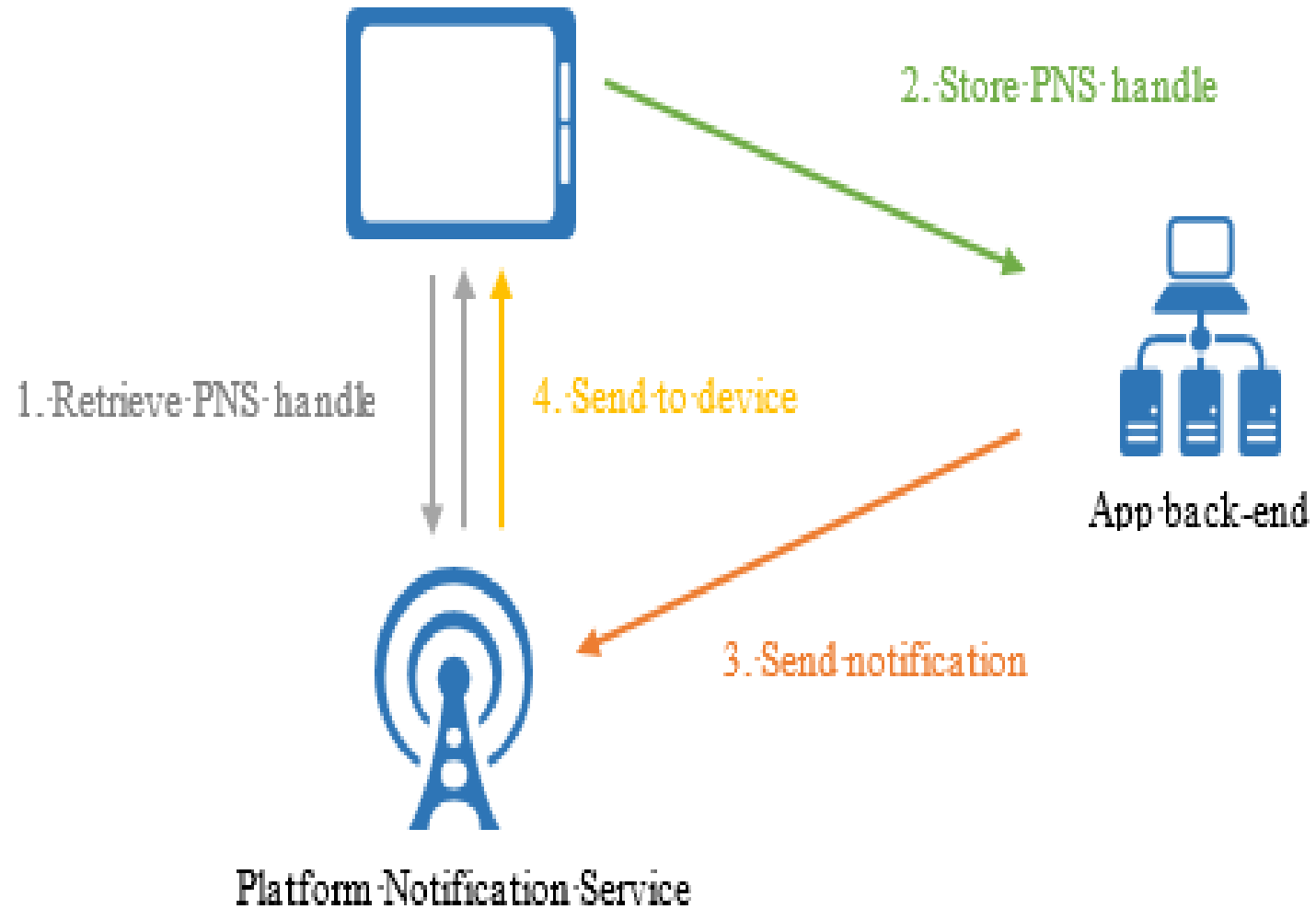




# More about IoT services



## Azure Notification Hub

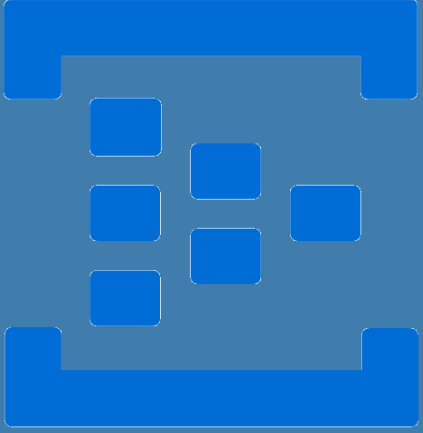


# More about IoT services



## Azure Notification Hub

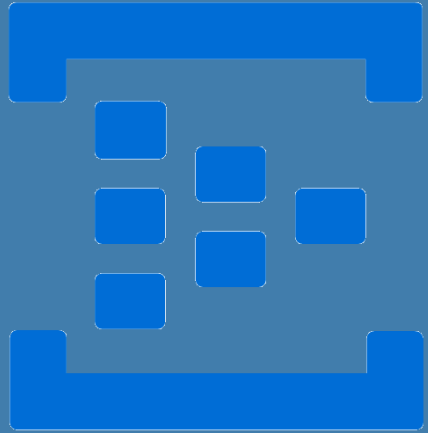
	FREE	BASIC	STANDARD
Base charge per namespace	Free	\$10/month	\$200/month
Included pushes per subscription per tier	1 million	10 million	10 million
Additional pushes per subscription per tier (price per million pushes)			
10 million – 100 million	Not available	\$1	\$10
Over 100 million	Not available	\$1	\$2.50
Namespaces per tier	100	100	Unlimited <sup>1</sup>
Hubs per namespace	100	100	100 <sup>2</sup>
Active devices per namespace	500	200,000	10,000,000
X-plat push to individual devices	✓	✓	✓
Push variables	✓	✓	✓
Telemetry	Limited	Limited	Rich <sup>3</sup>
Queryable audience (registration queries)	✓	✓	✓
Scheduled push	--	--	✓
Bulk import	--	--	✓
Multi-tenancy	--	--	✓
SLA	None	Covered	Covered



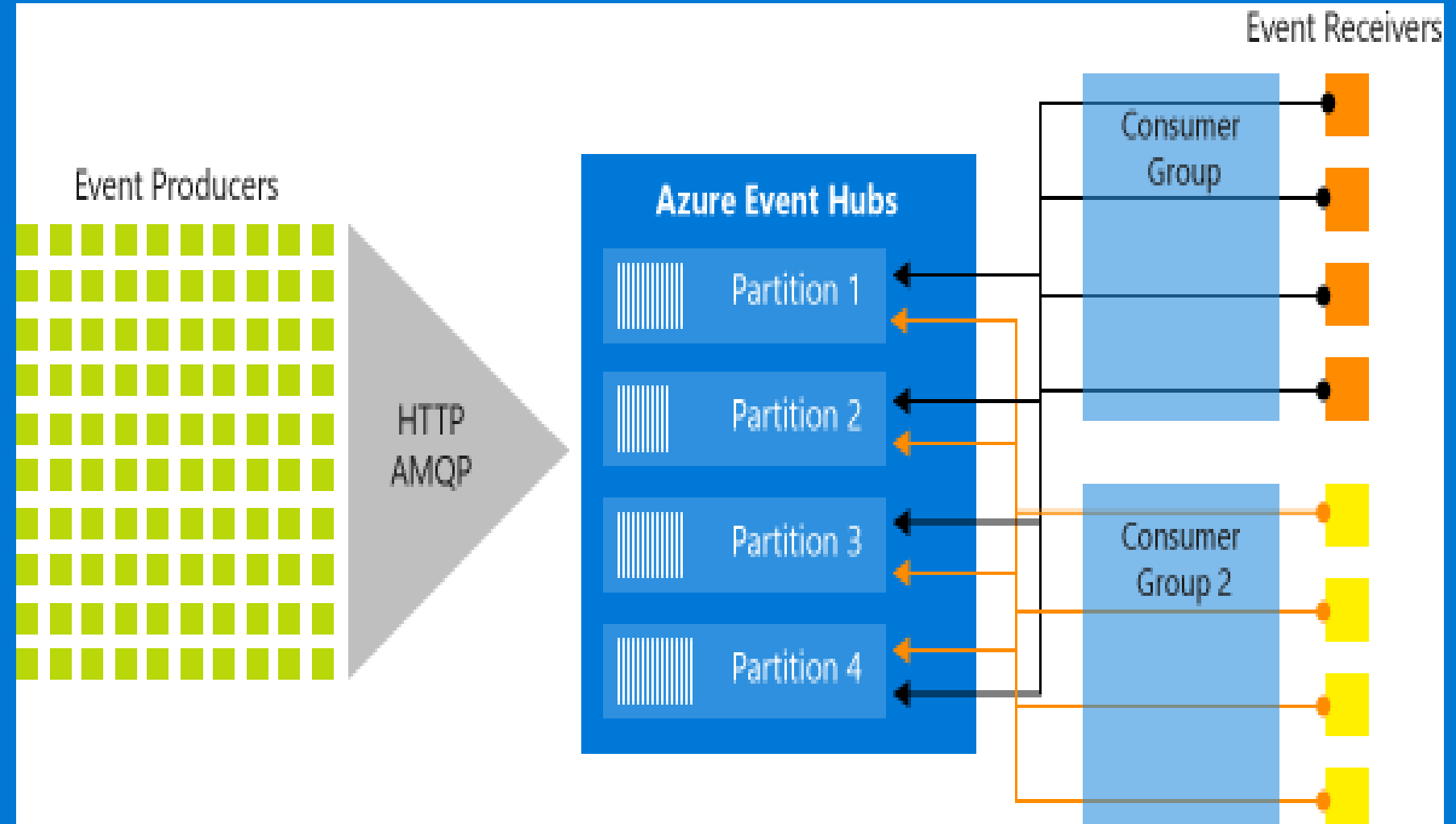
## Azure Events Hub

- **Anomaly detection (fraud/outliers)**
- **Application logging**
- **Analytics pipelines, such as clickstreams**
- **Live dashboarding**
- **Archiving data**
- **Transaction processing**
- **User telemetry processing**
- **Device telemetry streaming**

# More about IoT services



## Azure Events Hub



# More about IoT services

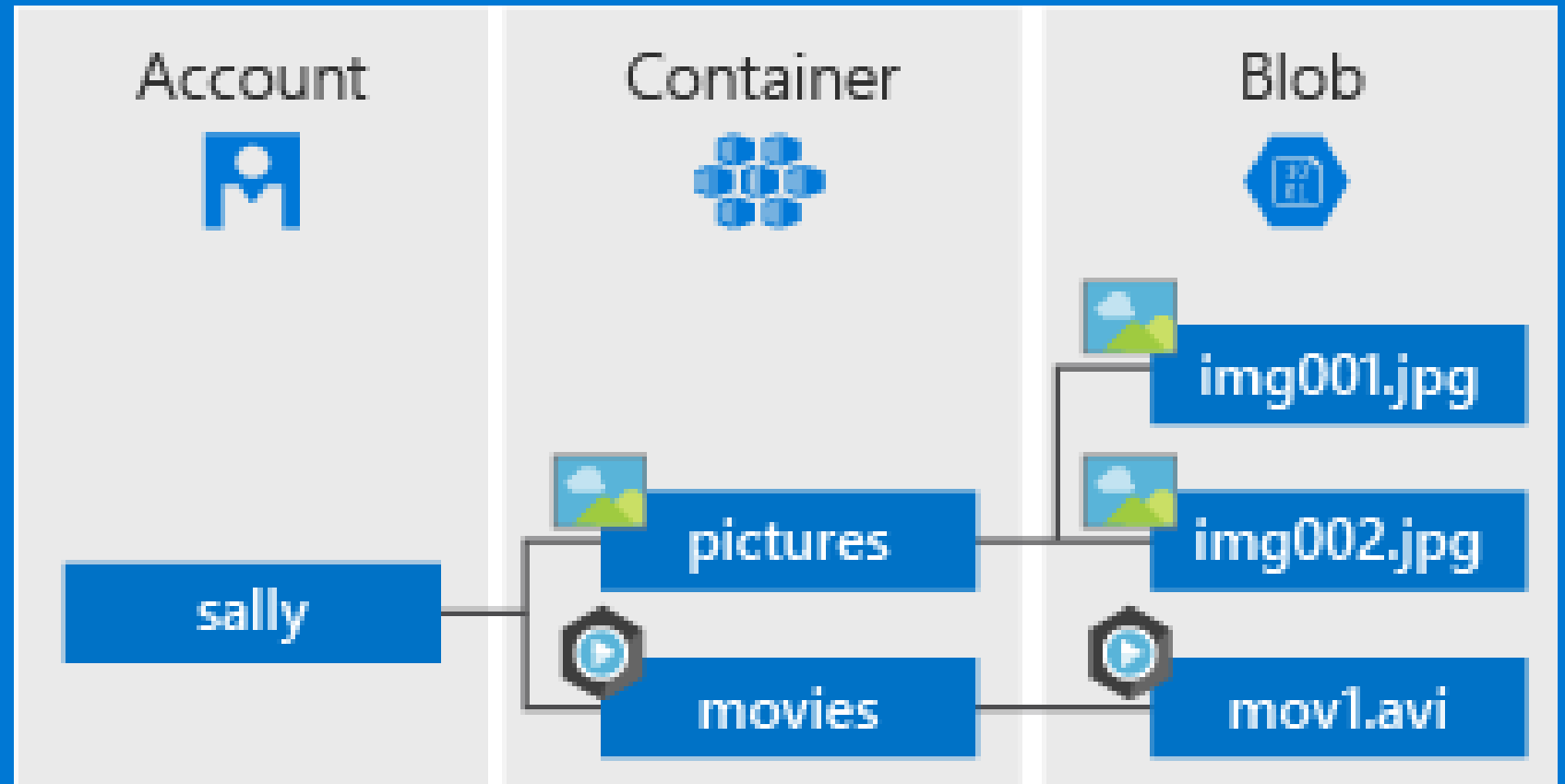


## Azure Events Hub

	BASIC	STANDARD	DEDICATED*
Ingress events	\$0.028 per million events	\$0.028 per million events	Included
Throughput unit (1 MB/s ingress, 2 MB/s egress)	\$0.015/hour	\$0.03/hour	Included
Message size	256 KB	256 KB	1 MB
Consumer groups	1 - Default	20	20
Message replay	✓	✓	✓
Maximum throughput units	20	20**	1 CU≈50
Apache Kafka		✓	✓
Brokered connections	100 included	1,000 included	25K included
Message retention	1 day included	1 day included***	Up to 7 days included***
Additional brokered connections		✓	✓
Publisher policies		✓	✓
Capture		\$0.10/hour	Included



## Azure Storage Blob



# More about IoT services



## Azure Storage Blob

### Block Blobs

Scalable object storage for documents, videos, pictures, and unstructured text or binary data. Choose from Hot, Cool, or Archive tiers.

Prices for locally redundant storage (LRS) Archive Block Blob start from:

**\$0.002**/GB per month

[See Pricing >](#)

### Azure Data Lake Storage Preview

Combines the power of a Hadoop compatible file system with integrated hierarchical namespace with the massive scale and economy of Azure Blob Storage to help speed your transition from proof of concept to production.

Prices for LRS start from:

**\$0.001**/GB per month

[See Pricing >](#)

### Managed Disks

Persistent, secured disks that support simple and scalable virtual machine deployment. Designed for 99.999% availability. Choose Premium (SSD) Disks for low latency and high throughput.

Prices for Standard Managed Disks start from:

**\$1.54** per month

[See Pricing >](#)

### Files

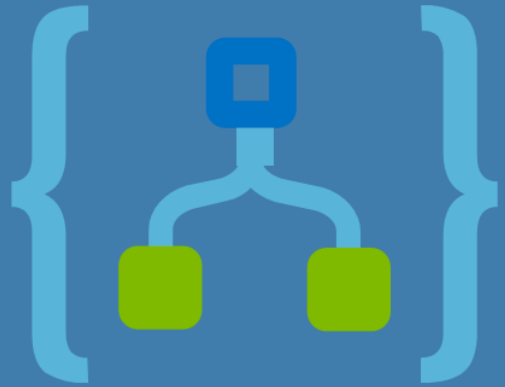
Fully managed file shares in the cloud, accessible via standard Server Message Block (SMB) protocol. Enables sharing files between applications using Windows APIs or REST API.

Prices for LRS File storage start from:

**\$0.06**/GB per month

[See Pricing >](#)

# More about IoT services

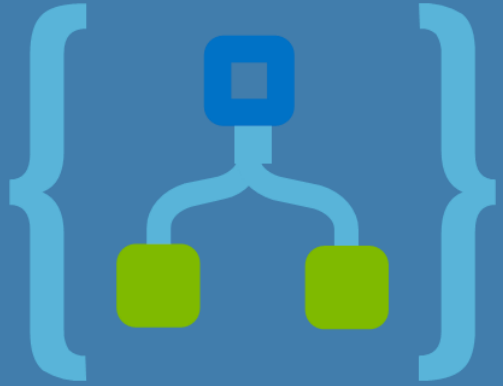


Azure  
Logic Apps





# More about IoT services



## Azure Logic Apps

### Pricing details

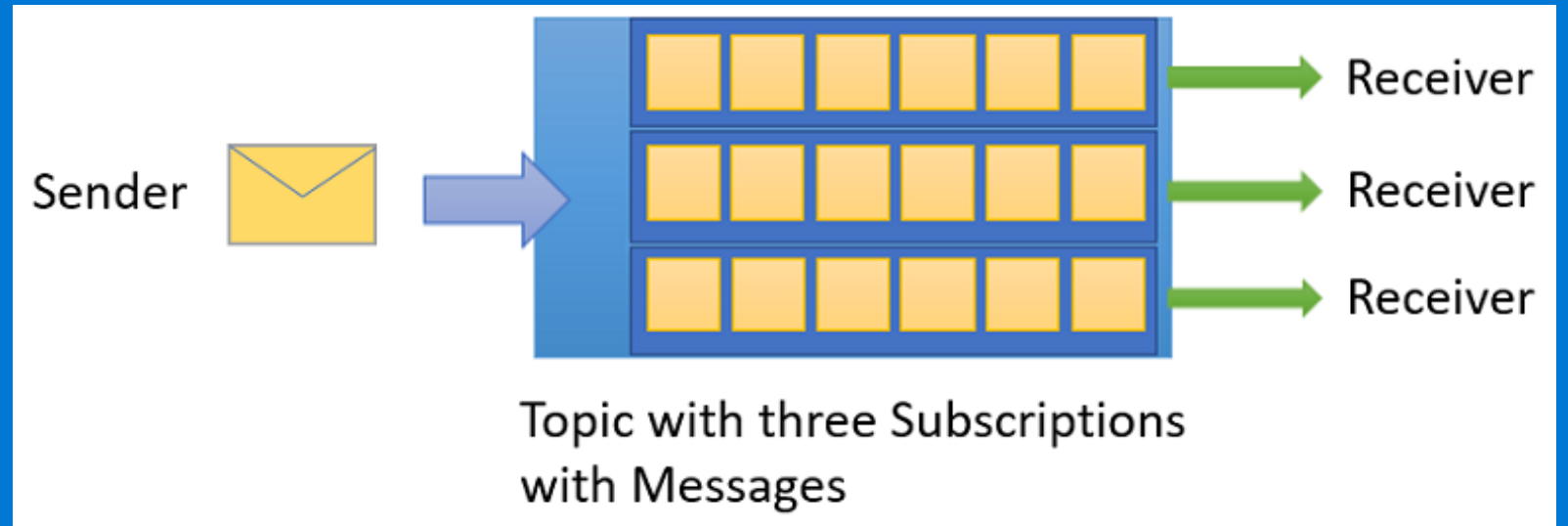
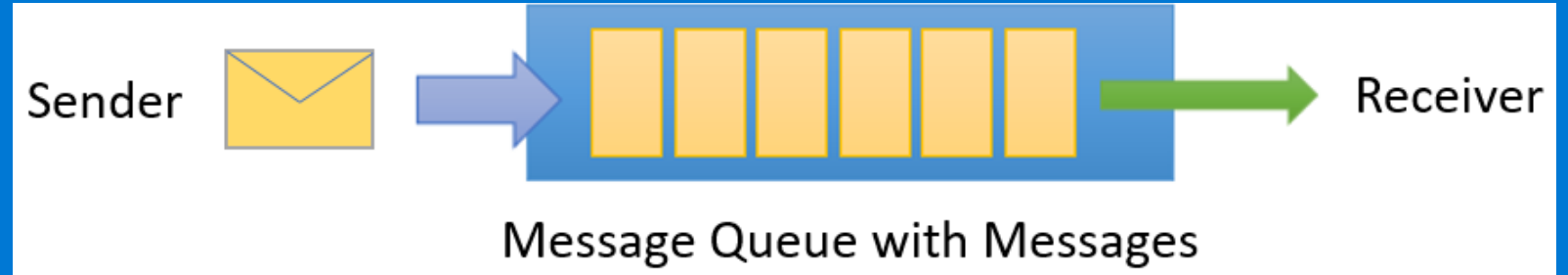
Every time a Logic App definition runs the triggers, action and connector executions are metered.

	PRICE PER EXECUTION
Actions	\$0.000025
Standard Connector	\$0.000125
Enterprise Connector	\$0.001

# More about IoT services



**Azure  
Service Bus**



# More about IoT services



## Azure Service Bus

FEATURE	BASIC	STANDARD	PREMIUM
Queues	✓	✓	✓
Scheduled messages	✓	✓	✓
Topics		✓	✓
Transactions		✓	✓
De-duplication		✓	✓
Sessions		✓	✓
ForwardTo/SendVia		✓	✓
Message Size	256 KB	256 KB	1 MB
Brokered connections included	100	1,000 <sup>1</sup>	1,000 per MU
Brokered connections (overage allowed)		(billable)	Up to 1,000 per MU
Resource isolation			✓
Geo-Disaster Recovery (Geo-DR)			✓
			<sup>1</sup> Requires additional Service Bus Premium namespaces in another region.

# More about IoT services



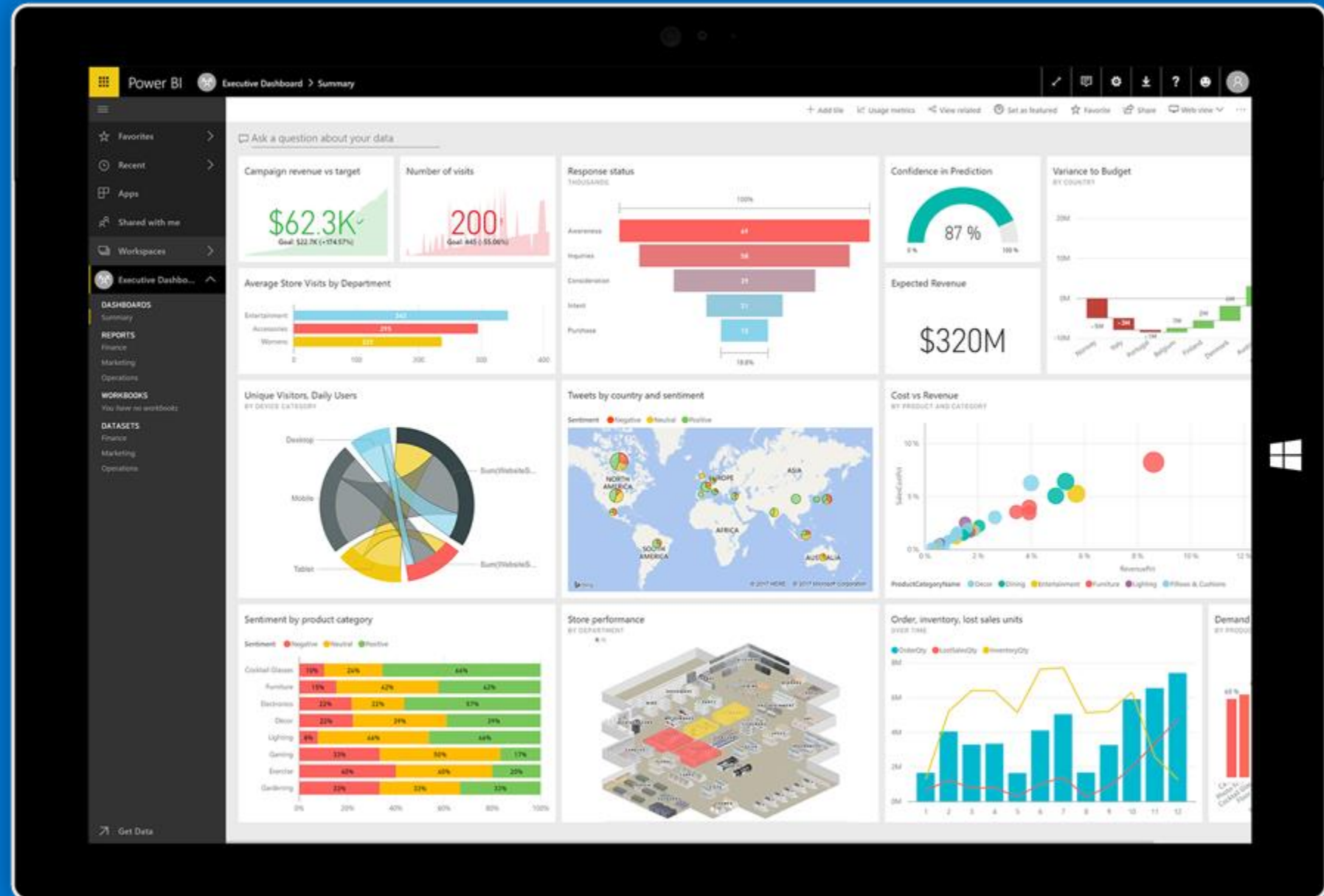
## Azure Service Bus

<b>BASIC</b>	
Operations	\$0.05 per million operations
<b>STANDARD</b>	
Base charge <sup>1</sup>	\$9.82/month
First 13M ops/month	Included
Next 87M ops (13M–100M ops)/month	\$0.80 per million operations
Next 2,400M ops (100M–2,500M ops)/month	\$0.50 per million operations
Over 2,500M ops/month	\$0.20 per million operations
<b>PREMIUM</b>	
Daily	\$22.26 fixed rate per message unit

# More about IoT services



## PowerBI



# More about IoT services



## PowerBI

### Author

Power BI Desktop

Free

[DOWNLOAD FREE >](#)

Connect to hundreds of data sources

Clean and prepare data using visual tools

Analyze and build stunning reports with custom visualizations

Publish to the Power BI service

Embed in public websites

### Share and collaborate

Power BI Pro

\$9.99

per user  
per month

[TRY FREE >](#)

Build dashboards that deliver a 360-degree, real-time view of the business

Keep data up-to-date automatically, including on-premises sources

Collaborate on shared data

Audit and govern how data is accessed and used

Package content and distribute to users with apps

### Scale large deployments

Power BI Premium

Capacity pricing

per node  
per month

[PLAN YOUR COSTS >](#)

Gain dedicated capacity you allocate, scale, and control

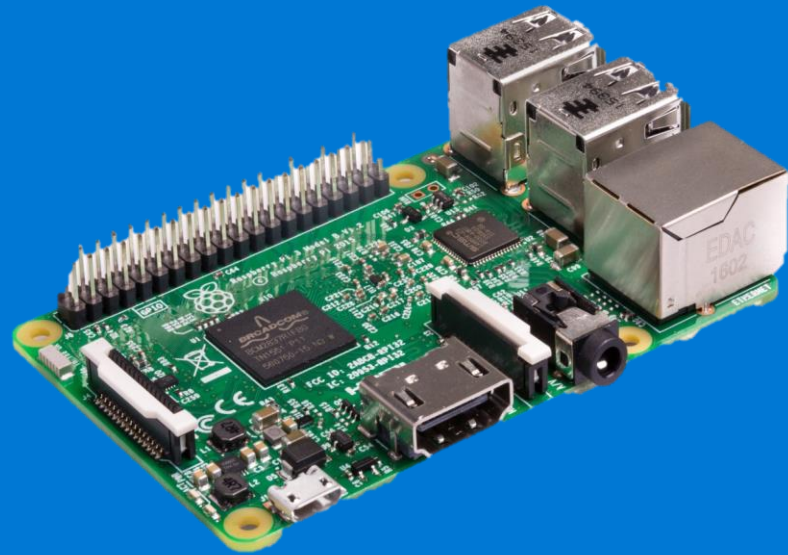
Distribute and **embed content** without purchasing per-user licenses

Publish reports on-premises with Power BI Report Server

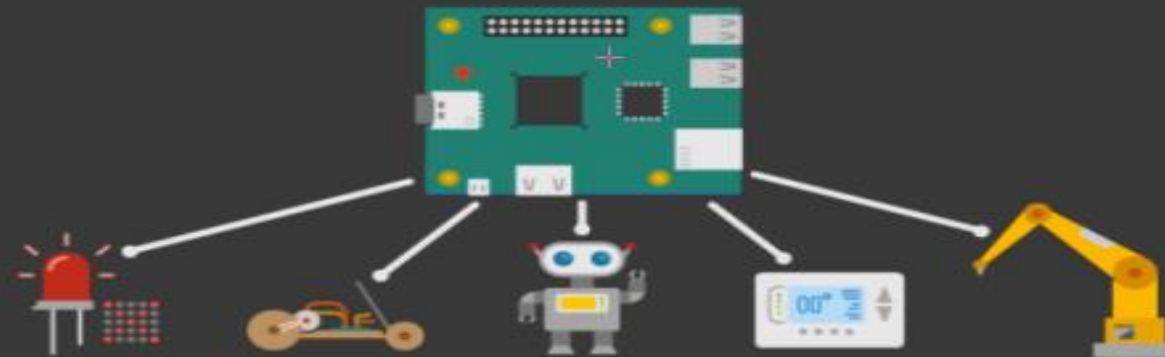
Unlock more capacity and higher limits for your Pro users

*Licensing information for Power BI Report Server and for embedding analytics with Power BI Premium.*

# Dashboards and IoT Core



## Windows 10 IoT Core



**IoT Core:**

**<https://docs.microsoft.com/en-us/windows/iot-core/tutorials/tutorials>**

**Pin mapping:**

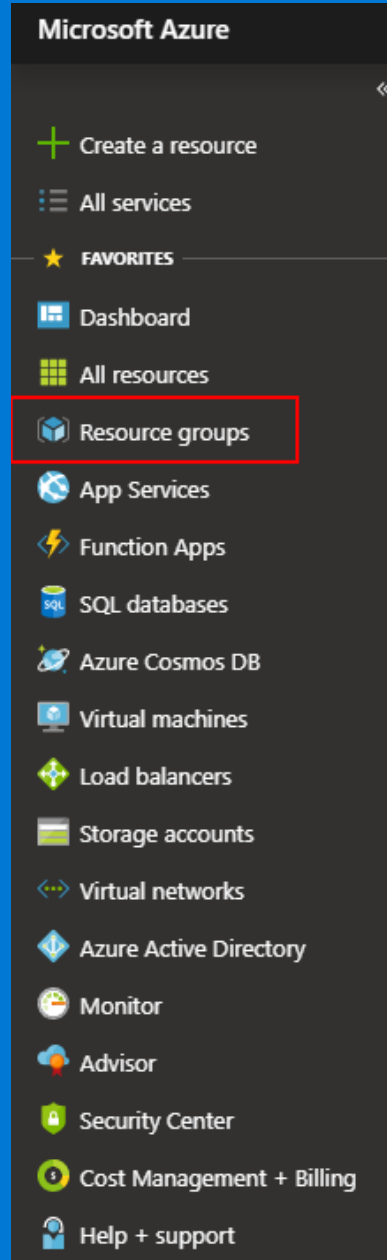
**<https://docs.microsoft.com/en-us/windows/iot-core/learn-about-hardware/pinmappings/pinmappingsrpi>**



# Universal Windows Platform



# Resource group



# Resource group

Microsoft Azure

+ Create a resource

All services

FAVORITES

Dashboard

All resources

Resource groups

App Services

Function Apps

SQL databases

Azure Cosmos DB

Virtual machines

Load balancers

Storage accounts

Virtual networks

Azure Active Directory

Monitor

Advisor

Security Center

Cost Management + Billing

Help + support

Search resources, services, and docs

>\_🔍⚙️?😊karoldd13@gmail.com  
KATALOG DOMYŚLNY

Home > Resource groups

Resource groups

Katalog domyślny

+ Add

Edit columns

Refresh

Assign tags

Subscriptions: Bezpłatna wersja próbna


Filter by name...

All locations

All tags

No grouping

0 items

<input type="checkbox"/> NAME ↑↓	SUBSCRIPTION ↑↓	LOCATION ↑↓
<div><div>No resource groups to display</div><div>Try changing your filters if you don't see what you're looking for. <a href="#">Learn more</a></div><div>Create resource group</div></div>		

# Resource group

Resource group

Create an empty resource group

\* Resource group name

FirstIoT

✓

\* Subscription

Bezpłatna wersja próbna

▼

\* Resource group location

West Europe

▼

# Azure IoT Hub

The screenshot displays the Microsoft Azure portal interface. On the left-hand navigation pane, the 'Create a resource' button, marked with a green plus icon, is highlighted with a red rectangular box. Below this, a list of services is visible, including 'All services', 'FAVORITES', 'Dashboard', 'Resource groups', 'All resources', 'Recent', 'App Services', 'SQL databases', 'Virtual machines (class...', 'Virtual machines', 'Cloud services (classic)', 'Subscriptions', and 'SQL servers'.

The main content area is titled 'New' and features a search bar labeled 'Search the Marketplace'. Below the search bar, there are two tabs: 'Azure Marketplace' and 'Featured', both with 'See all' links. Under the 'Featured' tab, several services are listed, each with an icon and a 'Quickstart tutorial' link. The 'IoT Hub' service, represented by a blue icon with a network diagram, is highlighted with a red rectangular box. Other services listed include 'IoT Hub Device Provisioning Service', 'Event Hubs', 'Time Series Insights', 'Stream Analytics job', and 'Machine Learning Experimentation (preview)'. At the bottom of the 'Featured' list, there is a 'PREVIEW' badge.

On the left side of the main content area, under the 'Azure Marketplace' tab, a list of categories is shown: 'Get started', 'Recently created', 'Compute', 'Networking', 'Storage', 'Web', 'Mobile', 'Containers', 'Databases', 'Analytics', 'AI + Machine Learning', 'Internet of Things', and 'Integration'. The 'Internet of Things' category is highlighted with a red rectangular box.

# Azure IoT Hub

[Home](#) > [New](#) > IoT hub

## IoT hub

Microsoft

[Basics](#) [Size and scale](#) [Review + create](#)

Create an IoT Hub to help you connect, monitor, and manage billions of your IoT assets. [Learn More](#)

### PROJECT DETAILS

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

* Subscription ⓘ	Free Trial	▼
* Resource Group ⓘ	cloud-shell-storage-westus	▼
	<a href="#">Create new</a>	
* Region ⓘ	West US	▼
* IoT Hub Name ⓘ	Name your IoT Hub	

[Review + create](#)

[Next: Size and scale »](#)

[Automation options](#)

# Azure IoT Hub

[Home](#) > [New](#) > IoT hub

## IoT hub

Microsoft

[Basics](#) [Size and scale](#) [Review + create](#)

Each IoT Hub is provisioned with a certain number of units in a specific tier. The tier and number of units determine the maximum daily quota of messages that you can send. [Learn more](#)

### SCALE TIER AND UNITS

\* Pricing and scale tier ⓘ

F1: Free tier



Only one Free IoT hub is allowed per subscription.

[Learn how to choose the right IoT Hub tier for your solution](#)

Number of F1 IoT Hub units ⓘ



This determines your IoT Hub scale capability and can be changed as your need increases.

1

Pricing and scale tier ⓘ F1

Messages per day ⓘ 8,000

Cost per month 0.00 USD

Device-to-cloud-messages ⓘ Enabled

Message routing ⓘ Enabled

Cloud-to-device commands ⓘ Enabled

IoT Edge ⓘ Enabled

Device management ⓘ Enabled

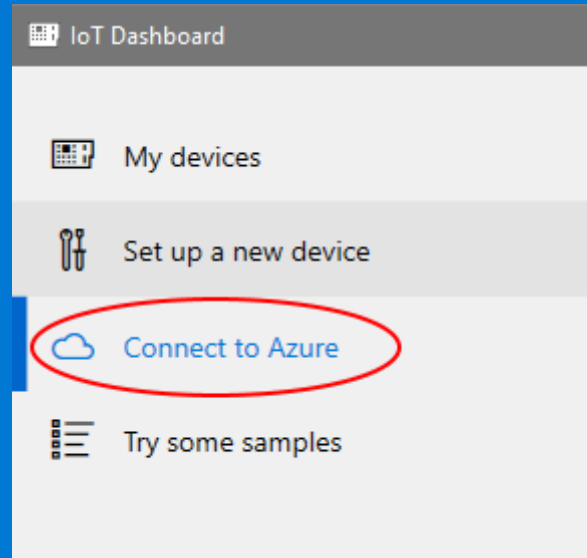
⌵ Advanced Settings

[Review + create](#)

[« Previous: Basics](#)

[Automation options](#)

# Connecting IoT Core device and UWP app with Azure cloud





# Connecting IoT Core device and UWP app with Azure cloud

## Provision your device

In order for your device to talk to Azure, it needs to have proper credentials.

Azure IoT Hub

sample-iot-hub

[Create new IoT Hub](#)

Azure device ID

BathroomThermometer

[Create new device](#)

Device to provision

samplerpi2d

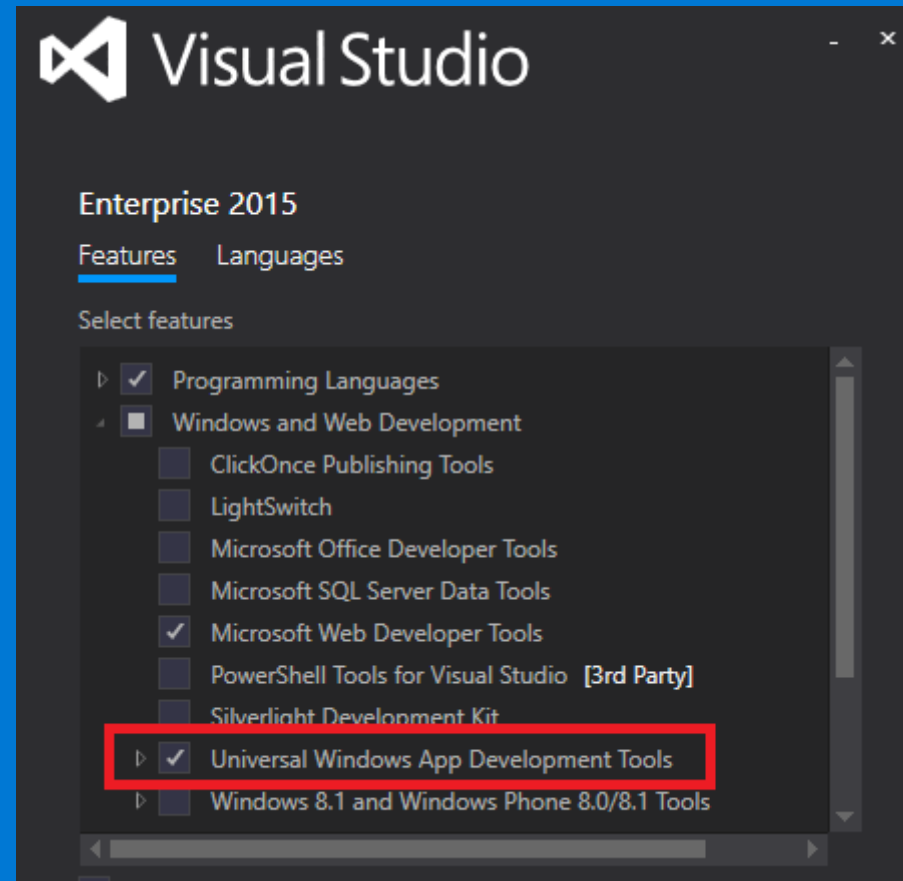
80.137.185.504



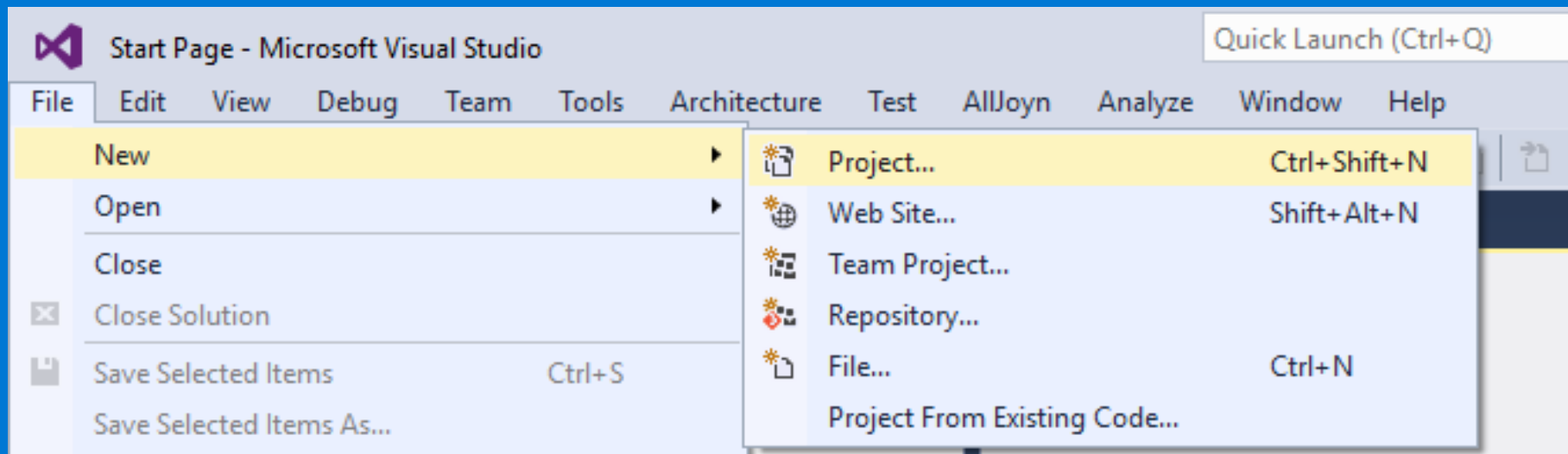
Back

Provision

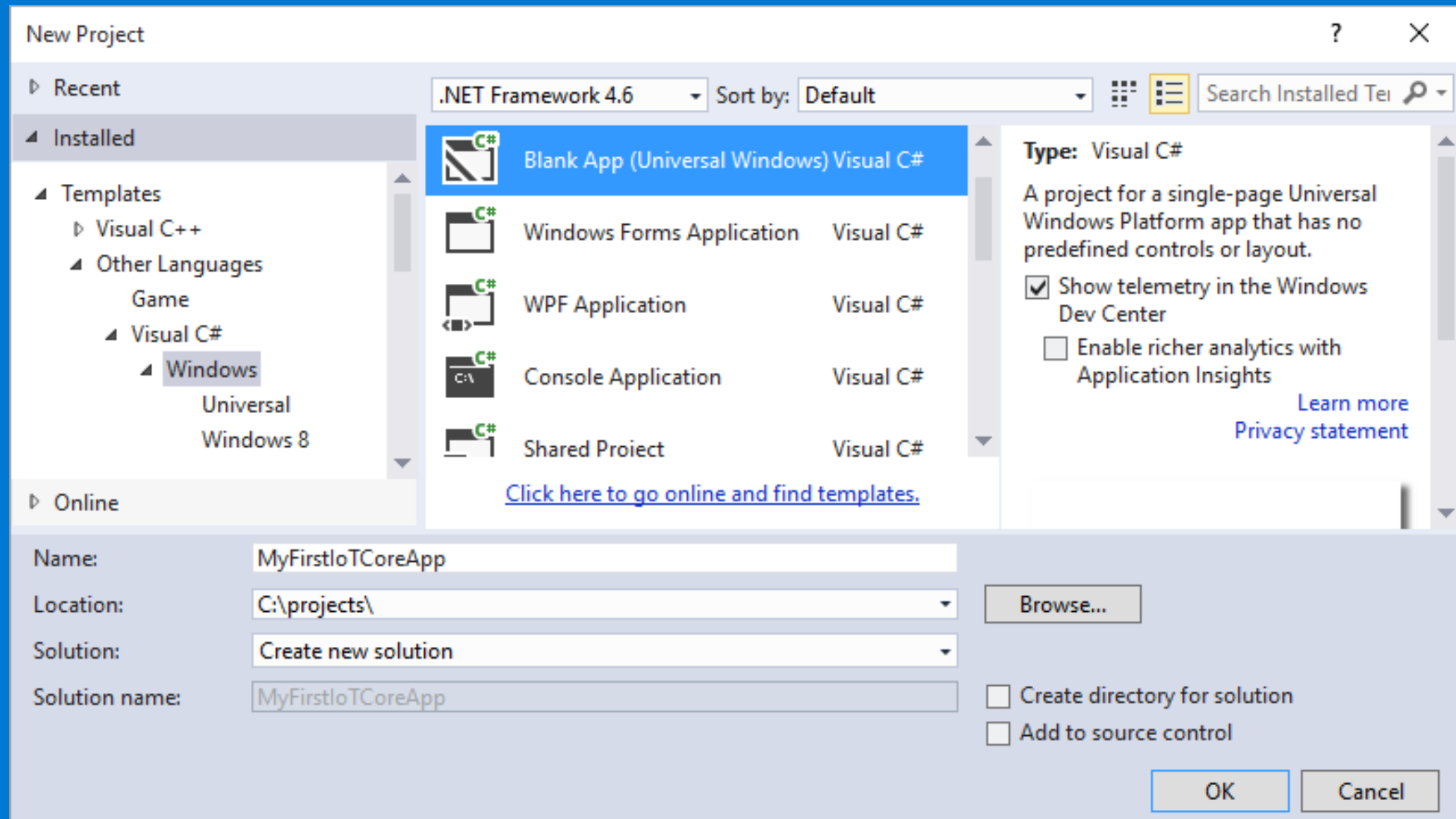
# Connecting IoT Core device and UWP app with Azure cloud



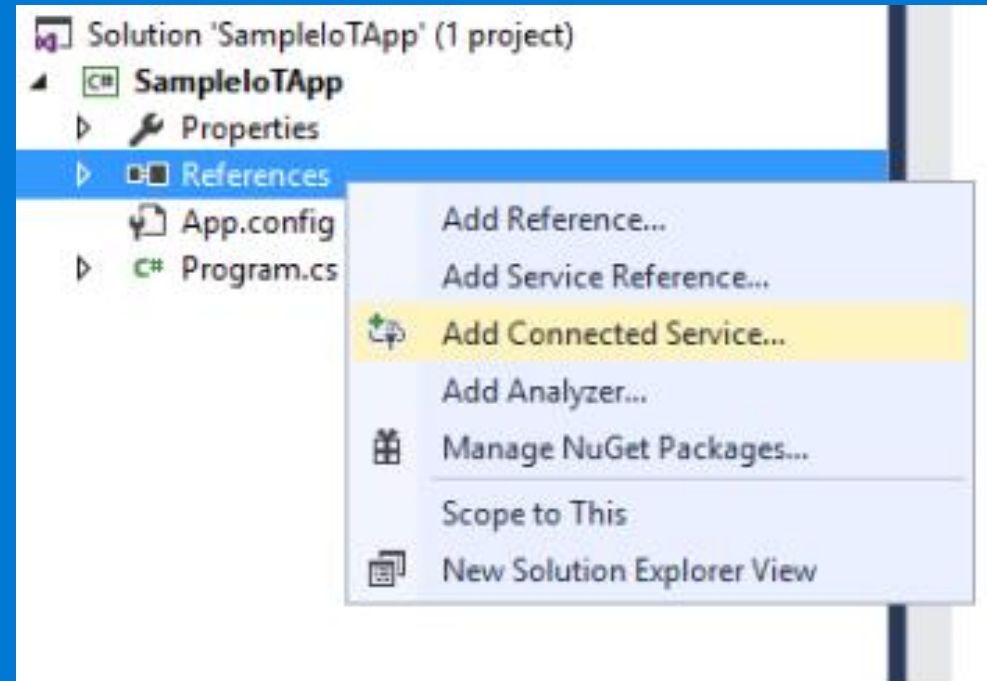
# Connecting IoT Core device and UWP app with Azure cloud



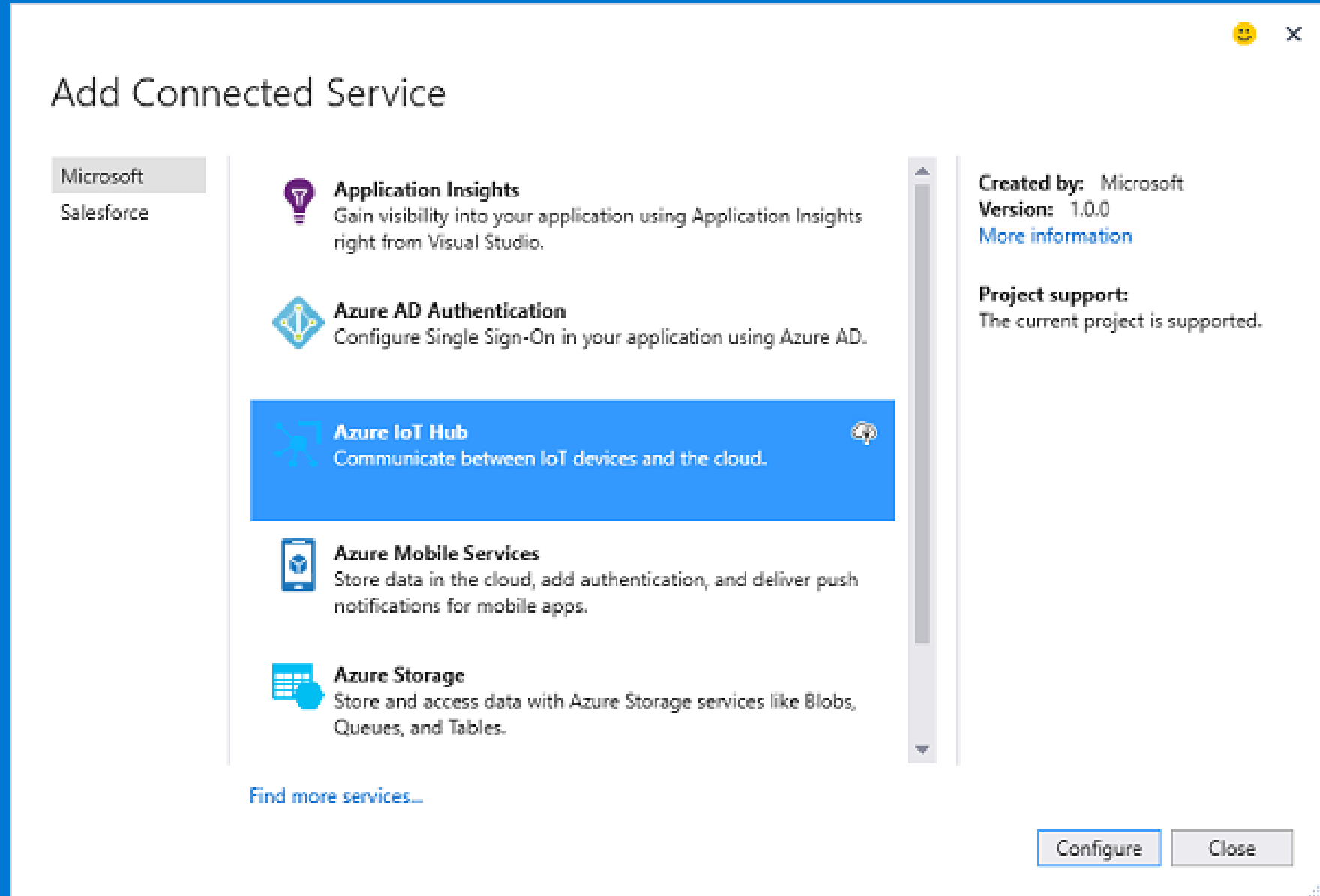
# Connecting IoT Core device and UWP app with Azure cloud



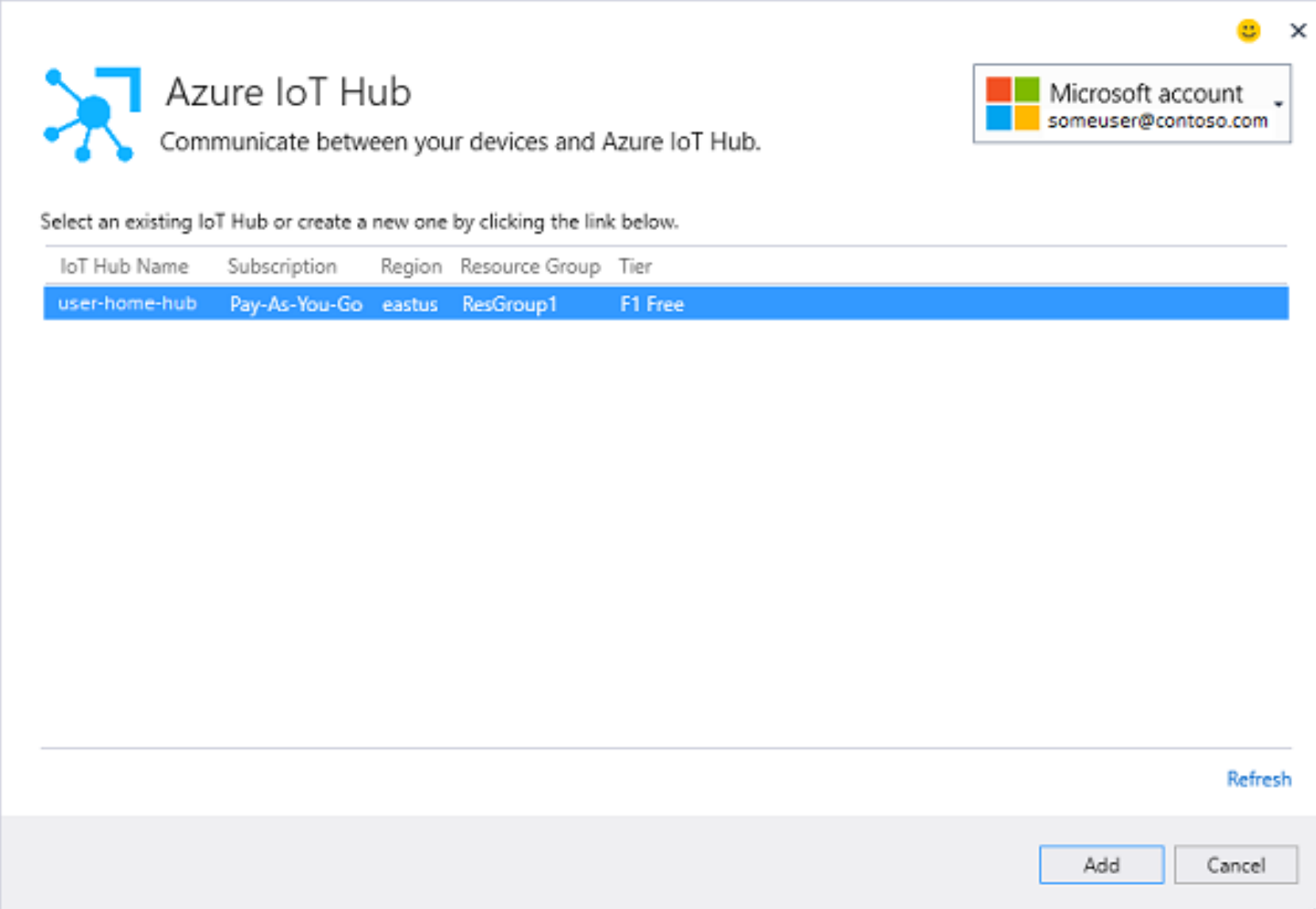
# Connecting IoT Core device and UWP app with Azure cloud



# Connecting IoT Core device and UWP app with Azure cloud



# Connecting IoT Core device and UWP app with Azure cloud



The screenshot shows the Azure IoT Hub management interface. At the top left is the Azure IoT Hub logo and the text "Azure IoT Hub" and "Communicate between your devices and Azure IoT Hub." At the top right is a Microsoft account dropdown menu showing "someuser@contoso.com". Below the header, there is a instruction: "Select an existing IoT Hub or create a new one by clicking the link below." Underneath is a table with the following columns: IoT Hub Name, Subscription, Region, Resource Group, and Tier. One row is visible and highlighted in blue: "user-home-hub", "Pay-As-You-Go", "eastus", "ResGroup1", and "F1 Free". At the bottom right of the table area is a "Refresh" link. At the very bottom of the window are "Add" and "Cancel" buttons.

**Azure IoT Hub**  
Communicate between your devices and Azure IoT Hub.

Select an existing IoT Hub or create a new one by clicking the link below.

IoT Hub Name	Subscription	Region	Resource Group	Tier
user-home-hub	Pay-As-You-Go	eastus	ResGroup1	F1 Free

[Refresh](#)

[Add](#) [Cancel](#)

# Azure Stream Analytics

Marketplace

+

Everything

Compute

Networking

Storage

Web + mobile

Databases

Intelligence + analytics

Internet of things

Enterprise integration

Security + identity

Developer tools

Monitoring + management

Add-ons

Containers

Everything

Filter

stream analytics

Results

NAME	PUBLISHER	CATEGORY
Stream Analytics job	Microsoft	Internet of things
Hive Streaming	Hive Streaming	Networking
KNIME® Cloud Analytics Platform 3.1	KNIME	Compute
DataZenie - Standard (BYOL)	DynApt Solutions	Compute
EnterpriseTube Premium ( 4-Channels )	VIDIZMO LLC	Compute
Zoomdata Server	Zoomdata	Compute
DataZenie - Standard	DynApt Solutions	Compute

Related to your search

Worldwide Historical Weather Data (preview)  
Weather Trends International

Event Hubs  
Microsoft

Stream Analytics job

Microsoft

Azure Stream Analytics is a fully managed, cost effective real-time event processing engine that helps to unlock deep insights from data. Stream Analytics makes it easy to set up real-time analytic computations on data streaming from devices, sensors, web sites, social media, applications, infrastructure systems, and more.

With a few clicks in the Azure portal, you can author a Stream Analytics job specifying the input source of the streaming data, the output sink for the results of your job, and a data transformation expressed in a SQL-like language. You can monitor and adjust the scale/speed of your job in the Azure portal to scale from a few kilobytes to a gigabyte or more of events processed per second.














Stream Analytics leverages years of Microsoft Research work in developing highly tuned streaming engines for time-sensitive processing, as well as language integrations for intuitive specifications of such.

Create



# Azure Stream Analytics

+



New Stream Analytics J... — □ ×

\* Job name

jsiotdevprocessing ✓

\* Subscription

▼

\* Resource group ⓘ

☐ Create new ☒ Use existing

jsrg-devprocessing ✓

\* Location

West Europe ▼

☒ Pin to dashboard

Create Automation options

# Azure Stream Analytics

Home > FirstSA - Inputs

## FirstSA - Inputs

Stream Analytics job

Search (Ctrl+J)

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Settings
  - Locks
- Job topology
  - Inputs**
  - Functions
  - Query
  - Outputs
- Configure
  - Scale
  - Locale
  - Event ordering
  - Error policy
  - Compatibility level
- General
  - Tools
  - Properties
- Monitoring
  - Metrics
  - Alert rules

+ Add stream input + Add reference input

	SOURCE TYPE	SOURCE
Event Hub		
IoT Hub		
Blob storage		

# Azure Stream Analytics

## IoT Hub

New input

\* Input alias

Telemetry1 ✓

☐ Provide IoT Hub settings manually

☒ Select IoT Hub from your subscriptions

Subscription

Bezpłatna wersja próbna

IoT Hub ⓘ

FirstDevices

Endpoint ⓘ

Messaging

Shared access policy name ⓘ

iothubowner

Shared access policy key ⓘ

.....

Consumer group ⓘ

\$Default

\* Event serialization format ⓘ

JSON

Encoding ⓘ

UTF-8

Event compression type ⓘ

None

Save

**i**

The selected resource and the stream analytics job are located in different regions. You will be billed to move data between regions.

# Azure Stream Analytics

Home > FirstSA - Outputs

## FirstSA - Outputs

Stream Analytics job

Search (Ctrl+/)

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Settings
  - Locks
- Job topology
  - Inputs
  - Functions
  - Query
  - Outputs**
- Configure
  - Scale
  - Locale
  - Event ordering
  - Error policy
  - Compatibility level
- General
  - Tools
  - Properties
- Monitoring
  - Metrics
  - Alert rules

+ Add

- Event Hub
- SQL Database
- Blob storage**
- Table storage
- Service Bus topic
- Service Bus queue
- Cosmos DB
- Power BI
- Data Lake Storage (Gen1)

SINK
------

# Azure Stream Analytics

**jsiotdevprocessing**  
Stream Analytics job

Settings Start Stop Delete

Created

**Essentials**

Resource group: [jsrg-devprocessing](#)  
Status: **Created**  
Location: **West Europe**  
Subscription name: [Azure-Irregulars\\_563702](#)  
Subscription ID: **65a1016d-0f67-45d2-b838-b8f373d6d52e**

Send feedback: [UserVoice](#)  
Created: **Tuesday, October 18, 2016 11:02:18 AM**  
Started: -  
Last output: -

**Job Topology**

Inputs: 0  
No results.

**Query**  
<>

Outputs: 0  
No results.

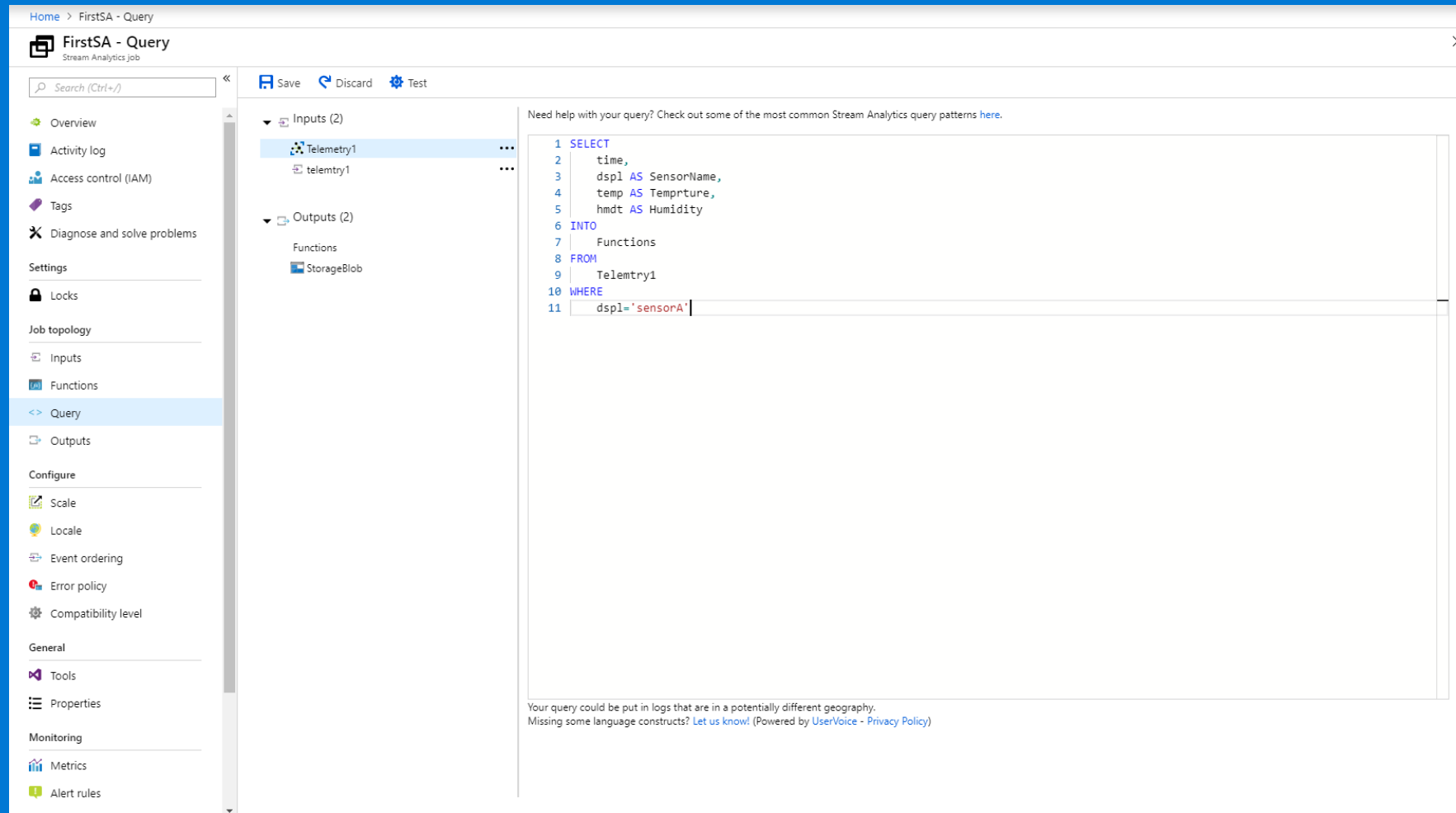
# Azure Stream Analytics

JSON

 Copy

```
{  
  "time": "2016-01-26T20:47:53.0000000",  
  "dspl": "sensorE",  
  "temp": 123,  
  "hmdt": 34  
}
```

# Azure Stream Analytics



<https://docs.microsoft.com/en-us/azure/stream-analytics/stream-analytics-stream-analytics-query-patterns>

# Azure Functions

Microsoft Azure

Home > New

Search resources

**+ Create a resource**

All services

FAVORITES

- Dashboard
- All resources
- Resource groups
- App Services
- SQL databases
- SQL data warehouses
- Azure Cosmos DB
- Virtual machines
- Load balancers
- Storage accounts
- Virtual networks
- Azure Active Directory
- Monitor
- Advisor
- Security Center
- Cost Management + Billing

Search the Marketplace

Azure Marketplace [See all](#)

- Get started
- Recently created
- Compute**
- Networking
- Storage
- Web + Mobile
- Containers
- Databases
- Data + Analytics
- AI + Cognitive Services
- Internet of Things
- Enterprise Integration
- Security + Identity
- Developer tools
- Monitoring + Management
- Add-ons
- Blockchain

Featured [See all](#)

- Windows Server 2016 Datacenter  
[Quickstart tutorial](#)
- Red Hat Enterprise Linux 7.2  
[Learn more](#)
- Ubuntu Server 16.04 LTS  
[Quickstart tutorial](#)
- SQL Server 2017 Enterprise Windows Server 2016  
[Learn more](#)
- Reserved VM Instances  
[Learn more](#)
- Service Fabric Cluster  
[Learn more](#)
- Web App for Containers  
[Learn more](#)
- Function App**  
[Quickstart tutorial](#)
- Batch Service  
[Learn more](#)



# Azure Functions

Function App

Create

\* App name

functions-ggailey777

.azurewebsites.net

\* Subscription

Visual Studio Enterprise

\* Resource Group ⓘ

☒ Create new ☐ Use existing

functions-ggailey777

\* OS

Windows Linux (Preview)

\* Hosting Plan ⓘ

Consumption Plan

\* Location

West Europe

\* Runtime Stack

.NET

\* Storage ⓘ

☒ Create new ☐ Use existing

functionsggaile8e6

Application Insights ⓘ

On Off

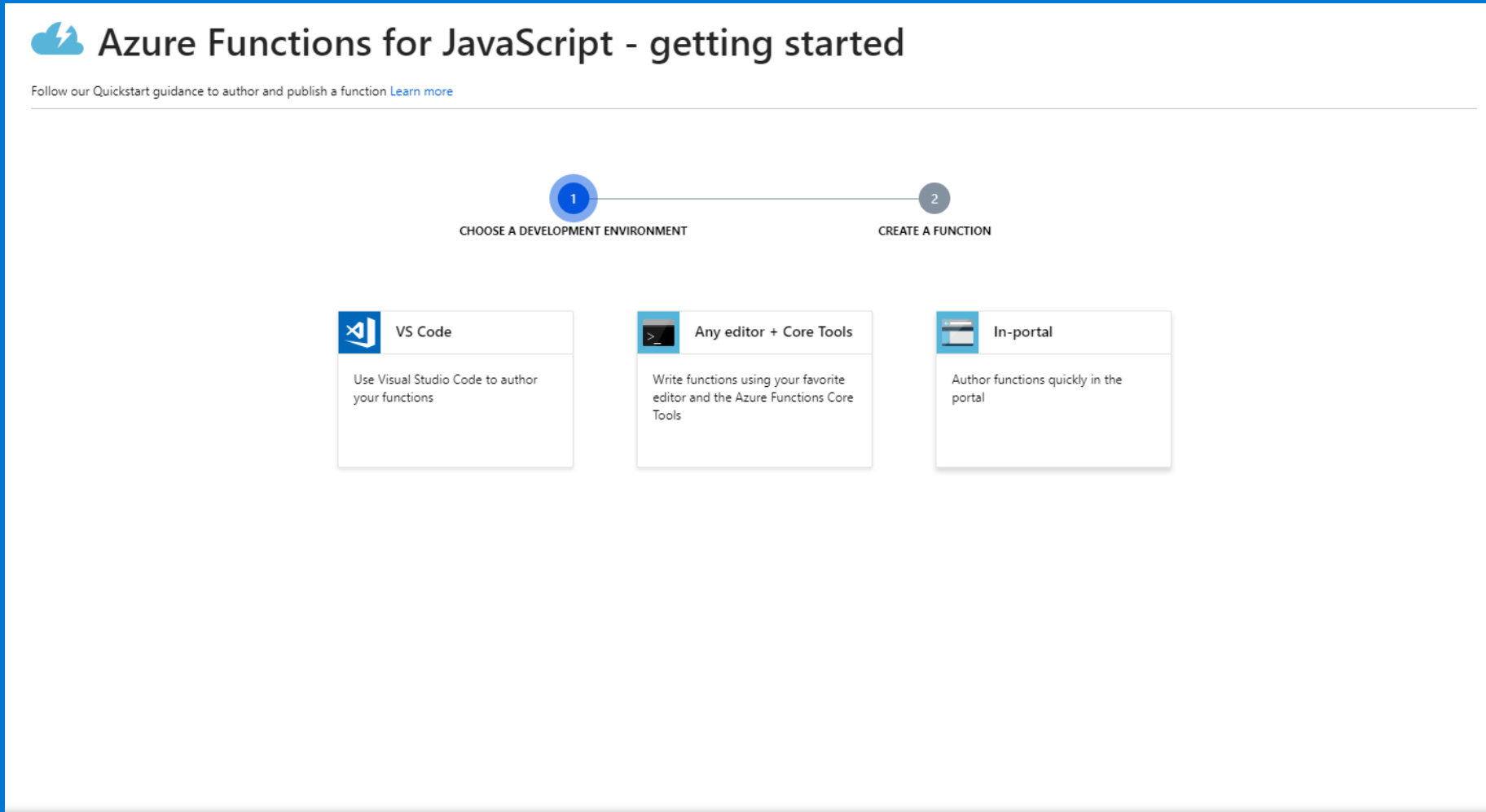
\* Application Insights Location ⓘ

West Europe

Create

Automation options

<https://docs.microsoft.com/en-us/azure/azure-functions/functions-create-cosmos-db-triggered-function>



## Azure Functions for JavaScript - getting started


Follow our Quickstart guidance to author and publish a function [Learn more](#)


---


1

2

CHOOSE A DEVELOPMENT ENVIRONMENT      CREATE A FUNCTION

 **VS Code**  
Use Visual Studio Code to author your functions

 **Any editor + Core Tools**  
Write functions using your favorite editor and the Azure Functions Core Tools

 **In-portal**  
Author functions quickly in the portal

# Azure Functions

## Azure Functions for JavaScript - getting started

Follow our Quickstart guidance to author and publish a function [Learn more](#)



CHOOSE A DEVELOPMENT ENVIRONMENT



CREATE A FUNCTION



Webhook + API

A function that will be run whenever it receives an HTTP request



Timer

A function that will be run on a specified schedule



More templates...

View all templates available to this function app

# Azure Functions

Triggers ⓘ

HTTP (req)

Inputs ⓘ


+ New Input


Outputs ⓘ


HTTP (res)


+ New Output


Advanced editor


  
Azure Queue Storage


  
Azure Blob Storage


  
HTTP


  
Azure Service Bus


  
Azure Table Storage


  
Azure Event Hubs


  
SendGrid

  
Excel table

  
Outlook mail message

  
OneDrive file

  
Microsoft Graph webhook subscription

  
Azure Cosmos DB

# Azure Functions

Home > FirstSA - Outputs

**FirstSA - Outputs**  
Stream Analytics job

Search (Ctrl+/)

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Settings
  - Locks
- Job topology
  - Inputs
  - Functions
  - Query
  - Outputs**
- Configure
  - Scale
  - Locale
  - Event ordering
  - Error policy
  - Compatibility level
- General
  - Tools
  - Properties
- Monitoring
  - Metrics
  - Alert rules

**+ Add**

- SQL Database
- Blob storage
- Table storage
- Service Bus topic
- Service Bus queue
- Cosmos DB
- Power BI
- Data Lake Storage Gen1
- Azure function**

**SINK**

# Azure Functions

Azure function

New output

⚠

Please make sure that the Minimum TLS version is set to 1.0 on your Azure Functions before you start your ASA job

\* Output alias

Functions

✓

☐ Provide azure function settings manually

☒ Select azure function from your subscriptions

Subscription

Bezpłatna wersja próbna

▼

\* Function app

FirtsFA

▼

\* Function

HttpTrigger1

▼

Key

.....

Max batch size ⓘ

Max batch count ⓘ

# Azure Machine Learning

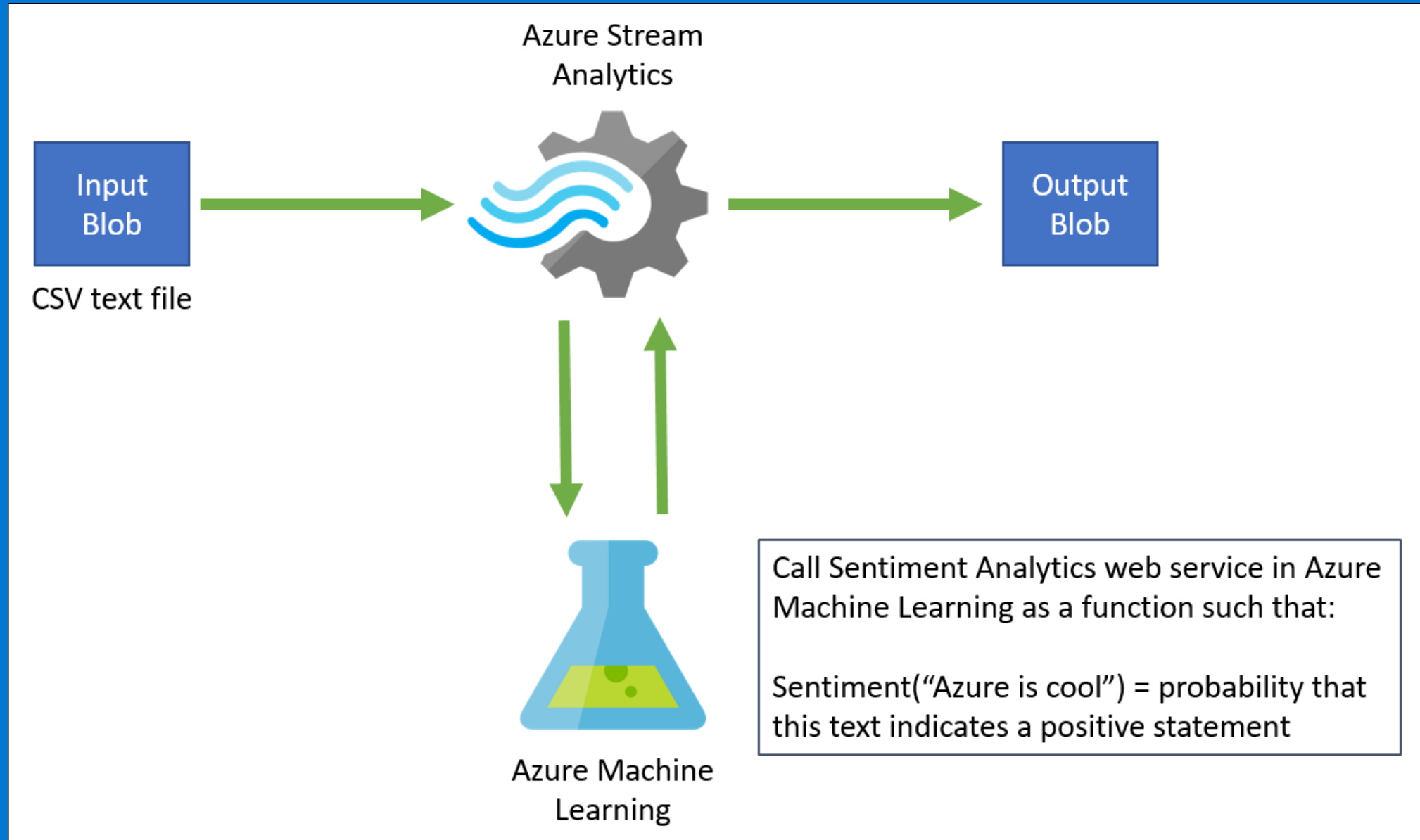
## Text

Azure is cool

Cortana Analytics rocks

I hate going to the gym

# Azure Machine Learning





# Azure Machine Learning

The screenshot displays the Azure Machine Learning interface for a Stream Analytics job named 'azure-sa-ml-demo - Functions'. The left sidebar contains navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, SETTINGS (Locks), JOB TOPOLOGY (Inputs, Functions, Query, Outputs), and CONFIGURE (Scale, Locale). The 'Functions' option is highlighted. The main area shows a table with one function named 'sentiment' having 1 parameter. A '+ Add' button is visible. The right panel, titled 'Azure Machine Learning function', contains configuration fields: 'Function alias' (sentiment1), 'Provide Azure Machine Learning function settings manually' (selected), 'Subscription' (Subscription information not needed), 'URL' (https://ussouthcentral.services.azureml.net/workspaces/81...), and 'Key' (masked). A 'Save' button and an information message are at the bottom.

actions

azure-sa-ml-demo - Functions  
Stream Analytics job

Search (Ctrl+/) << + Add

NAME	PARAMETERS
sentiment	1

**Azure Machine Learning function**  
New function

\* Function alias  
sentiment1 ✓

☒ Provide Azure Machine Learning function settings manually  
☐ Select Azure Machine Learning function from your subscriptions

Subscription  
Subscription information not needed ✓

\* URL  
https://ussouthcentral.services.azureml.net/workspaces/81... ✓

Key  
.....

Save

If the chosen resource and the stream analytics job are located in different regions, you will be billed to move data between regions.

# Azure Machine Learning

```
WITH sentiment AS (  
  SELECT text, sentiment(text) as result  
  FROM datainput  
)  
  
SELECT text, result.[Score]  
INTO datamloutput  
FROM sentiment
```

# Azure Machine Learning

The screenshot displays the Azure Storage Explorer interface for a container named 'azuresamlblob'. The interface includes a top navigation bar with icons for Upload, Refresh, Delete container, Properties, and Access policy. Below this, the 'Location' is set to 'azuresamlblob'. A search bar is present with the placeholder text 'Search blobs by prefix (case-sensitive)'. The main area shows a list of blobs under the heading 'NAME'. Two blobs are listed: '-1415627-108\_1.csv' and 'SA-ML-demo.csv'. The first blob is selected, indicated by a checkmark icon. A context menu is open over the selected blob, showing three options: 'Edit metadata' (with an information icon), 'Download' (with a download icon), and 'Delete' (with a trash icon). The 'Download' option is highlighted with a red box.

azuresamlblob  
Container

Upload Refresh Delete container Properties Access policy

Location: azuresamlblob

Search blobs by prefix (case-sensitive)

NAME

<input checked="" type="checkbox"/>	-1415627-108_1.csv	
<input type="checkbox"/>	SA-ML-demo.csv	

- Edit metadata ⓘ
- Download ⬇
- Delete 🗑

# Azure Machine Learning

text	scored probabilities
Azure is so cool	0.733864188
Cortana Analytics rocks	0.590195894
I hate going to Gym	0.403451264

The screenshot displays the 'ASATutorial - Outputs' interface. On the left, a sidebar contains navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, SETTINGS (Locks), JOB TOPOLOGY (Inputs, Functions, Query, Outputs), and CONFIGURE (Scale, Locale, Event ordering). The 'Outputs' option is highlighted with a red box. In the main area, a '+ Add' button is also highlighted with a red box. Below it, a table with the header 'NAME' shows an 'Empty' state.

The 'Power BI' modal window, titled 'New output', is open on the right. It contains the following fields and options:

- \* Output alias:** MyPBLOutput ✓
- Group workspace:** Authorize connection to load workspaces ▼
- \* Dataset name:** ASAdataset ✓
- \* Table name:** ASATable ✓

Below these fields, the modal includes an **Authorize connection** section with the text: 'You'll need to authorize with Power BI to configure your output settings.' and an **Authorize** button.

At the bottom of the modal, there is a link: 'Don't have a Microsoft Power BI account yet? [Sign up](#)'.

A note box at the bottom right states: 'Note: You are granting this output permanent access to your Power BI dashboard. Should you need to revoke this access in the future you can do one of the following:' followed by a list:

1. Change the user account password.
2. Delete this output.
3. Delete this job.

ASATutorial - Query  
Stream Analytics job

Search (Ctrl+/)

Save Discard Test

Inputs (1)  
CallStream

Outputs (1)  
MyPBIOutput

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

SETTINGS  
Locks

JOB TOPOLOGY  
Inputs  
Functions  
**Query**  
Outputs

CONFIGURE  
Scale  
Locale  
Event ordering  
Error policy

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

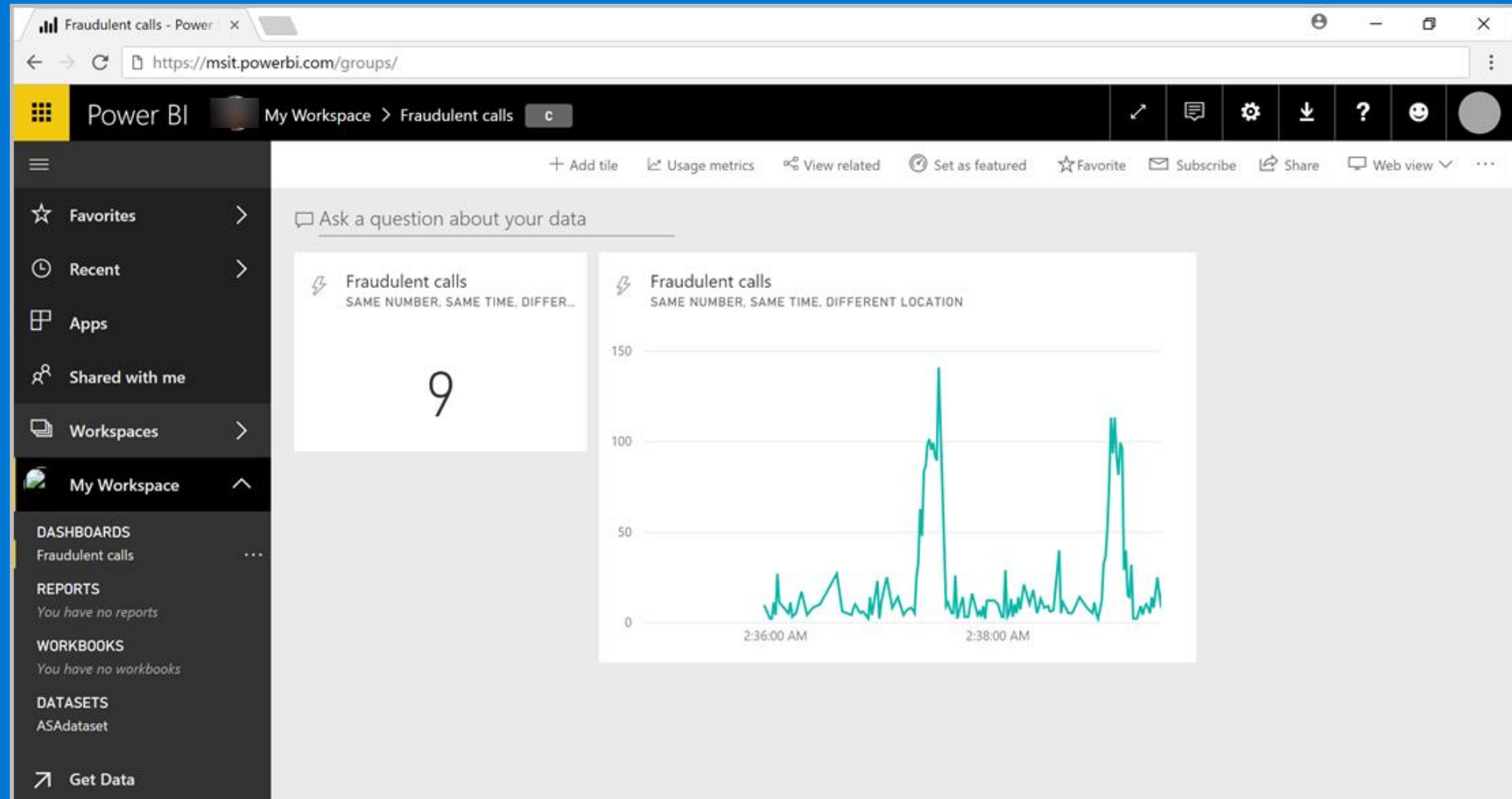
```
1 SELECT System.Timestamp AS WindowEnd, COUNT(*) AS FraudulentCalls
2 INTO "MyPBIOutput"
3 FROM "CallStream" CS1 TIMESTAMP BY CallRecTime
4 JOIN "CallStream" CS2 TIMESTAMP BY CallRecTime
5 ON CS1.CallingIMSI = CS2.CallingIMSI
6 AND DATEDIFF(ss, CS1, CS2) BETWEEN 1 AND 5
7 WHERE CS1.SwitchNum != CS2.SwitchNum
8 GROUP BY TumblingWindow(Duration(second, 1))
```

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](#))

# PowerBI

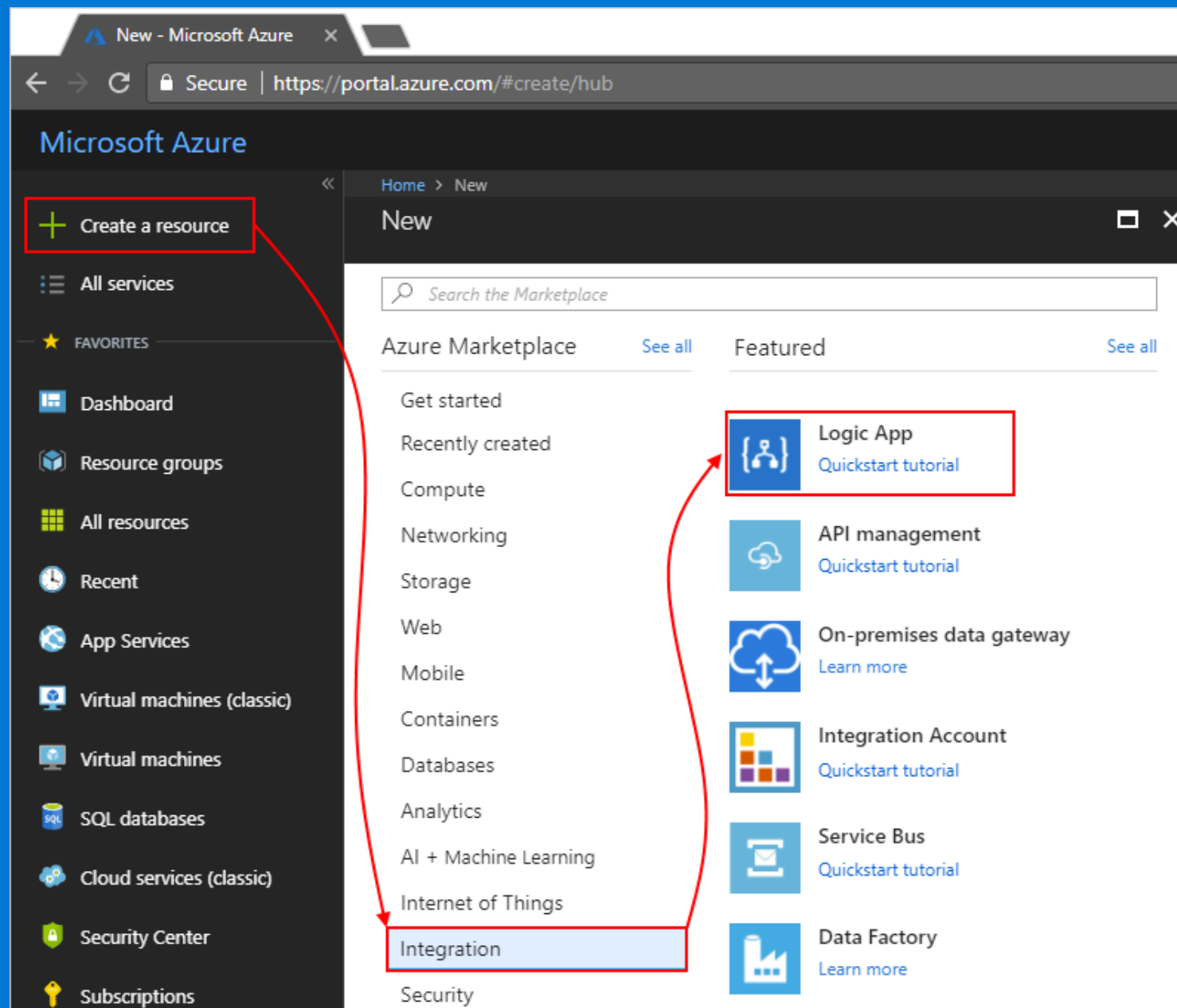
The screenshot displays the Microsoft Power BI web application interface. The browser's address bar shows the URL <https://msit.powerbi.com/groups/>. The top navigation bar includes the Power BI logo, the current workspace 'My Workspace', and the specific dashboard 'Fraudulent calls'. A left-hand navigation pane lists various categories: Favorites, Recent, Apps, Shared with me, Workspaces, My Workspace, DASHBOARDS (containing 'Fraudulent calls'), REPORTS (with the note 'You have no reports'), WORKBOOKS (with the note 'You have no workbooks'), DATASETS (containing 'ASAdataset'), and a 'Get Data' button at the bottom. The main content area is currently empty, with options to '+ Add tile', 'Usage metrics', and 'View relationships'. An 'Add tile' dialog box is open on the right side of the screen. This dialog box has a 'Select source' section with a 'Video' tile option. Below this, a section titled 'REAL-TIME DATA' is highlighted with a red border and contains a 'Custom Streaming Data' tile, which is also highlighted with a yellow border. At the bottom of the 'REAL-TIME DATA' section, there are 'Next' and 'Cancel' buttons.

# PowerBI
























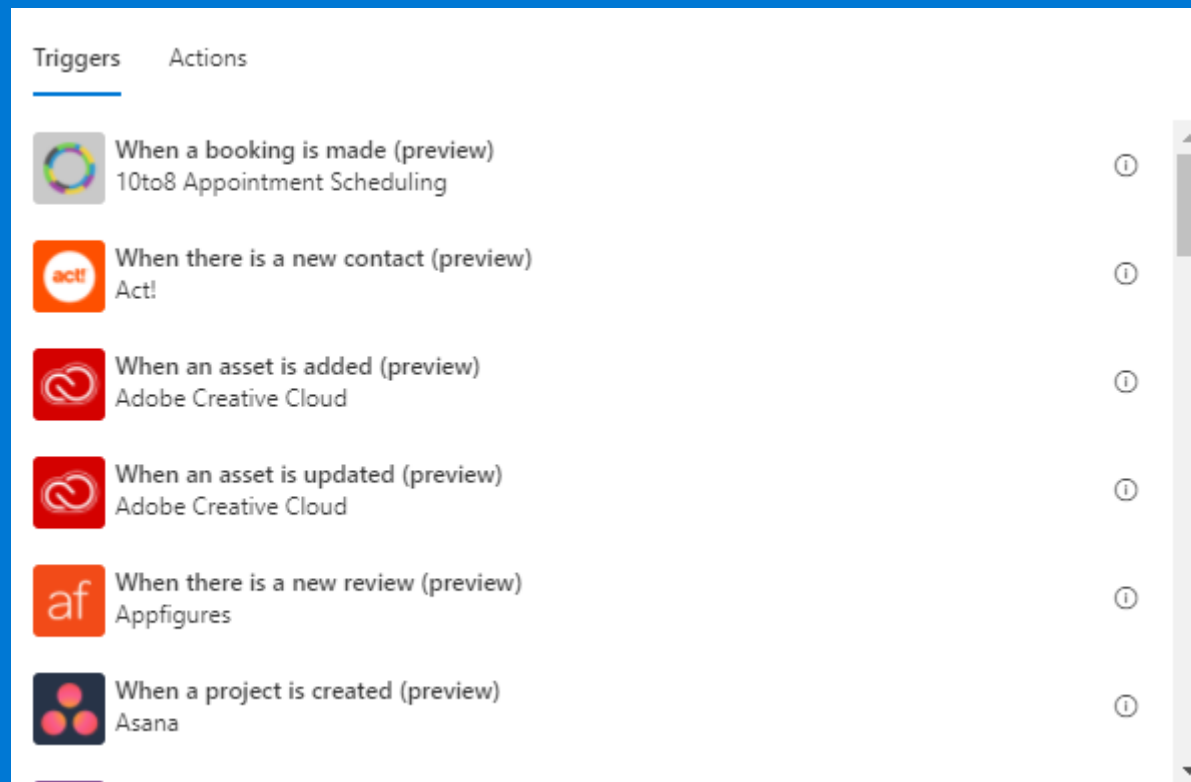
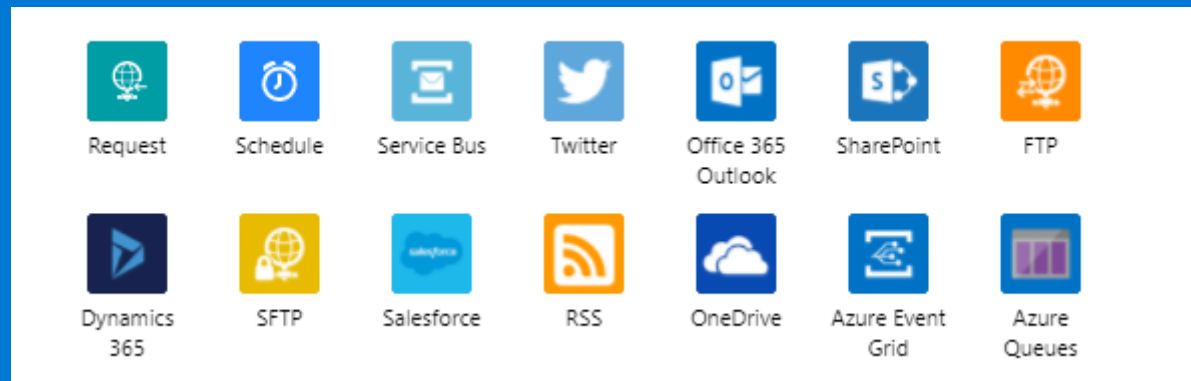
# Logic Apps



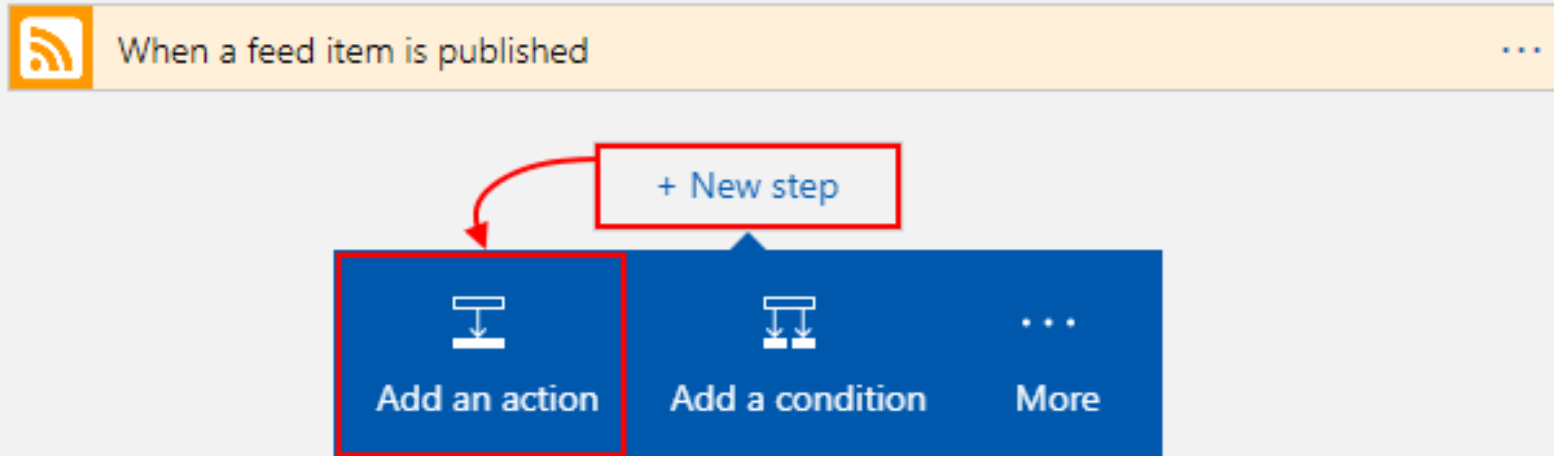
# Logic Apps

<p>Blank Logic App</p> 	  <p>Correlated in-order delivery using service bus sessions</p>	  <p>Delete old Azure blobs</p>	  <p>HTTP Request-Response</p>
  <p>Peek-lock receive a Service Bus message and complete it</p>	    <p>Receive an X12 EDI document over AS2 and transform it to XML</p>	  <p>Send an email when an item in a Sharepoint list is modified</p>	    <p>Receive an AS2 payload and reply with an asynchronous or synchronous MDN to sender</p>

# Logic Apps



# Logic Apps



# Logic Apps



Control



HTTP



Service Bus



SQL Server



Azure  
Functions



Office 365  
Outlook



Azure Blob  
Storage

Triggers

Actions



Response  
Request



Book new appointment (preview)  
10to8 Appointment Scheduling



Create a contact (preview)  
Act!



Get asset contents using asset id (preview)  
Adobe Creative Cloud



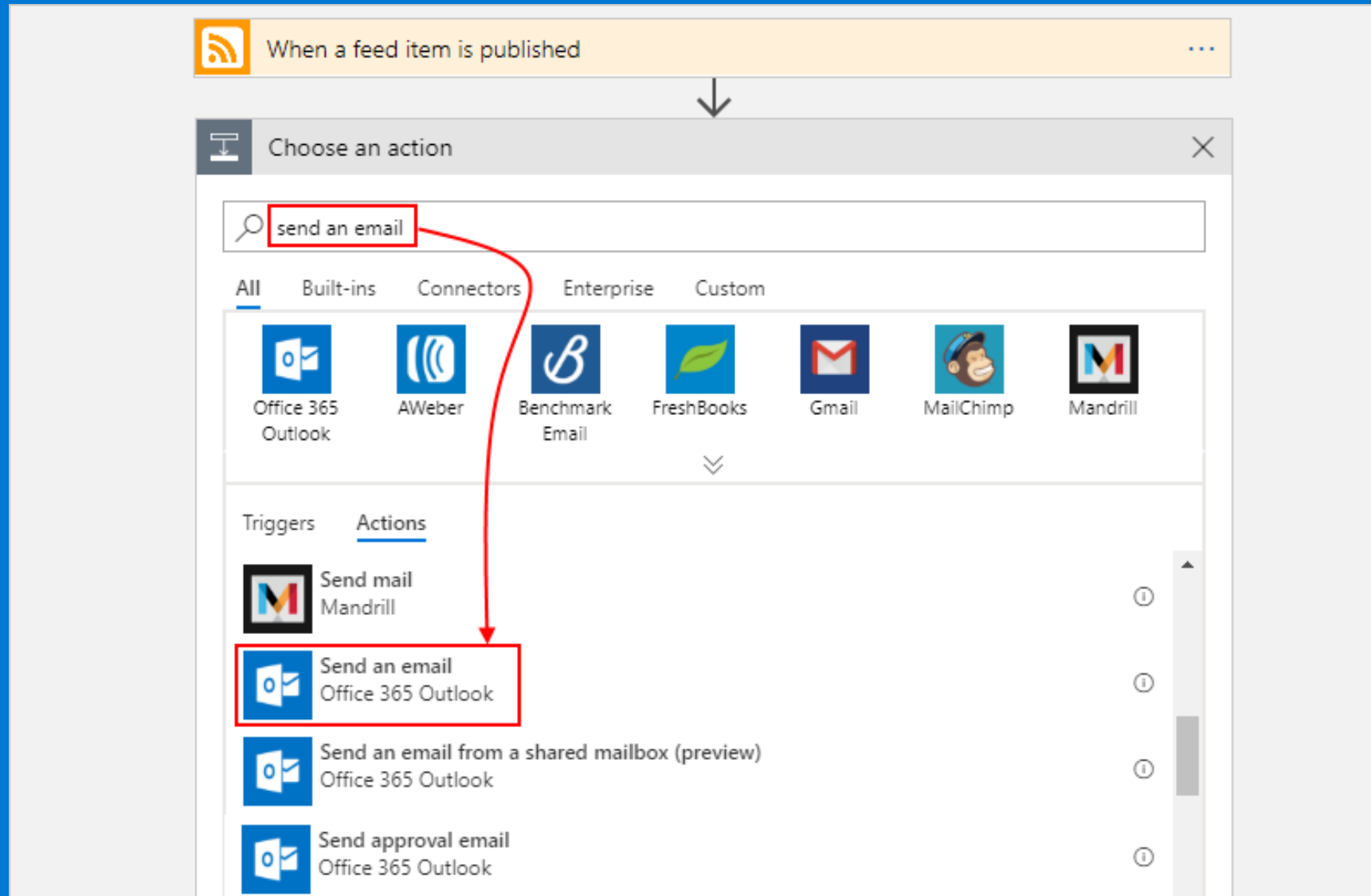
Get asset details using asset id (preview)  
Adobe Creative Cloud



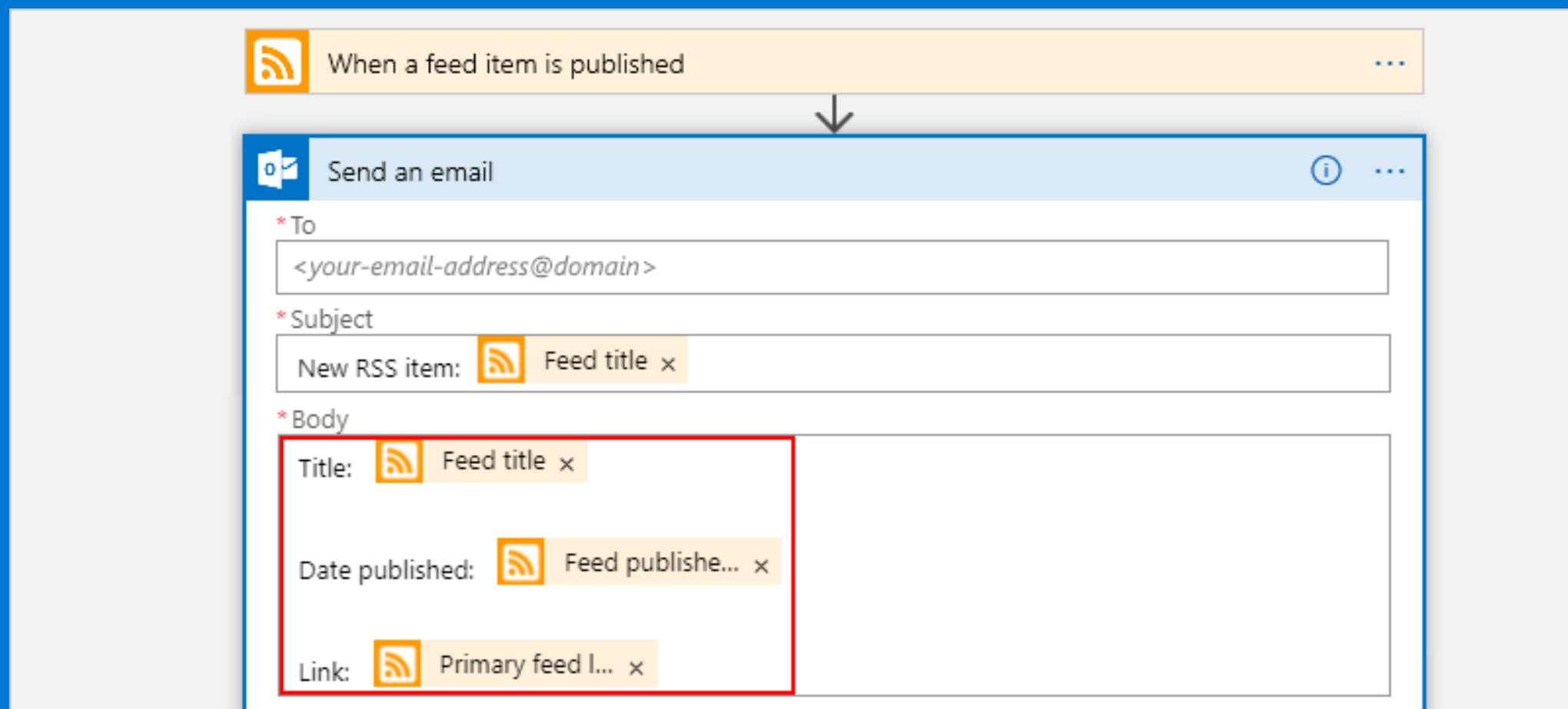
List all assets in folder (preview)  
Adobe Creative Cloud



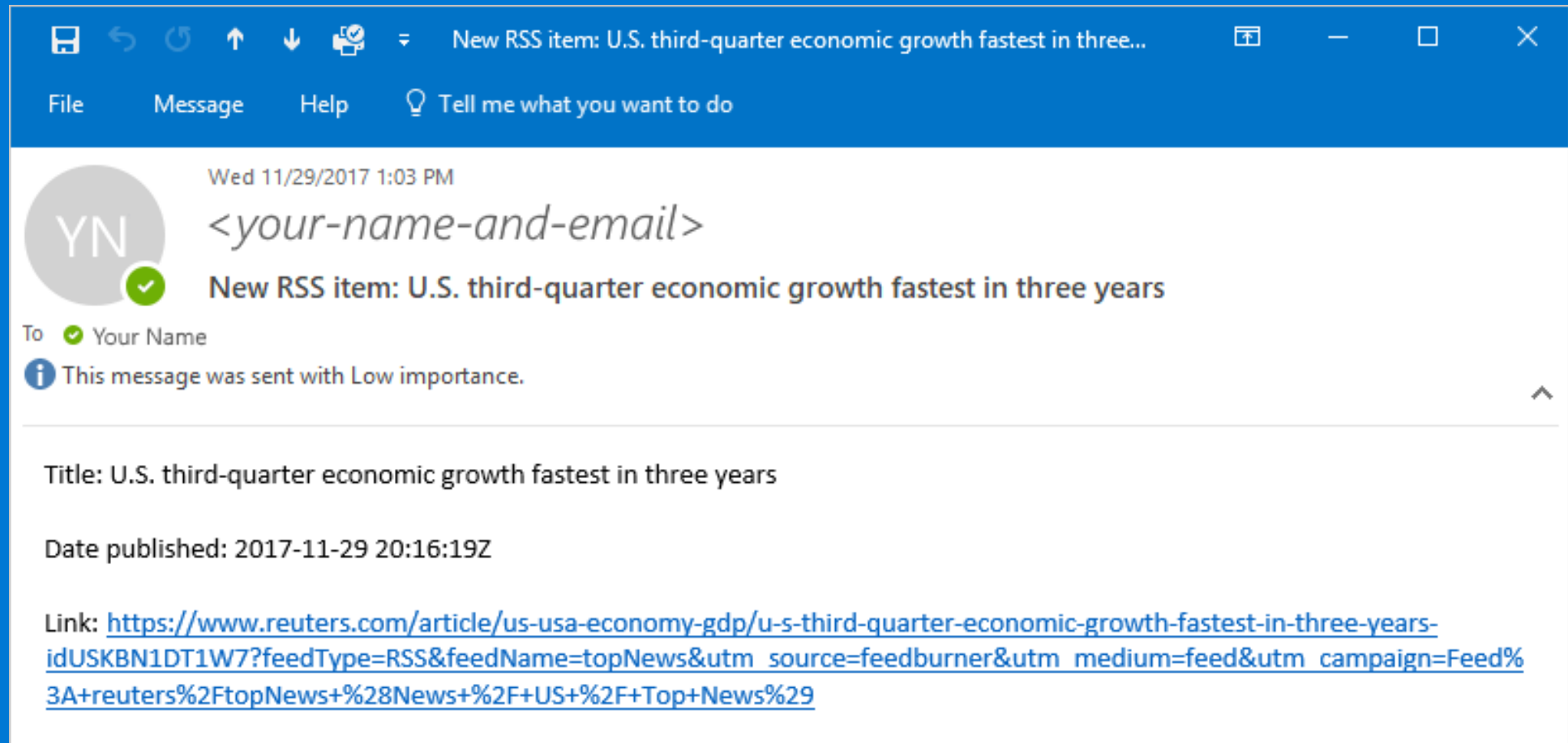
# Logic Apps



# Logic Apps

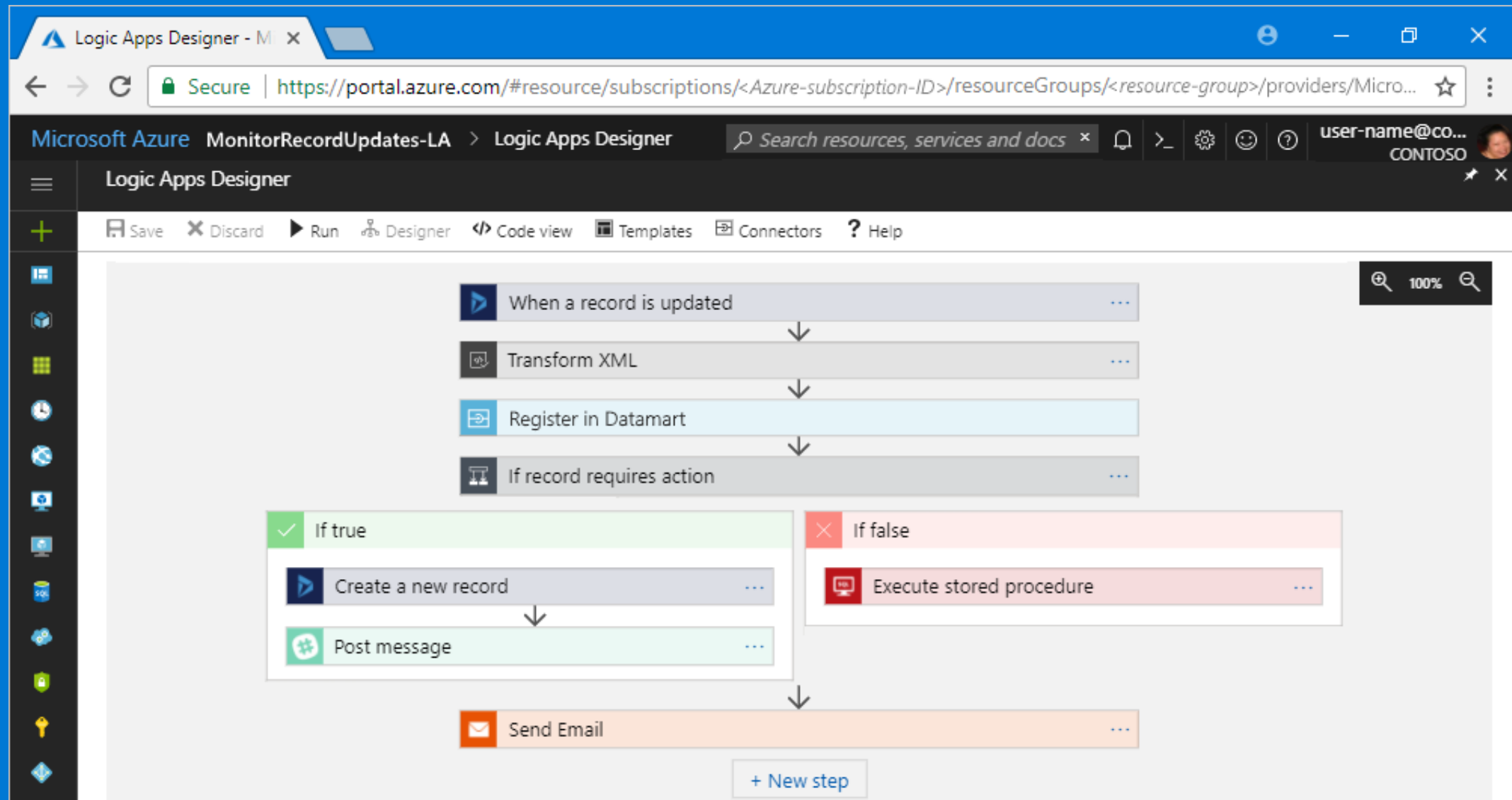


# Logic Apps

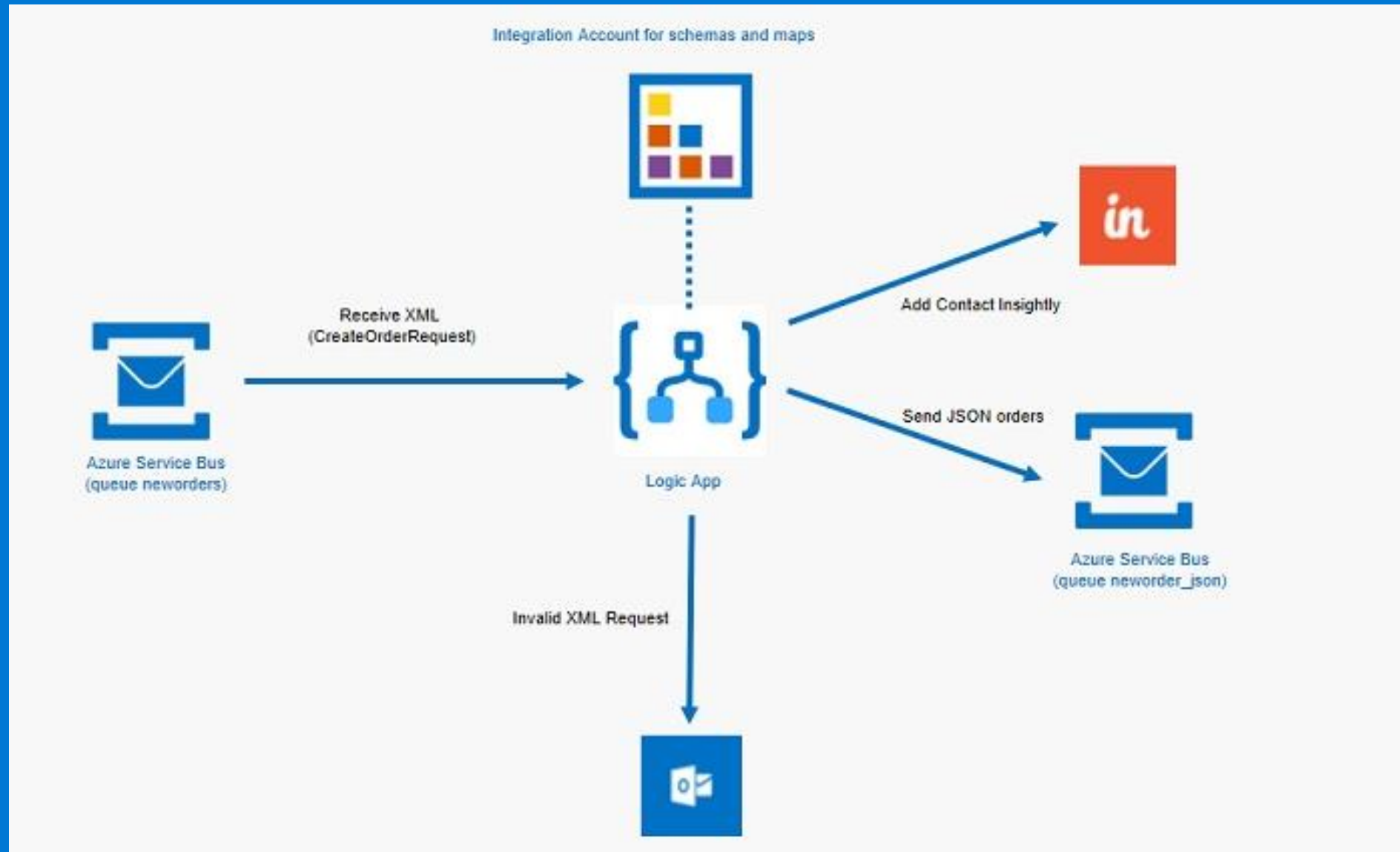




# Logic Apps



# Logic Apps

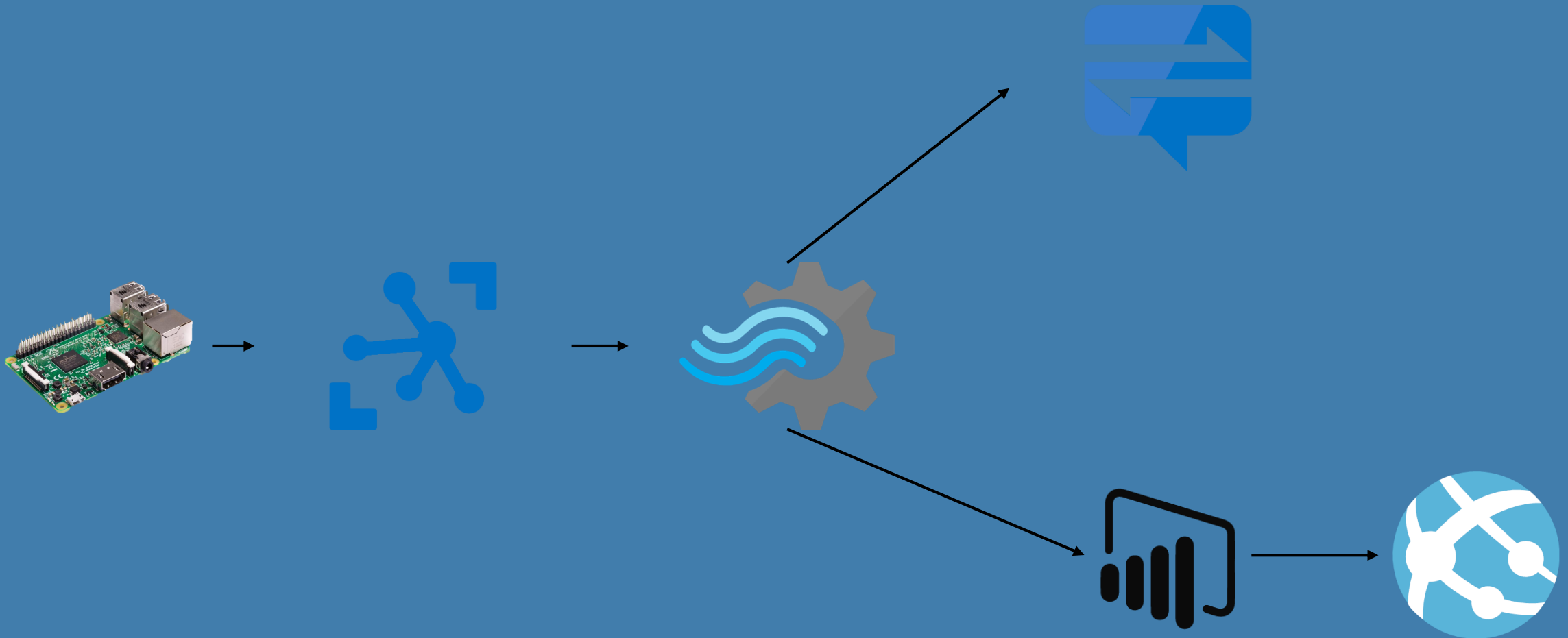


# Sharing in application

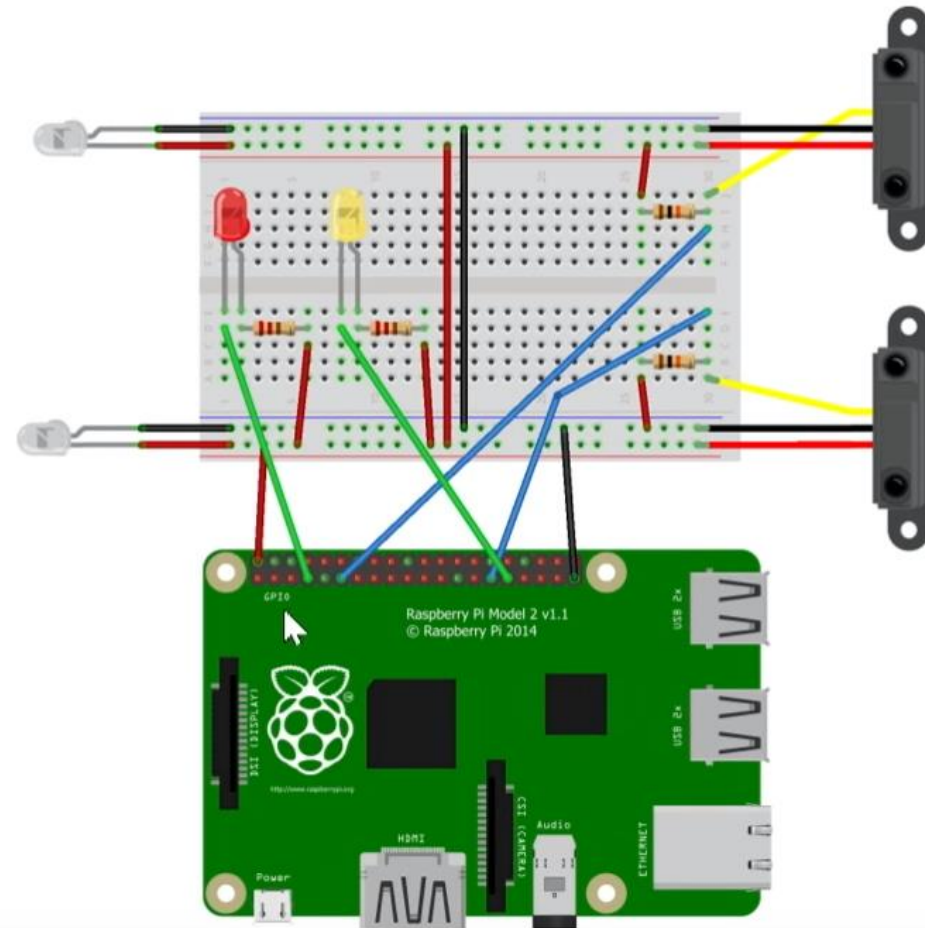


# UWP Shop analytic

<https://github.com/Microsoft/uwp-shop-analytics-sample>



## IoT Schematic



## IR beam sensor map



enter = false;  
exit = false;

No event has  
happened yet

Entry

Exit

Entry

Exit

## IR beam sensor map

enter = true;  
exit = false;

No event has  
happened yet

Entry

Exit



Entry

Exit

## IR beam sensor map

enter = true;  
exit = true;

At this point, an  
“Entry” event has  
occurred

Entry

Exit

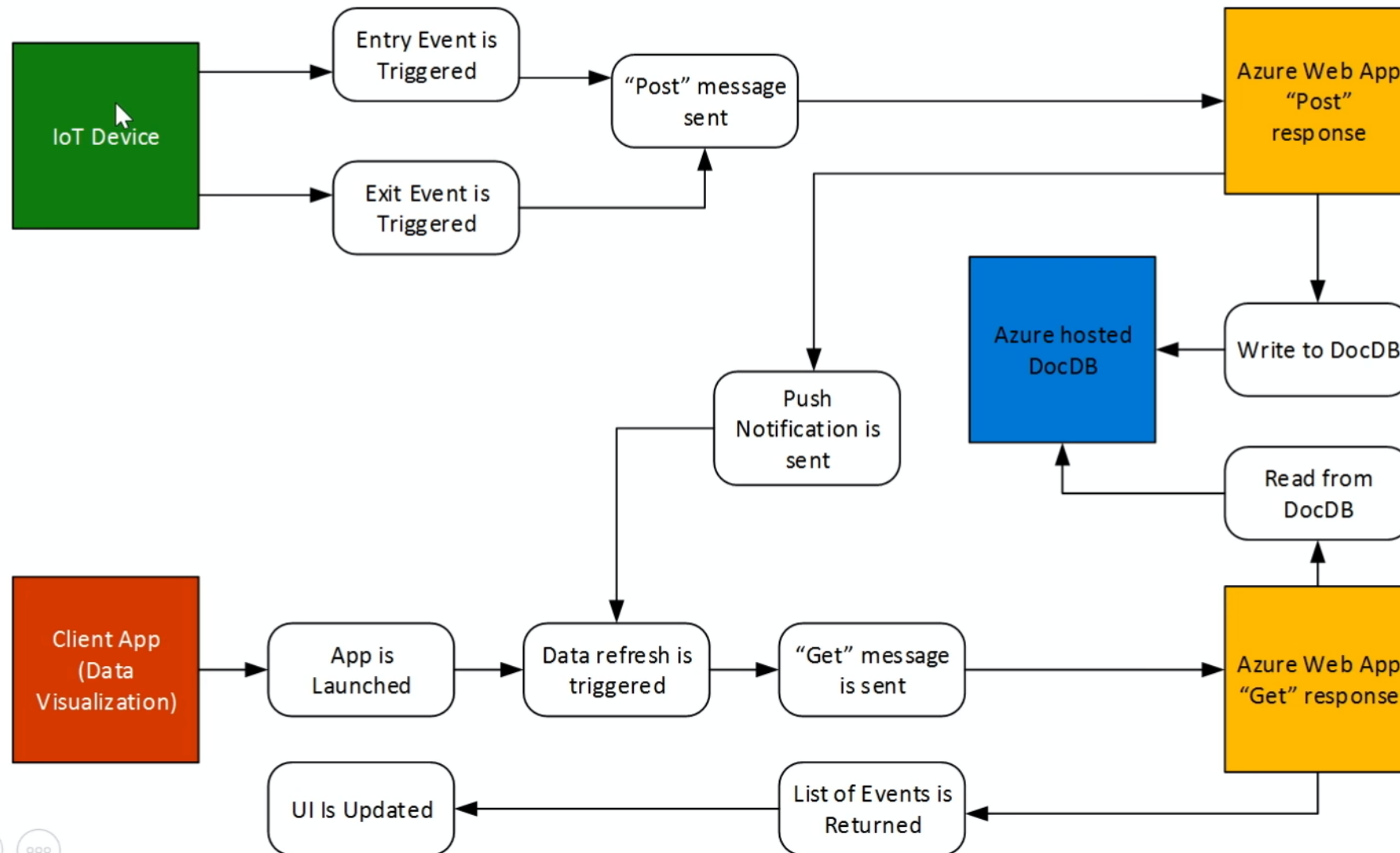
Entry

Exit





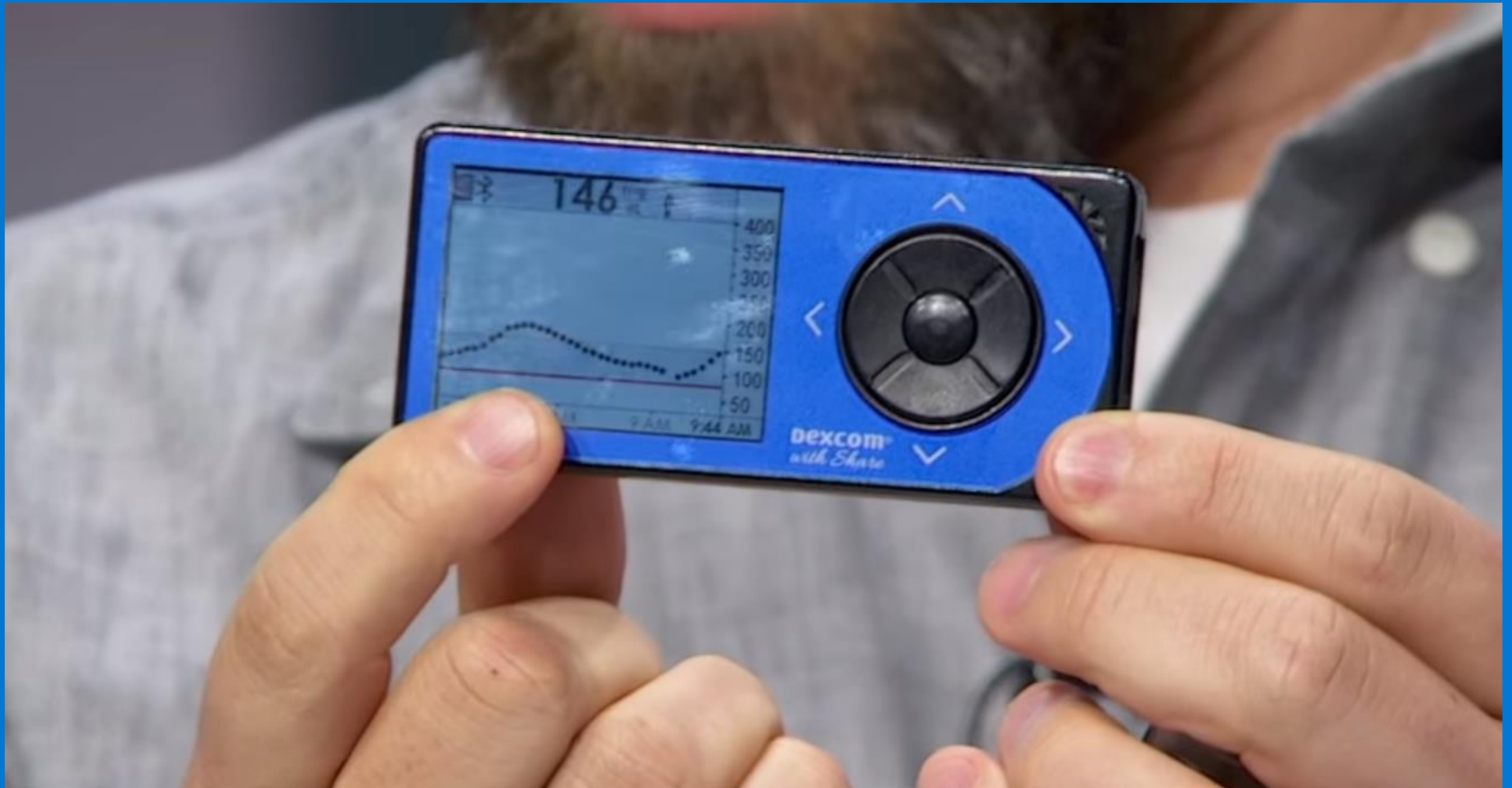
## App Design



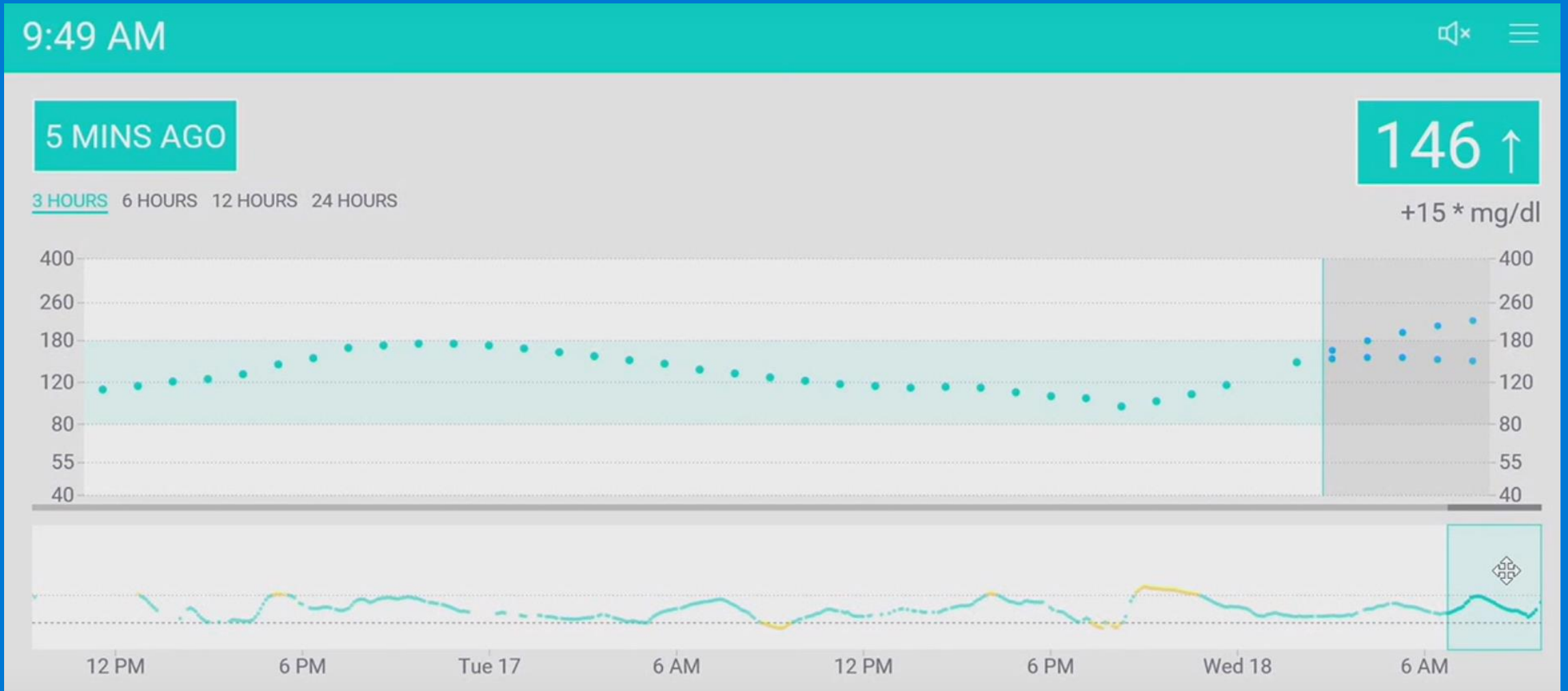
# UWP Shop analytic



# Scott Hanselman Sugar tracker



# Scott Hanselman Sugar tracker



# Scott Hanselman Sugar tracker

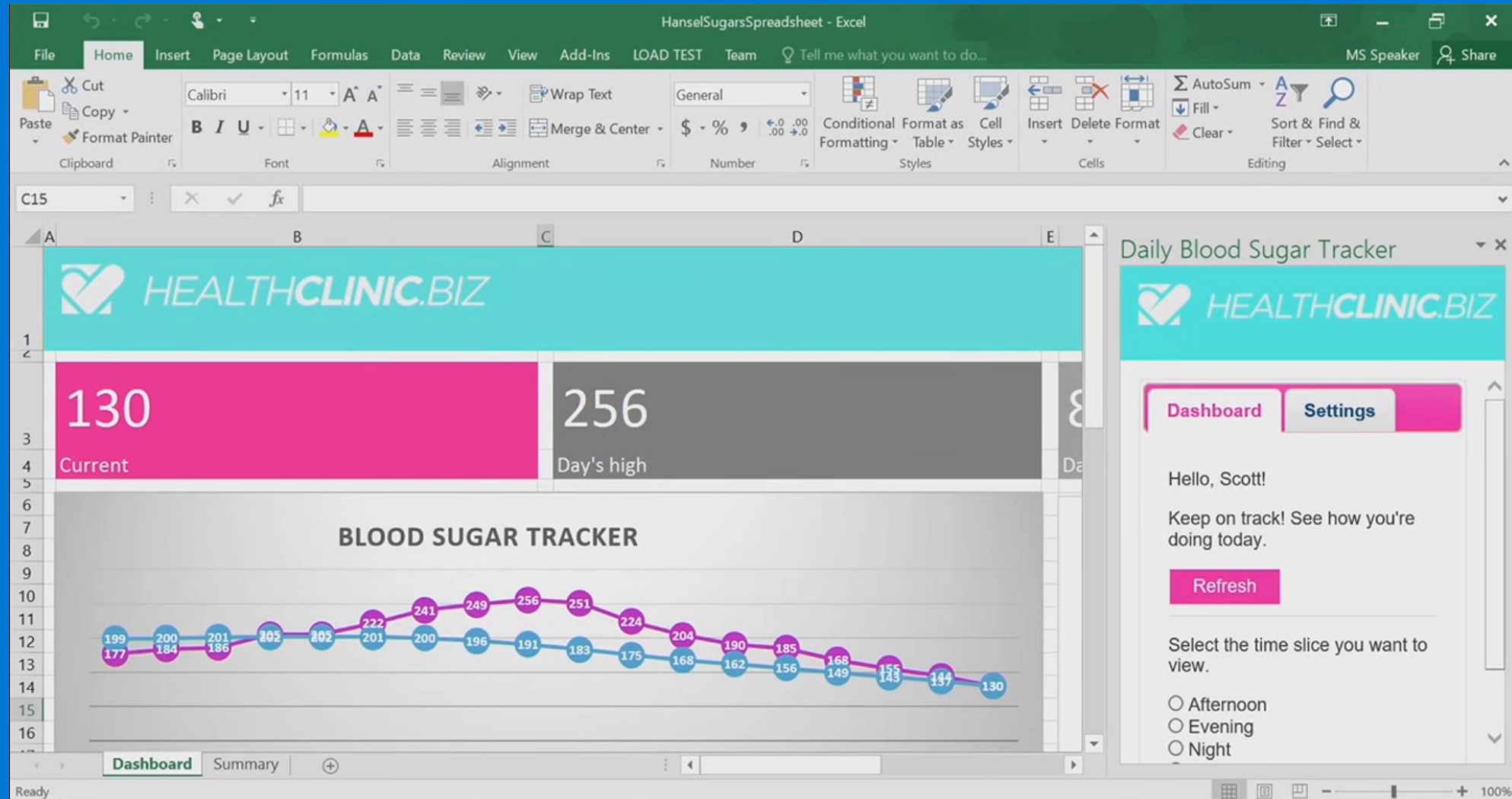




# Scott Hanselman Sugar tracker

```
"notifications": [  
  {  
    "condition": "{{bgs0sgv}} >= 150",  
    "title": "Sugar is high!",  
    "body": "Current sugar: {{bgs0sgv}}.",  
  },  
  {  
    "condition": "{{bgs0sgv}} <= 75",  
    "title": "Sugar is low!",  
    "body": "Current sugar: {{bgs0sgv}}.",  
  }  
]
```

# Scott Hanselman Sugar tracker



# Scott Hanselman Sugar tracker

Microsoft Azure Machine Learning | Home Studio Gallery HealthClinic

## Glucose Forecast (storage)

In draft

Search experiment items

- ▶ Saved Datasets
- ▶ Data Format Conversions
- ▶ Data Input and Output
- ▶ Data Transformation
- ▶ Feature Selection
- ▶ Machine Learning
- ▶ OpenCV Library Modules
- ▶ Python Language Modules
- ▶ R Language Modules
- ▶ Statistical Functions
- ▶ Text Analytics
- ▶ Web Service
- ▶ Deprecated

**Reader**  
Load glucose data from Azure SQL Database

**Execute R Script**  
Load data, and perform the time alignment ...

**Reader**  
Load heart rate data from Azure Storage

**Project Columns**  
Remove the Duration field.

**Execute R Script**  
Expands the granularity and imputes the gap ...

**Clean Missing Data**  
Impute missing values on the series.

**Join Data**

**Properties**

**Experiment Properties**

START TIME	-
END TIME	-
STATUS CODE	InDraft
STATUS DETAILS	None

[Prior Run](#)

**Summary**

Enter a few sentences describing your experiment (up to 140 characters).

**Description**

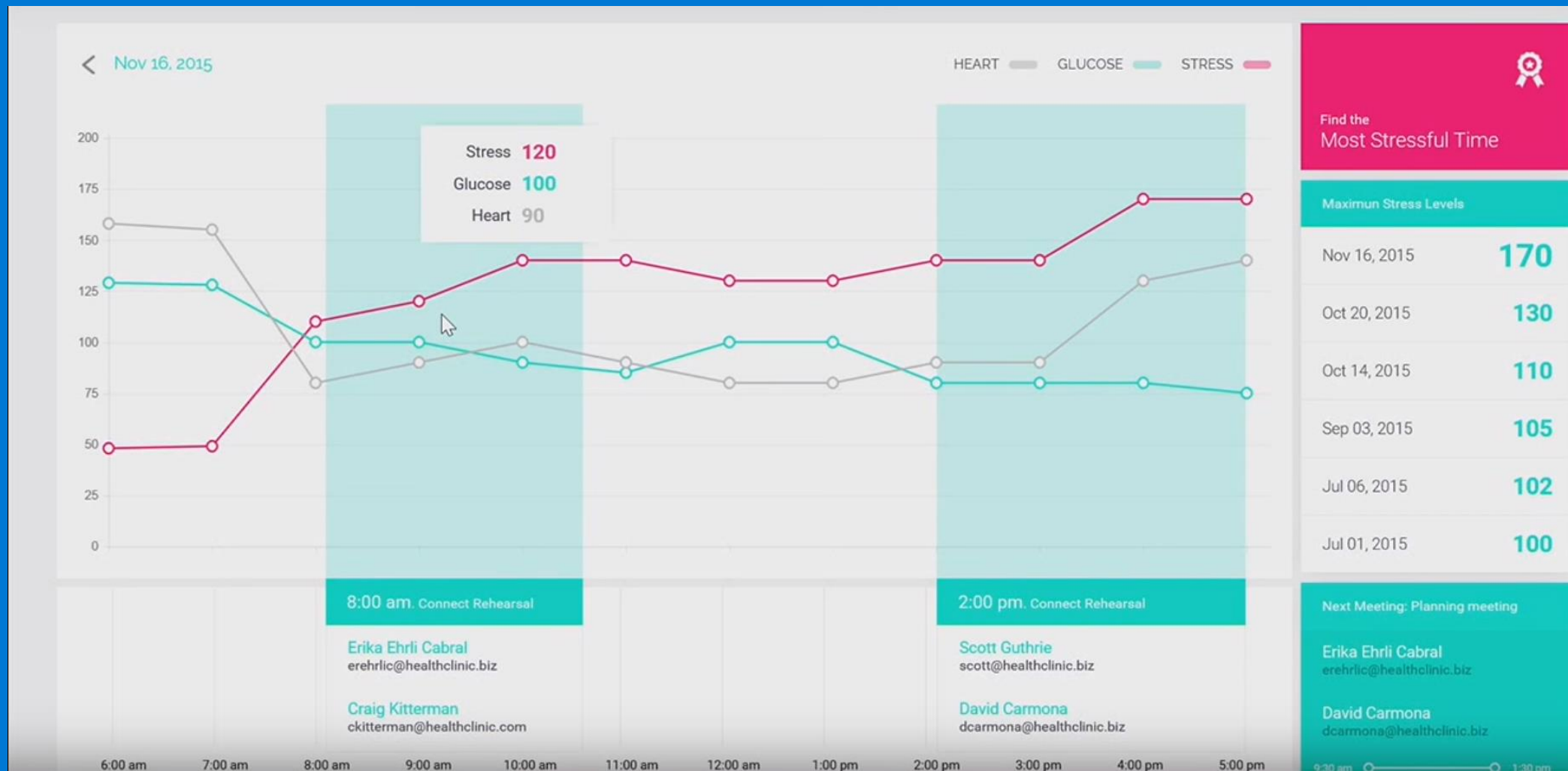
Enter the detailed description for your experiment.

**Quick Help**

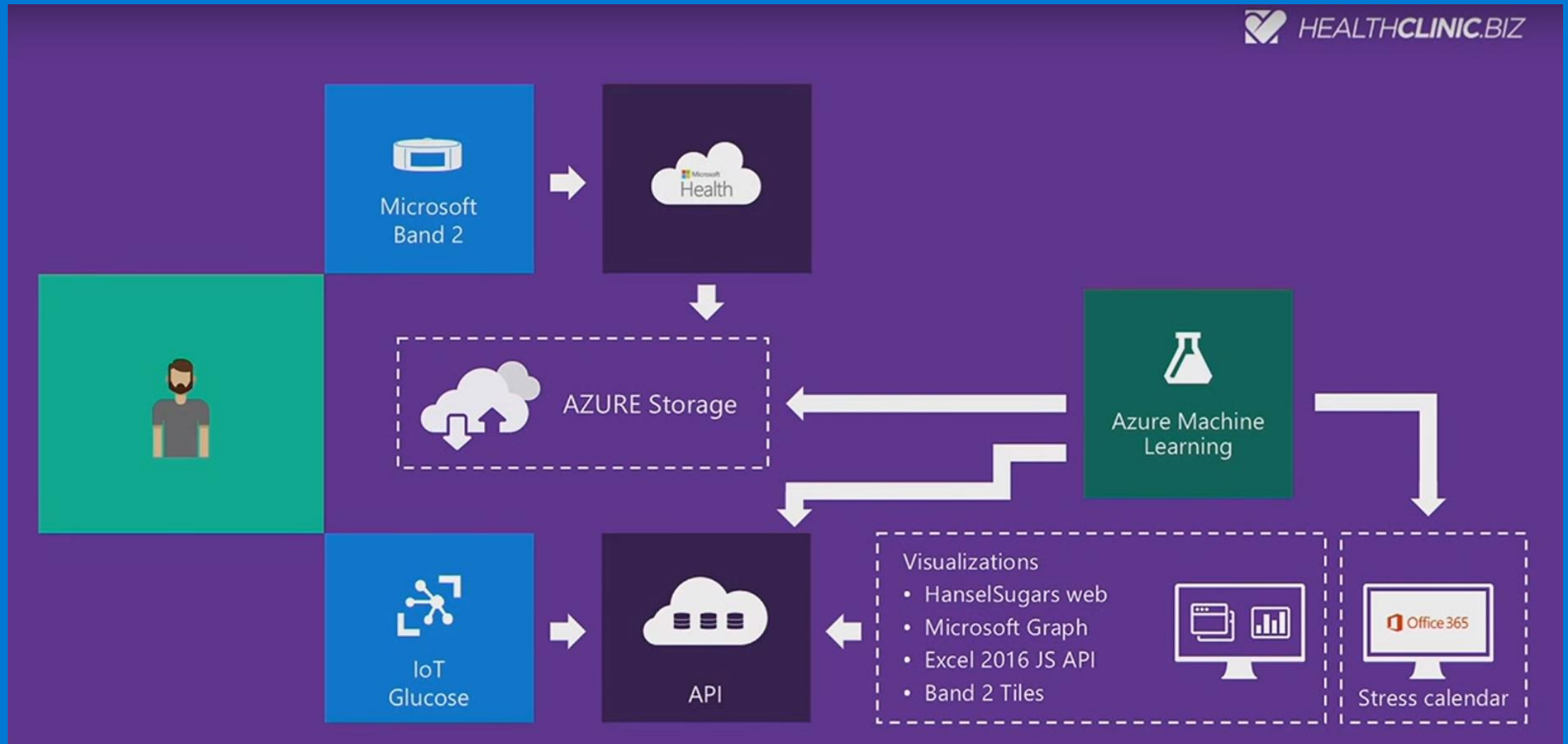
+ NEW RUN HISTORY SAVE DISCARD CHANGES RUN SET UP WEB SERVICE PUBLISH TO GALLERY



# Scott Hanselman Sugar tracker



# Scott Hanselman Sugar tracker



<https://www.youtube.com/watch?v=u5oTz1e5qqE>

# Used material

- MS Azure IoT Reference Architecture
- eBook Introducing Windows Azure
  - <https://azure.microsoft.com/>
- <https://docs.microsoft.com/en-us/azure/index>
  - <https://www.youtube.com/user/Microsoft>
  - <https://www.youtube.com/user/VisualStudio>
  - <https://www.youtube.com/user/windowsazure>
  - [https://en.wikipedia.org/wiki/Microsoft Azure](https://en.wikipedia.org/wiki/Microsoft_Azure)
- <https://chmurowisko.pl/serwisy-microsoft-azure/>