Hi, I am Sam, CTO of Codit

Azure Event Grid

From poll to push

Azure MVP

SamVanhoutte

Connecting end to end

Cloud strategy & architecture

Connect things to the cloud

Things

Platforms

Systems

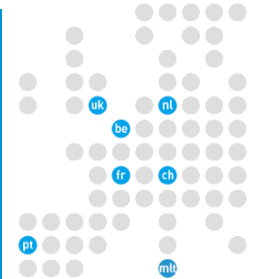Applications

Automate business processes

Expose API's

Run

Build

Design
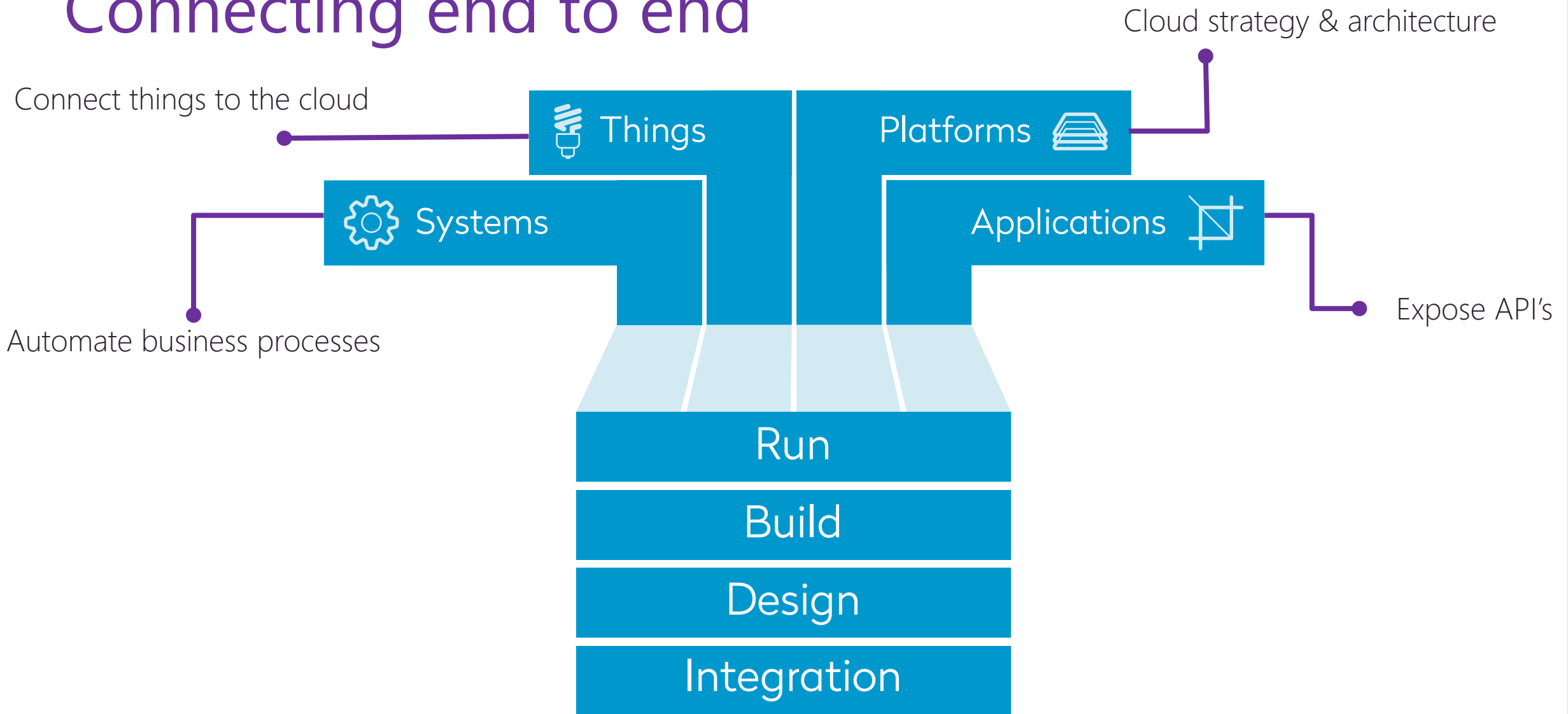
Integration

About Codit
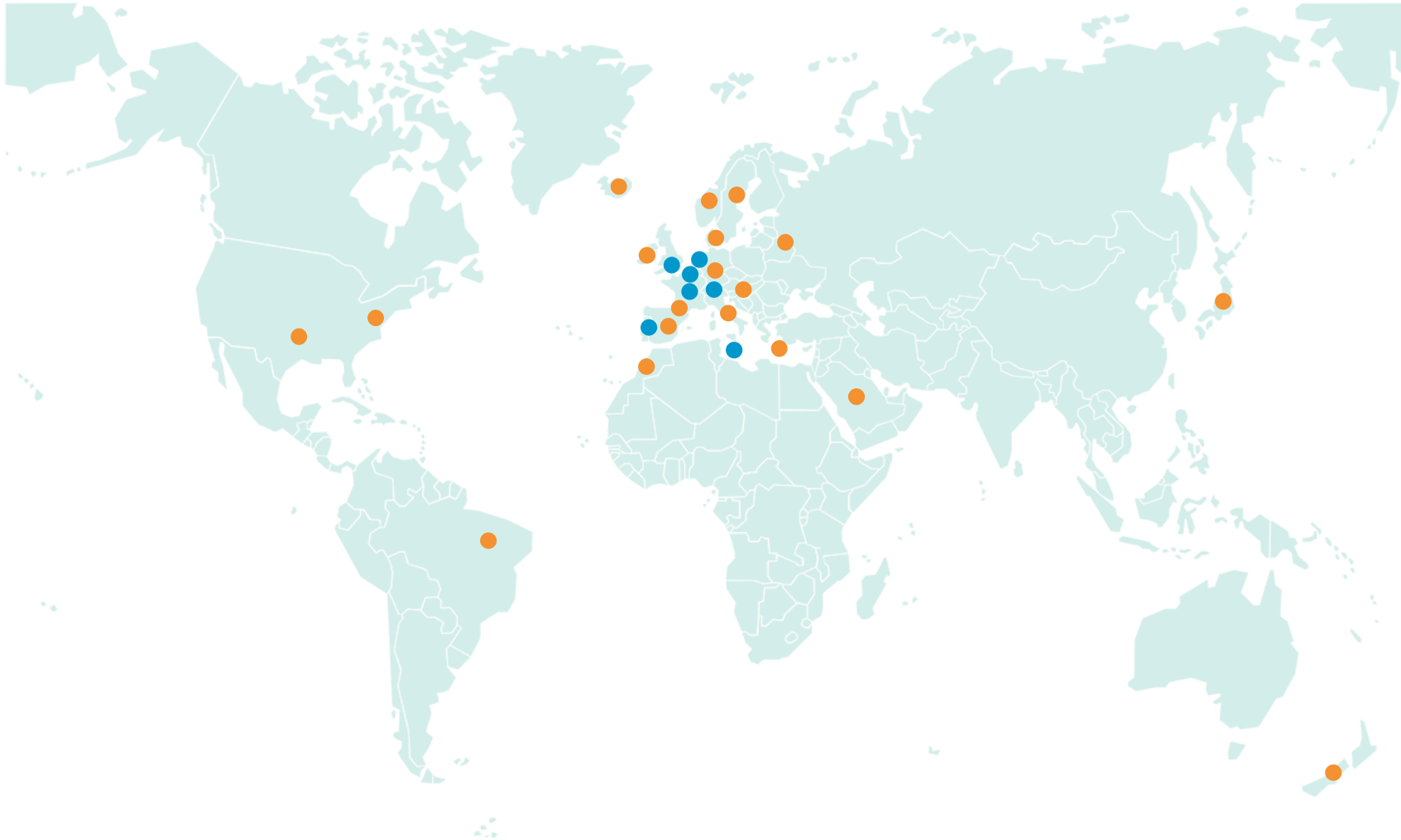
2000 Belgium
2004 France
2013 Portugal
2016 Switzerland
2016 UK
2016 The Netherlands
2017 Malta

uk nl be fr ch pt mh

180
worldwide

Largest Microsoft partner in Europe for integration, API management, IoT and Azure Solutions

Microsoft

Microsoft Partner

Gold Application Development
Gold Application Integration
Gold Cloud Platform
Gold Data Analytics

Microsoft

3

Messaging & service communication

Intents vs Facts

Intents	**Facts**
Messages	**Events**

Commands	Report
Query	Notification
Job	Measurement
Assignment	Trace
Update	Audit
Request	

Event types

Messages

Discrete

Events

Series

Commands
Query
Jobs
Assignment
Update
Request

Independent
Reporting state change
Actionable

Time ordered
Context partitioned
Reporting conditions
Analyzable

Report
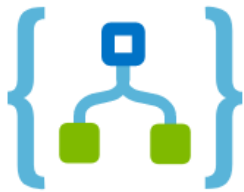Notification
Measurement
Trace
Audit

The Azure Messaging landscape

Notification Hubs

Mobile push notifications

Logic Apps

Workflow and LOB Integration

Service Bus & Azure Queues

Cloud messaging

Event Hubs

Telemetry stream ingestion

Event Grid

Event distribution

IoT Hub

IoT messaging and manage-ment

Relay

Discovery, Firewall/NAT Traversal

Azure messaging (Service Bus vs Event Grid)

Azure Service Bus
Durable Enterprise Messaging

| Push - pull

| Queuing

| Advanced routing

| Competing consumers

| Advanced features (sessions, peek/lock, defering...)

| Durable consistancy

Azure Event Grid
Reactive event-based programming

| Push – push

| Less advanced features

| Filtering for routing

| Retry & Dead letter queuing

The Azure Messaging landscape

Events, Data Points, and Messages - Choosing the right Azure messaging service for your data

Posted on September 12, 2017

Clemens Vasters, Architect, Azure Service Bus

With the introduction of Event Grid, Microsoft Azure now offers an even greater choice of messaging infrastructure options. The expanded messaging service fleet consists of the Service Bus message broker, the Event Hubs streaming platform, and the new Event Grid event distribution service. Those services, which are all focused on moving datagrams, are complemented by the Azure Relay that enables bi-directional, point-to-point network connection bridging.
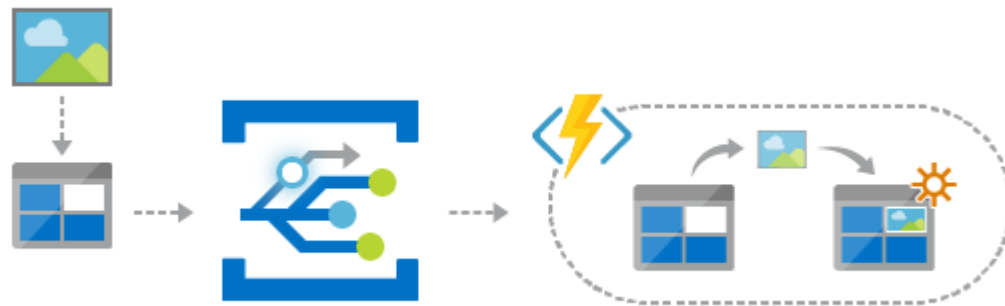
Event Grid scenarios

Serverless applications architectures

Event driven business logic

Examples

- Image processing upon upload
- Tekst sentiment analysis upon upload
- Notification upon IoT device disconnect (not yet available)

Operations automation

| DevOps workflow

| Examples

- Policy enforcement (firewall checks, auto-scale...)
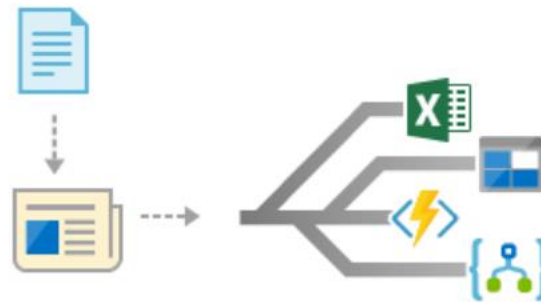- Administration notification
- Inventory system
- Billing verification

Application Integration

Connectivity & integration

Examples

  Data transformation

  Automatic synchronization of data

  Logic Apps for workflow automation

arcus-azure : open source library

| https://arcus-azure.net
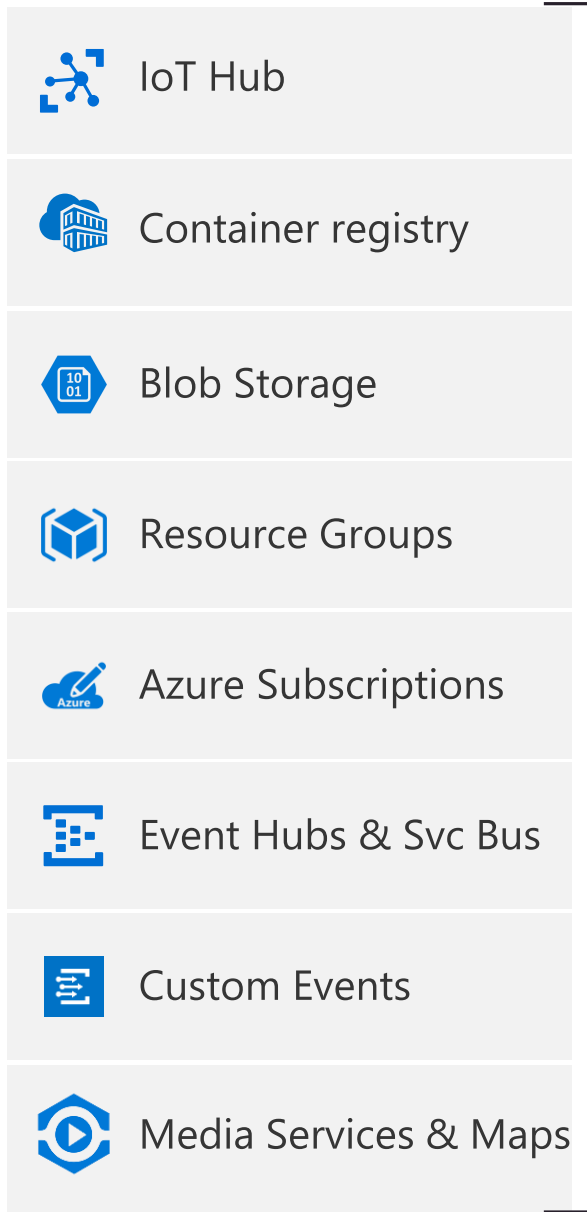
| https://github.com/arcus-azure/arcus.eventgrid

| Arcus Event Grid
   | Publishing events
   | Endpoint validation handshake
   | Event contracts
   | Integration tests
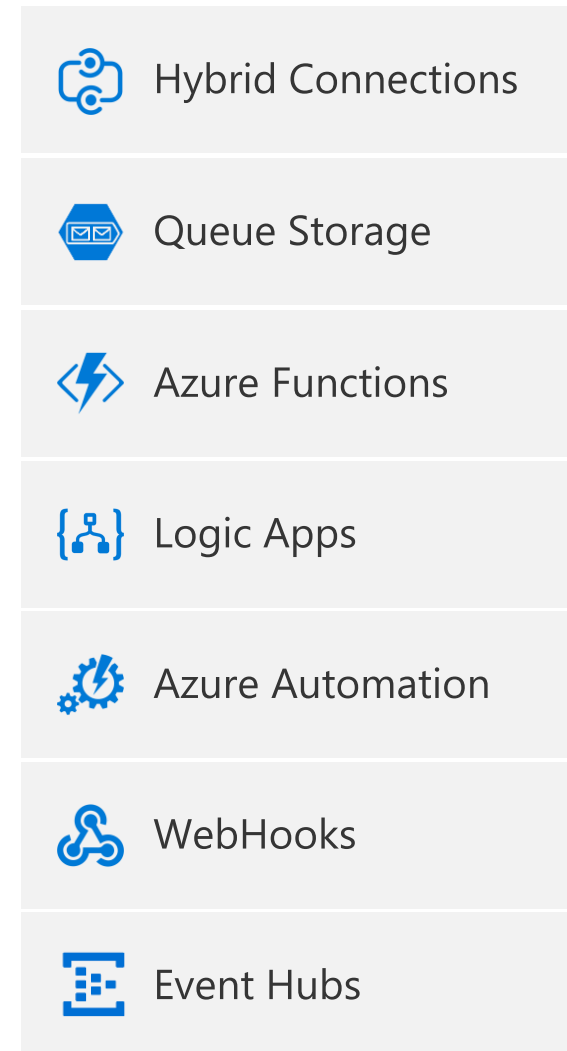 | Deserializing events
   | Custom events

| `Install-Package Arcus.EventGrid.All`

arcus

14

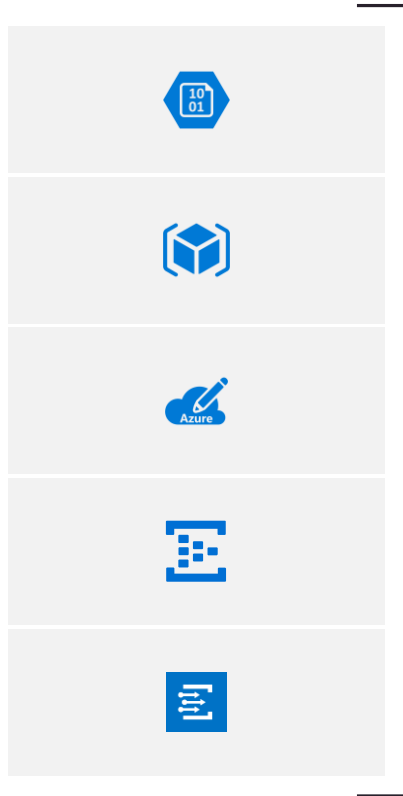# Event Grid introduction

Event sources

Event handlers

IoT Hub

Container registry

Blob Storage

Resource Groups

Azure Subscriptions

Event Hubs & Svc Bus

Custom Events

Media Services & Maps

Hybrid Connections

Queue Storage

Azure Functions

Logic Apps

Azure Automation

WebHooks

Event Hubs

Manage all events in one place

Event publishers

Event handlers

Subscribe to pre-defined system events in Azure or create your own custom topics

Route events to any end-points, Azure or even beyond

Enable filtering and efficient routing of events

Create Event Subscription
Event Grid - PREVIEW

Name

Subscription
Azure Event Grid - Test

Resource group
○ Use existing

Topic Type
Storage Accounts

Event Types
Raised when a blob is created.

Subscriber Type
Web Hook

Prefix Filter
Sample-workitems/{name}
Optional

Suffix Filter
.jpg
Optional

☐ Filter Case Sensitive

Create
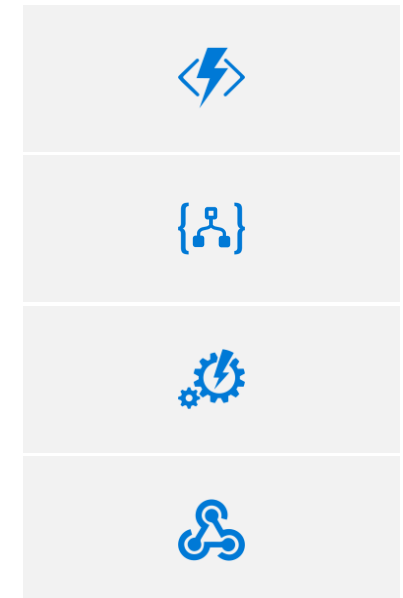
Azure services adoption

Publishers

- Blob Storage
- Resource Groups
- Azure Subscriptions
- Event Hubs
- Custom Events
- Container Registry
- Media Services
- Maps
- IoT Hub
- Service Bus

Subscribers

- Azure Functions
- Logic Apps
- Azure Automation
- WebHooks
- Event Hubs
- Hybrid Connections
- Storage Queues

My take on missing adoption

Service	Publisher		Consumer	
Azure Data Bricks	*Structured streaming*	•••		
Azure Functions	*Output binding*	•••	OK	✅
IoT Hub	*Telemetry events*	•••		
Stream Analytics	*Output*	•••		
Azure Monitor	*Alerts*	•••	*Custom events*	•••
Cosmos Db	*Change feed*	•••		

Concepts

Event sources

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Blob Storage

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Azure Automation

WebHooks

Event Hubs

1. Events: what happened

2. Event Publishers: where it took place

3. Topics: where publishers send events

4. Event Subscriptions: how you receive events

5. Event Handlers: the app or service reacting to the event

codit
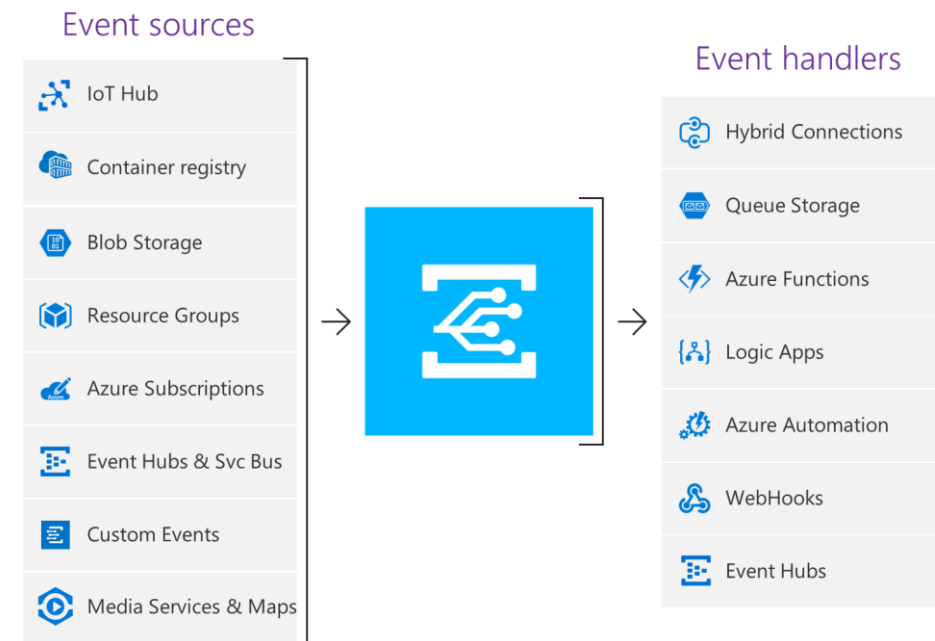
Event Grid capacity

Always available

Near real-time event delivery

At least once delivery

Dynamic scale

Platform agnostic (WebHook)

Language agnostic (HTTP protocol)

Event Schema: Event Grid (default)

```
[
  {
    "topic": "/subscriptions/{subscription-id}/resourceGroups/Storage/providers/Microsoft.Storage/storageAccounts/xstoretestaccount",
    "subject": "/blobServices/default/containers/oc2d2817345i200097container/blobs/oc2d2817345i20002296blob",
    "eventType": "Microsoft.Storage.BlobCreated",
    "eventTime": "2017-06-26T18:41:00.9584103Z",
    "id": "831e1650-001e-001b-66ab-eeb76e069631",
    "data": {
      "api": "PutBlockList",
      "clientRequestId": "6d79dbfb-0e37-4fc4-981f-442c9ca65760",
      "requestId": "831e1650-001e-001b-66ab-eeb76e000000",
      "eTag": "0x8D4BCC2E4835CD0",
      "contentType": "application/octet-stream",
      "contentLength": 524288,
      "blobType": "BlockBlob",
      "url": "https://oc2d2817345i60006.blob.core.windows.net/oc2d2817345i200097container/oc2d2817345i20002296blob",
      "sequencer": "00000000000004420000000000028963",
      "storageDiagnostics": {
        "batchId": "b68529f3-68cd-4744-baa4-3c0498ec19f0"
      }
    }
  }
]
```

Event Schema: CloudEvents

cloudevents

```
{
"cloudEventsVersion" : "0.1",
"eventType" : "Microsoft.Storage.BlobCreated",
"eventTypeVersion" : "",
"source" : "/subscriptions/{subscription-id}/resourceGroups/{resource-group}/providers/Microsoft.Storage/storageAccounts/{
"eventID" : "173d9985-401e-0075-2497-de268c06ff25",
"eventTime" : "2018-04-28T02:18:47.1281675Z",
"data" : {
  "api": "PutBlockList",
  "clientRequestId": "6d79dbfb-0e37-4fc4-981f-442c9ca65760",
  "requestId": "831e1650-001e-001b-66ab-eeb76e000000",
  "eTag": "0x8D4BCC2E4835CD0",
  "contentType": "application/octet-stream",
  "contentLength": 524288,
  "blobType": "BlockBlob",
  "url": "https://oc2d2817345i60006.blob.core.windows.net/oc2d2817345i200097container/oc2d2817345i20002296blob",
  "sequencer": "00000000000004420000000000028963",
  "storageDiagnostics": {
    "batchId": "b68529f3-68cd-4744-baa4-3c0498ec19f0"
  }
}
}
```

Target performance

Sub-second end-to-end laten

99.99% availability

10,000,000 events per secon

100,000,000 subscriptions pe

50 ms publisher latency

Transparent regional failover

24 hour retry with exponentia

    10 sec – 30 sec – 1 min – 5 min –
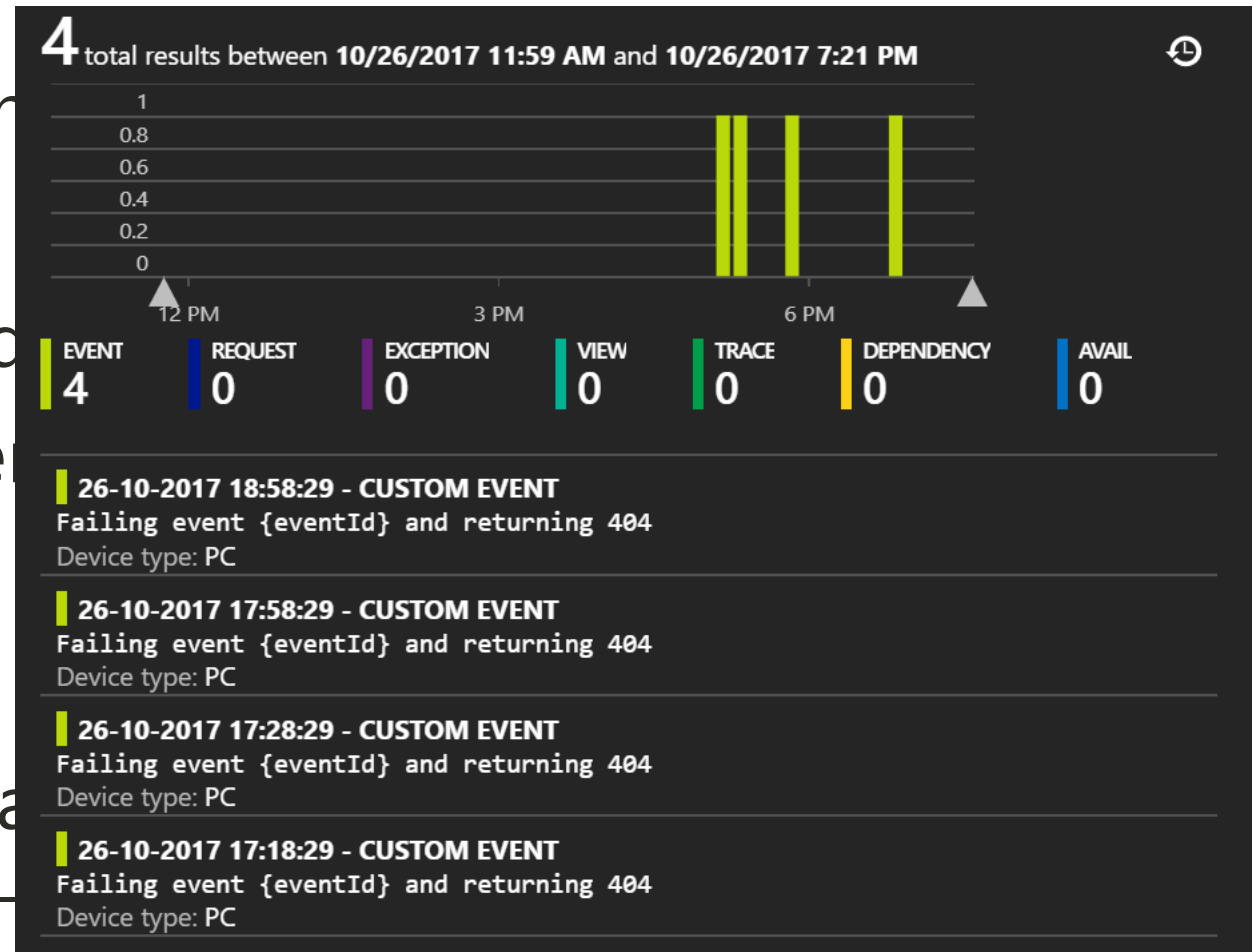
Pricing

- ✓ $0.60 per million operations

- ✓ Operations include:
  - Ingress events
  - Advanced matches
  - Delivery attempts
  - Management calls

- ✓ 100,000 free operations per month

- ✓ Management operations throttled to 10 per second

- ✓ 1,000 event subscriptions per account

Operation definitions, number of free operations, management throttling, and number of subscriptions per account subject to change upon GA

Consuming events

Subscriptions & filtering

Standard Filtering on

- Event type (all vs specific event type)
- Prefix / suffix (on subject)

Advanced filtering

- id, topic, subject, eventtype, dataversion
- Custom properties (in data payload, max depth 1)
  - data.customvalue > 10

Web hooks

| Special security case: echo back initial validationCode

| As prevention of DDOS

| Aeg-Event-Type: SubscriptionValidation (header)

| ~~FYI : RequestBin is 'special cased' and white listed~~

| Limited possibilities to secure your web hook

| No header support

| No oAuth…

| Only possibility : querystring

Validation echo

```
[
  {
    "id": "2d1781af-3a4c-4d7c-bd0c-e34b19da4e66",
    "topic": "/subscriptions/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx",
    "subject": "",
    "data": {
      "validationCode": "512d38b6-c7b8-40c8-89fe-f46f9e9622b6"?
      "validationUrl": "https://xxxxx/validate?id=512..."
    },
    "eventType": "Microsoft.EventGrid.SubscriptionValidationEvent",
    "eventTime": "2017-08-06T22:09:30.740323Z"
  }
]
```

```
{
  "validationResponse": "512d38b6-c7b8-40c8-89fe-f46f9e9622b6"
}
```

Arcus sample

Exception handling

RETRY POLICIES

Customize how many times and for how long event delivery will be retried. Learn more

Max Event Delivery Attempts
| 3 | ✓ |

Event Time to Live

Days	Hours	Minutes	Seconds
0	1	0	0

DEAD-LETTERING

Save events that cannot be delivered to storage. Learn more

☑ Enable dead-lettering

Storage Subscription
| MVP Subscription (sponsor) ⌄ |

Storage Blob Container   menu-dlq (change)

EVENT SUBSCRIPTION EXPIRATION TIME

Set a time at which the event subscription will automatically be deleted.

☑ Enable expiration time

| 2019-04-11 📅 | 5:50:11 AM |

(UTC) Coordinated Universal Time ⌄

Time until expiry: 1 days 0 hours

Demo: Danish menu translation

menu-input

menu-ocr

menu-translated

event-menu-new-create	WebHook	/blobServices/default/containers/menu-input/blobs/	Microsoft.Storage.BlobCreated
event-menu-ocr-create	WebHook	/blobServices/default/containers/menu-ocr/blobs/	Microsoft.Storage.BlobCreated
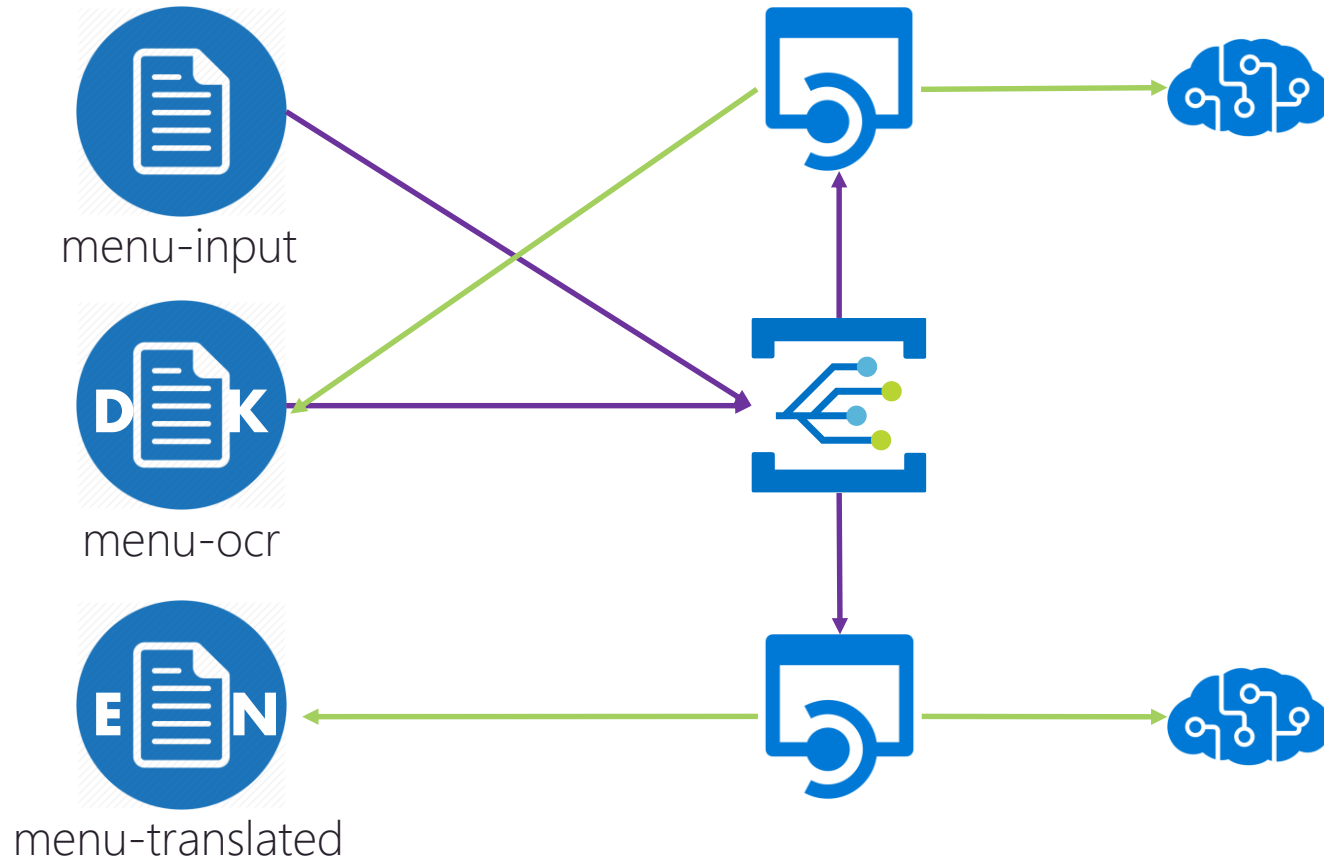
Publishing events

Custom Event Grid topics
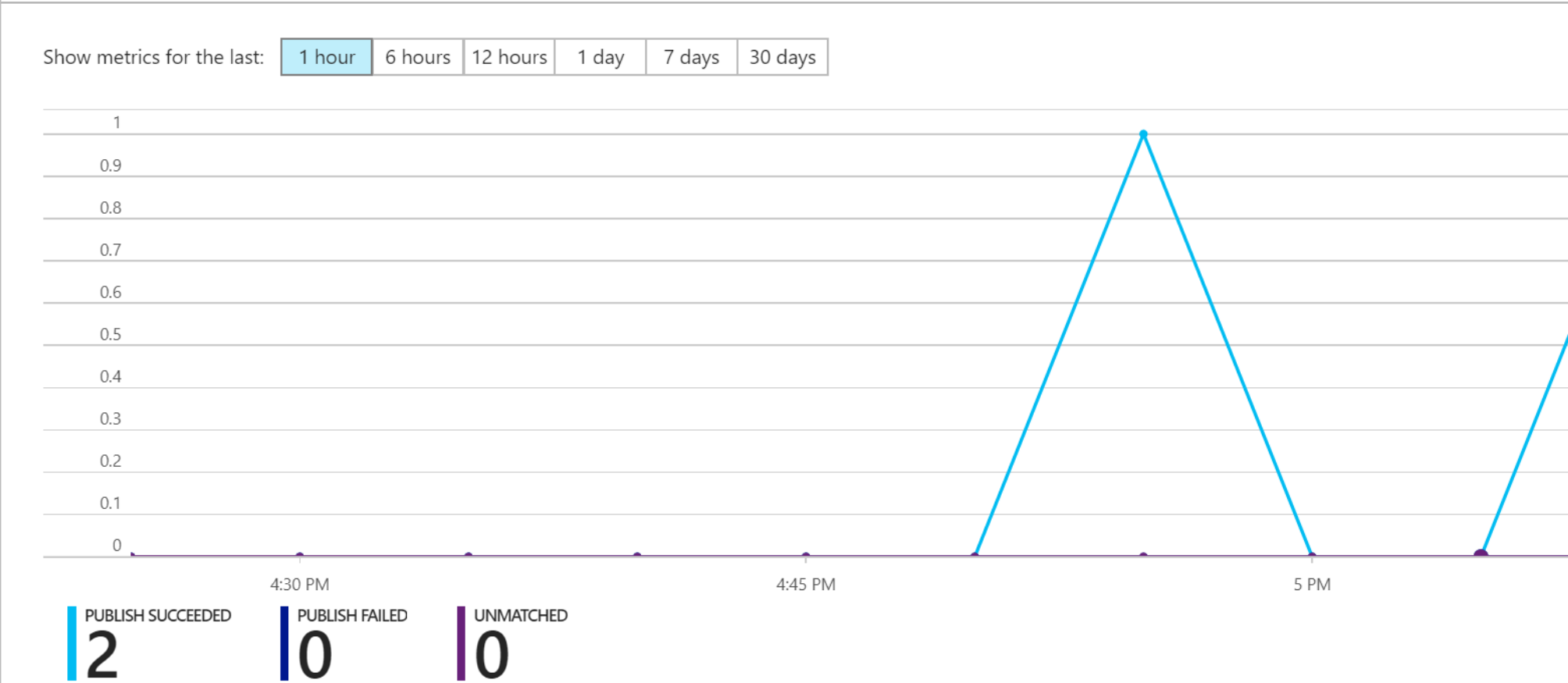
Custom topics
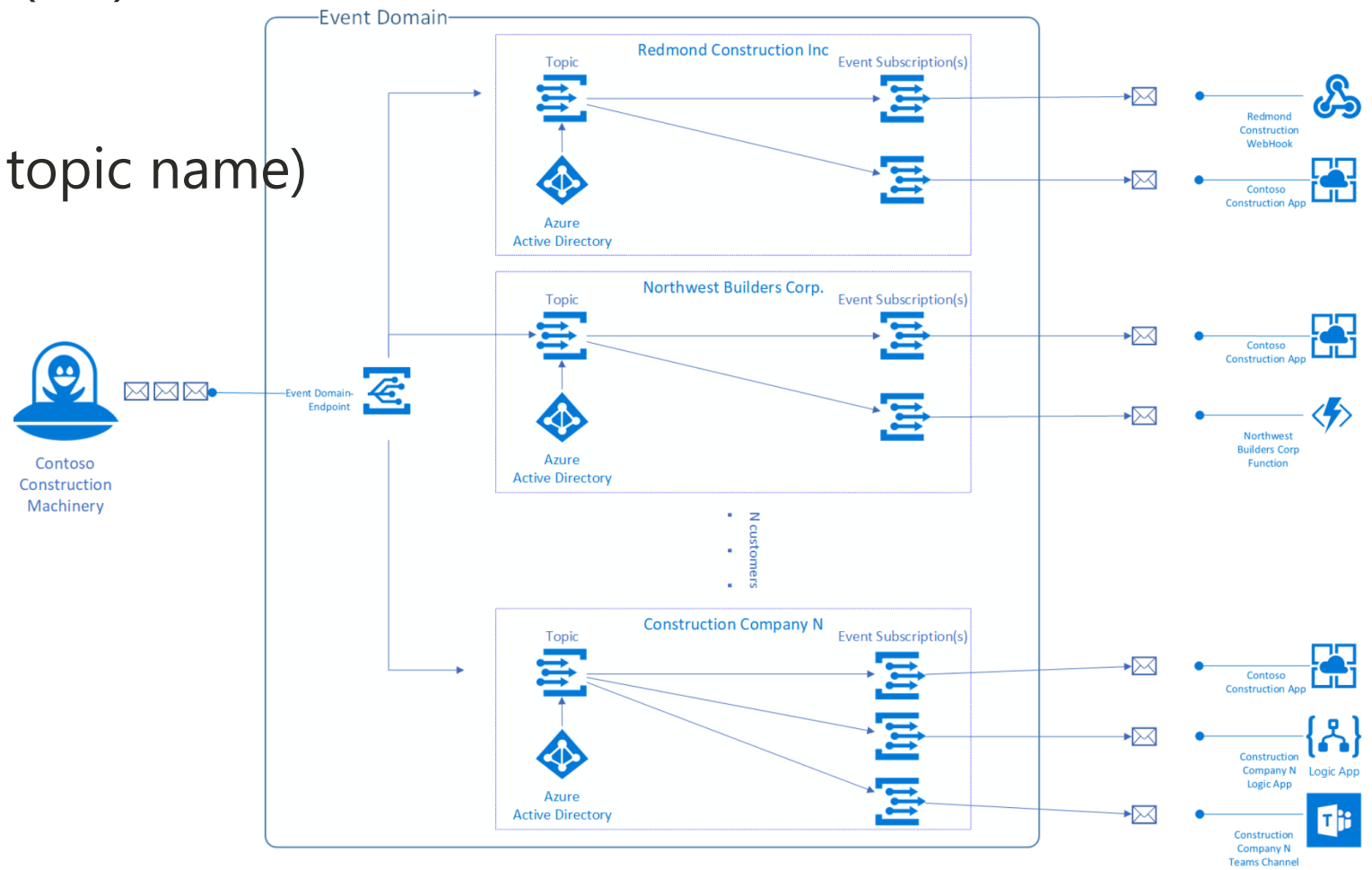
| Create event grid topic for your custom events

  | Access keys to publish
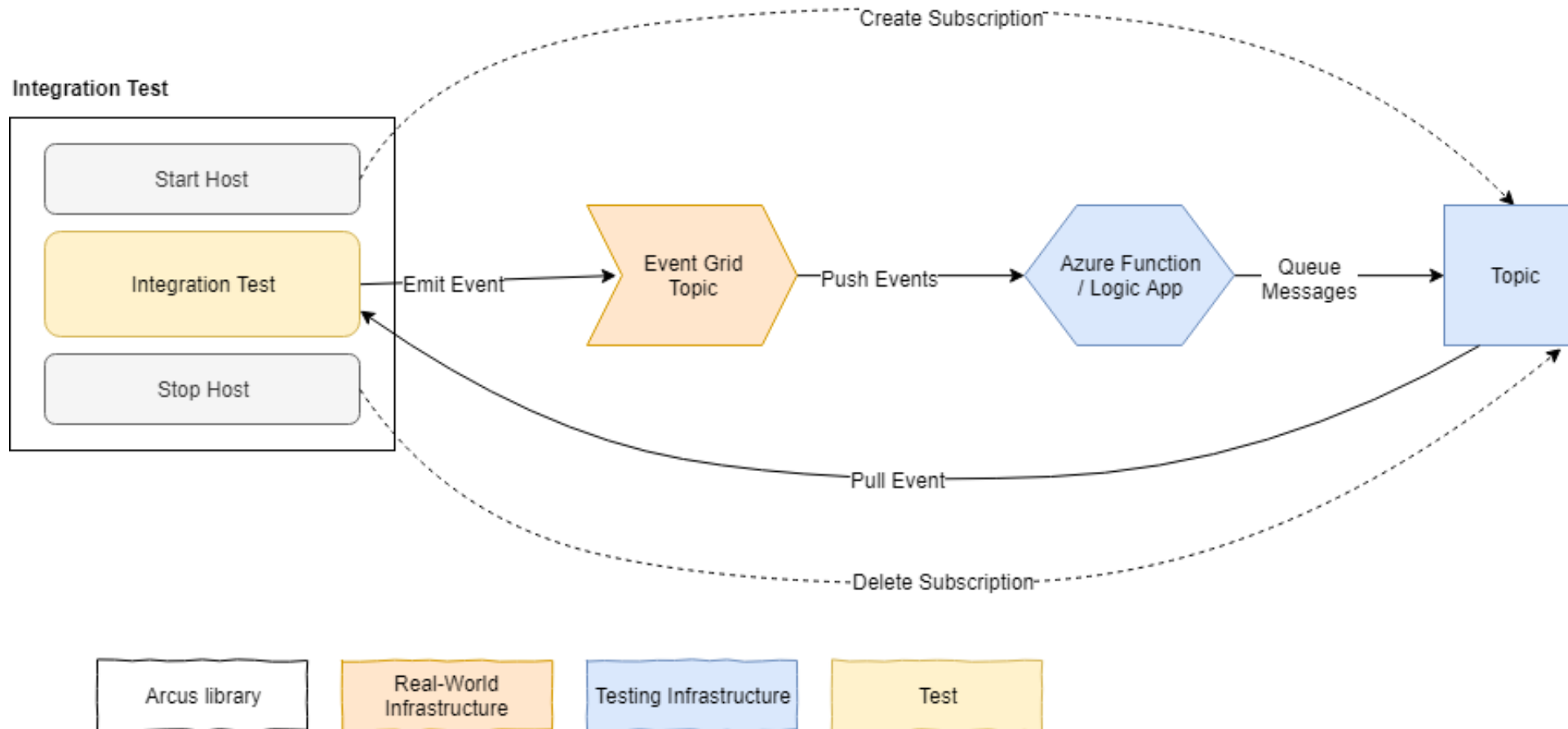
  | REST endpoint available to publish

| Authentication

  | Key authentication : HTTP header: aeg-sas-key: xxxxxxxxxxx

  | SAS token authentication : aeg-sas-token: xxxxxxxxxxx

Arcus sample

Event domains (preview)

| Multi-tenancy & security (AD)

| Partitioning
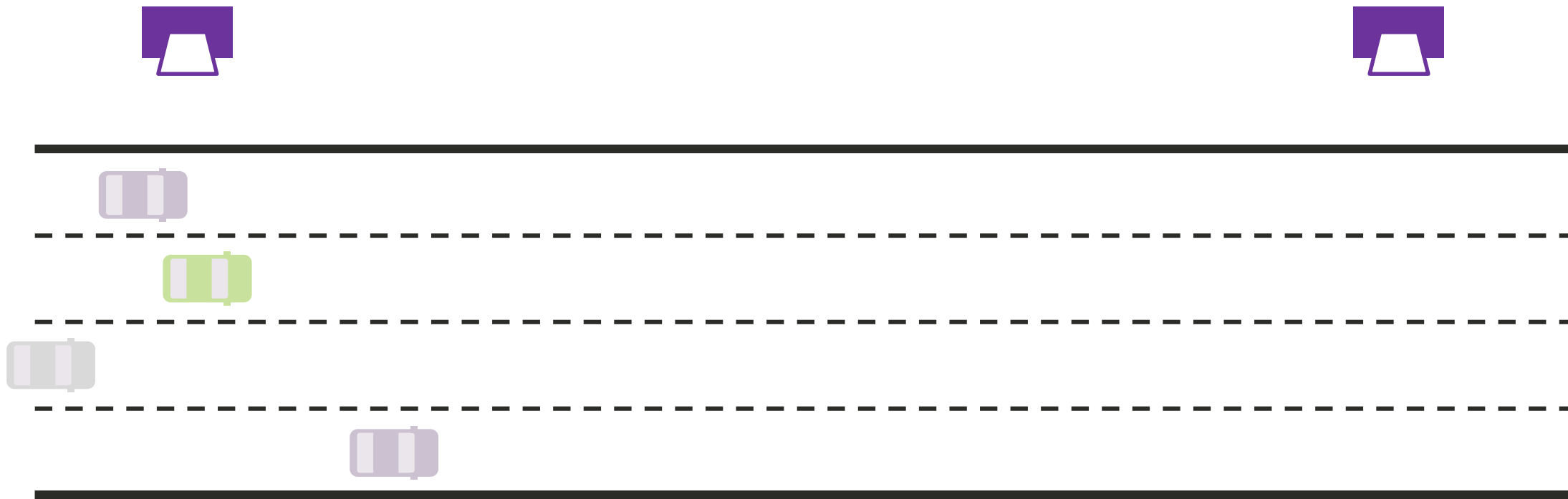
| Publish to topic (include topic name)

Integration testing for Azure Event Grid

Demo time

Traffic camera scenario
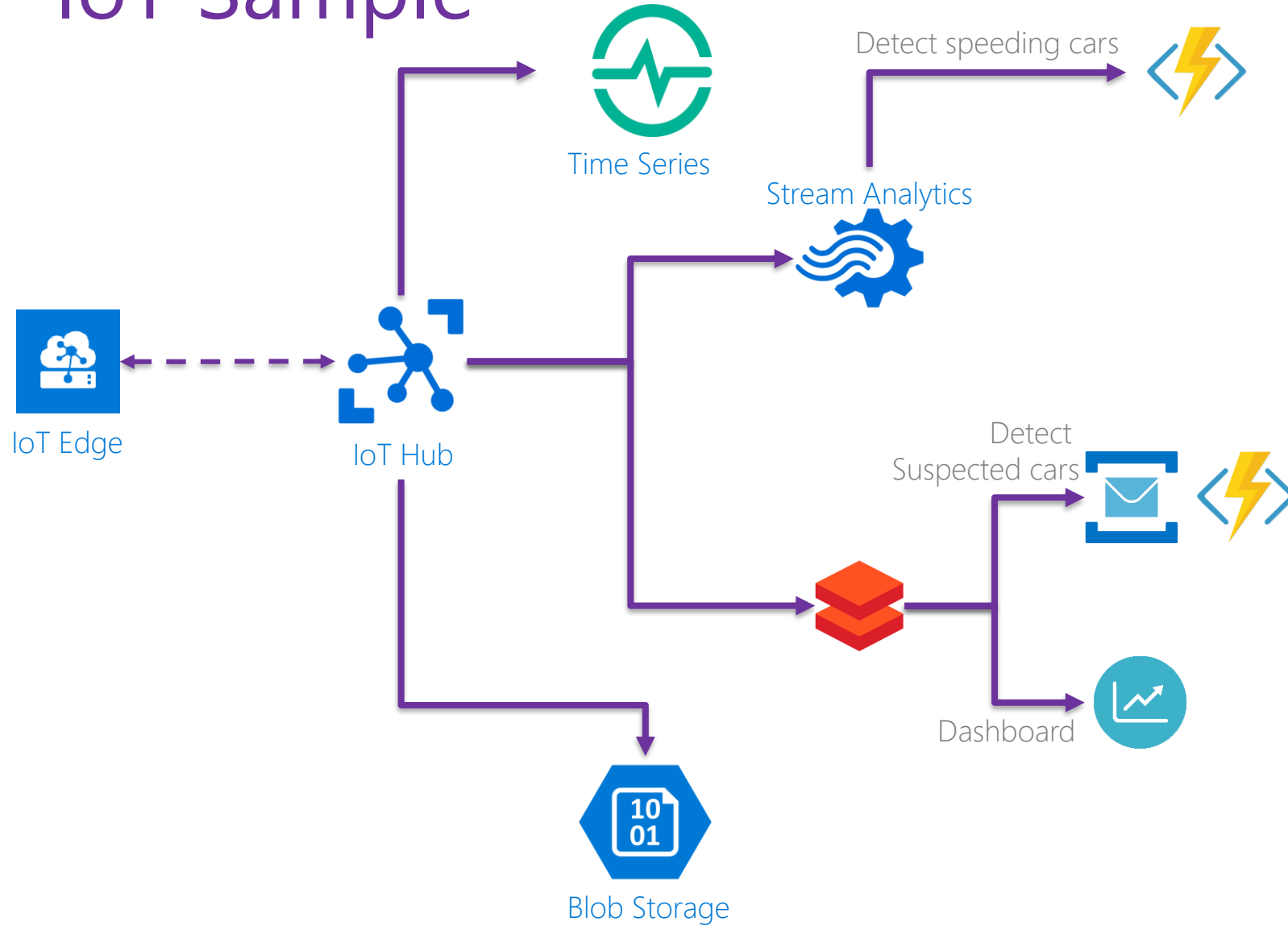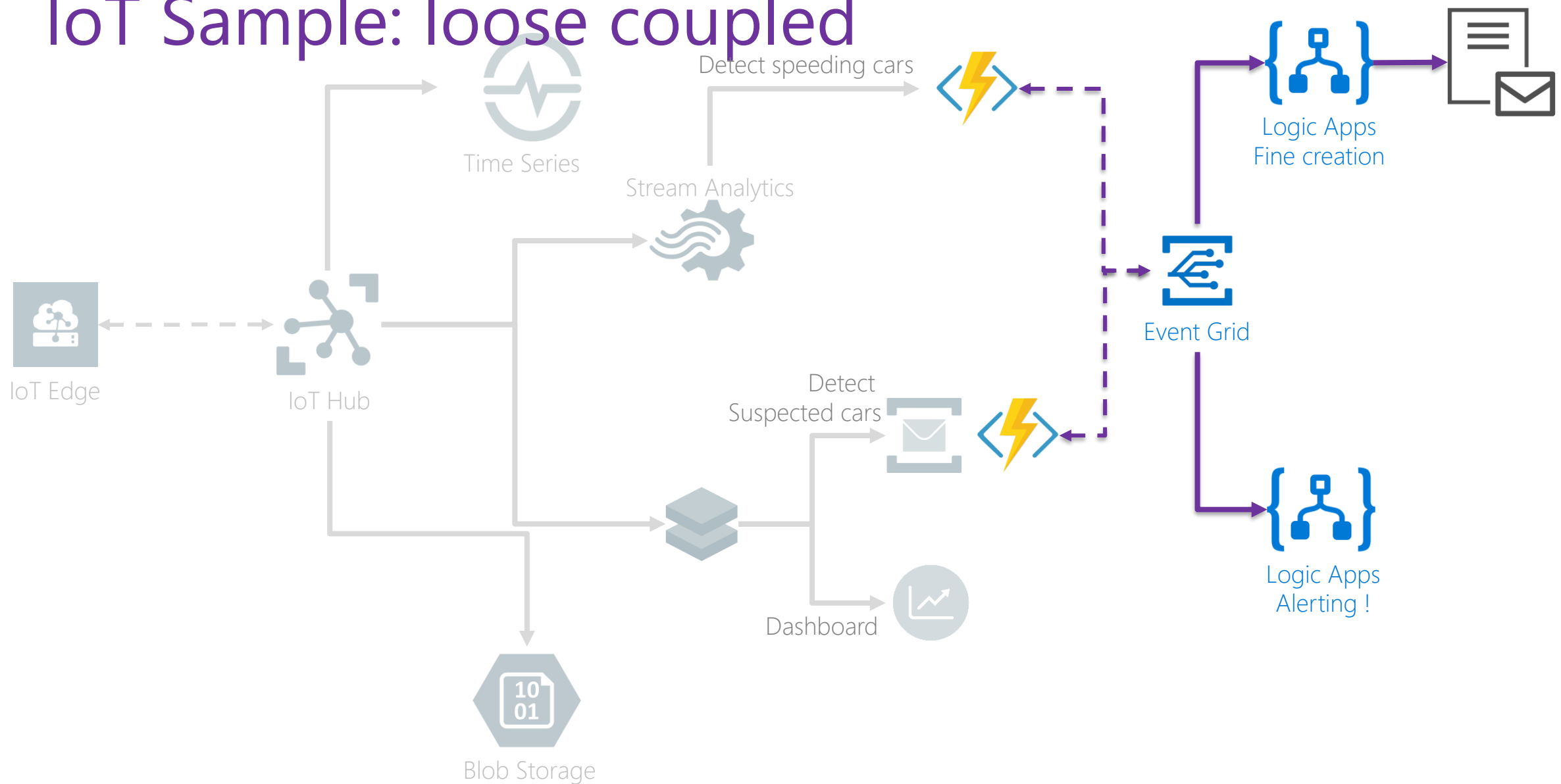
Traffic camera scenario

```
{
    "trajectid": "01",
    "cameraid": "Camera1",
    "eventtime": "2019-01-16T05:14:58.2500000Z",
    "lane": 1,
    "country": "BE",
    "licenseplate": "1-UVF-558",
    "make": "BMW",
    "color": "DarkGray"
}
```

```
{
    "trajectid": "01",
    "cameraid": "Camera2",
    "eventtime": "2019-01-16T05:16:21.5200000Z",
    "lane": 2,
    "country": "BE",
    "licenseplate": "1-UVF-558",
    "make": "BMW",
    "color": "DarkGray"
}
```

IoT Sample

Time Series

Detect speeding cars

Stream Analytics

IoT Edge

IoT Hub

Detect Suspected cars

Dashboard

Blob Storage

IoT Sample: loose coupled

Time Series

Detect speeding cars

Stream Analytics

IoT Edge

IoT Hub

Detect
Suspected cars

Dashboard

Blob Storage

Event Grid

Logic Apps
Fine creation

Logic Apps
Alerting !

Thank you. Let's connect!