



Reactive Architecture with Event Grid

Azure Global Bootcamp 2019



Chris McKelt

chris@mckelt.com

[@chris_mckelt](https://twitter.com/chris_mckelt)

McKelt.com

Today's session...

- Reactive architecture
- Azure Event Grid
- Azure messaging landscape
- Go for ride the grid



Gartner Technology Trends for 2018

“A key distinction of a digital business is that it’s event-centric, which means it’s always sensing, always ready and always learning,”

Gartner predicts that, by 2020, achieving broad competence in event-driven IT will be a top-three priority for the majority of global enterprise CIOs.

What are Events?

- Events capture state changes
- Streams of events capture behaviour
- Behaviour patterns tell stories

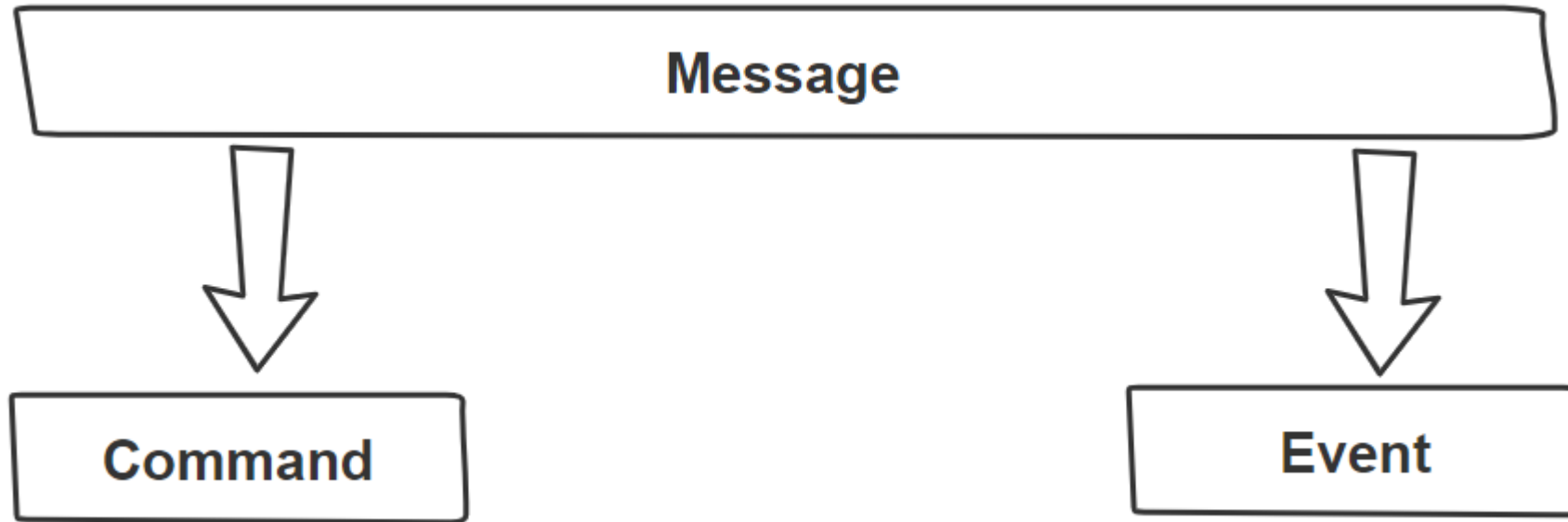


What is a Reactive Architecture?



<https://www.reactivemanifesto.org/>

Messages vs Commands vs Events



- Has intent – do something
- 1 to 1 from producer to consumer
- EG: Create Customer

- No intent – something happened
- 1 to many subscribers
- No expectation from subscriber
- EG: Customer Created

What is Azure Event Grid?



Azure Event Grid is a fully-managed intelligent event routing service that allows for uniform event consumption using a publish-subscribe model.

Use Azure Event Grid to react to relevant events across both Azure and non-Azure services in near-real time fashion.

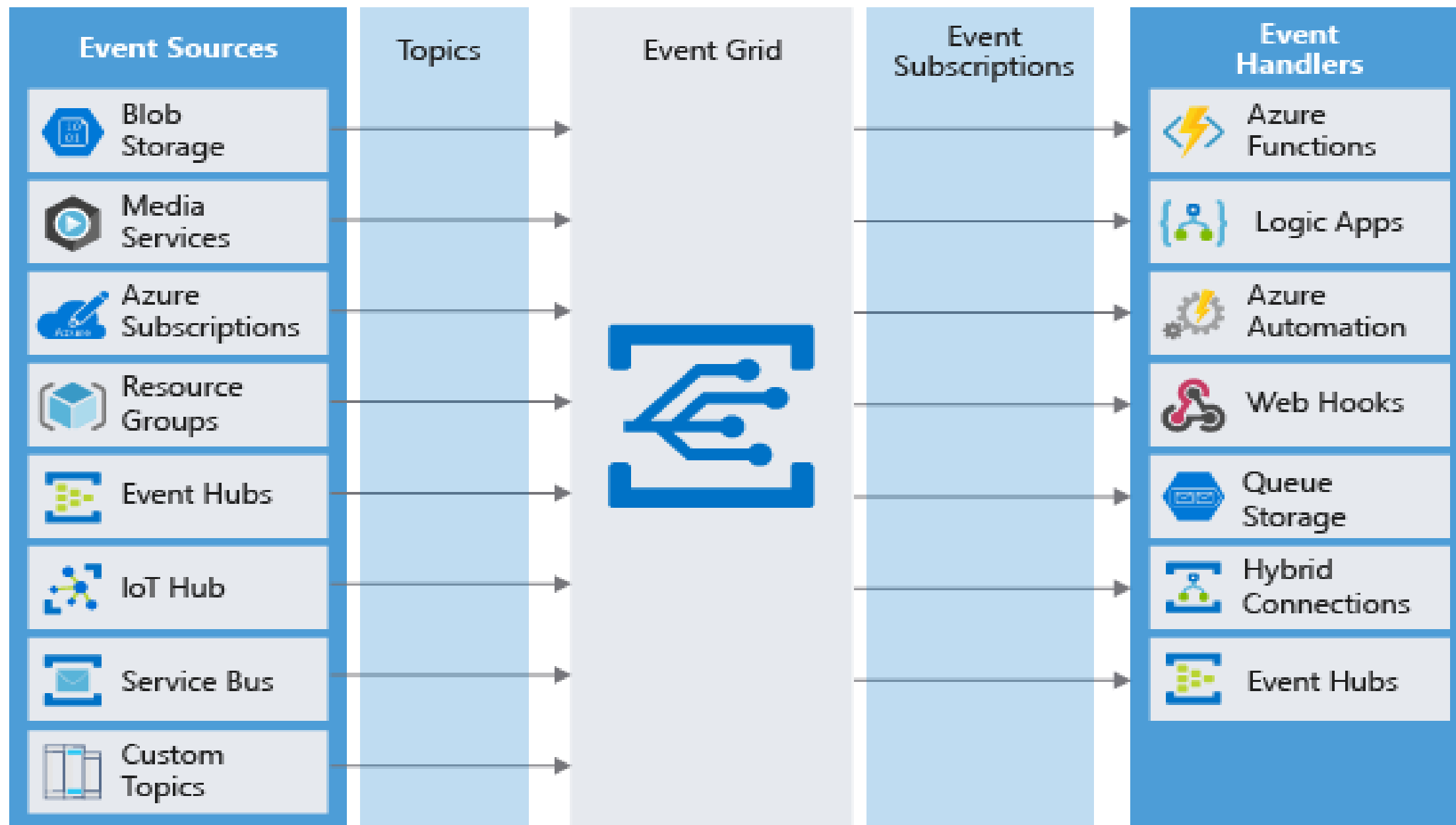
Awesomeness



- Near real time
- 10 million events per second per region
- 24 hour retry – push to subscribers
- Built in Azure Events → *ResourceWriteSuccess*
- Use your own custom events
- 100K free operations per month

**1.3 PB/ day
ingress**

**2 PB/ day
egress**



What is Event Grid For?

Serverless apps

Trigger a function to run when a file is added to storage

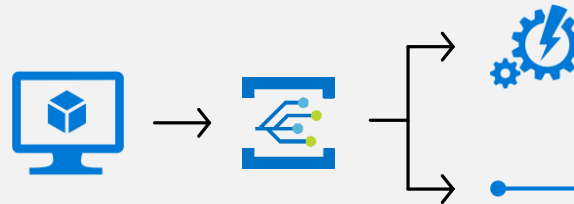


Ops automation

Automatically audit new infra

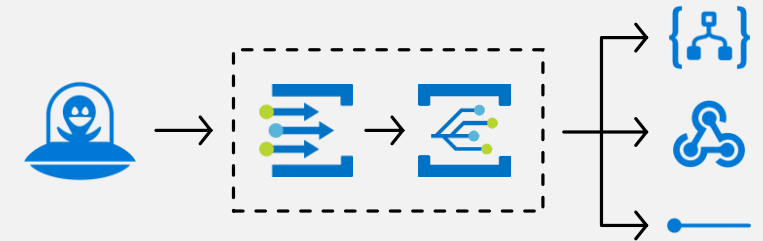


Automatically tag objects in Azure














Third-party integration

Publish and consume external events



Azure Integration Services

Monitoring & Management		OMS / Log Analytics		Logic Apps Management OMS Solution
API Mediation & Management		API Management		Azure Function Proxies
Orchestration, Connectors, Data Handling, Transformation Routing		Logic Apps Workflows		Logic Apps Connectors Protocol Connectors Hybrid & Enterprise Connectors Azure Services Connectors SaaS Connectors EDI, AS2 & XML Connectors On-premises data gateway
Serverless Compute <i>(Custom Code and Custom Connectors)</i>				Azure Functions
Messaging & Eventing		Service Bus		Event Grid
Development & Solution Life-cycle		Visual Studio		Visual Studio Team Services

Azure Messaging Services



Storage
Queues



Notification
Hub



Service
Bus



IoT
Hub



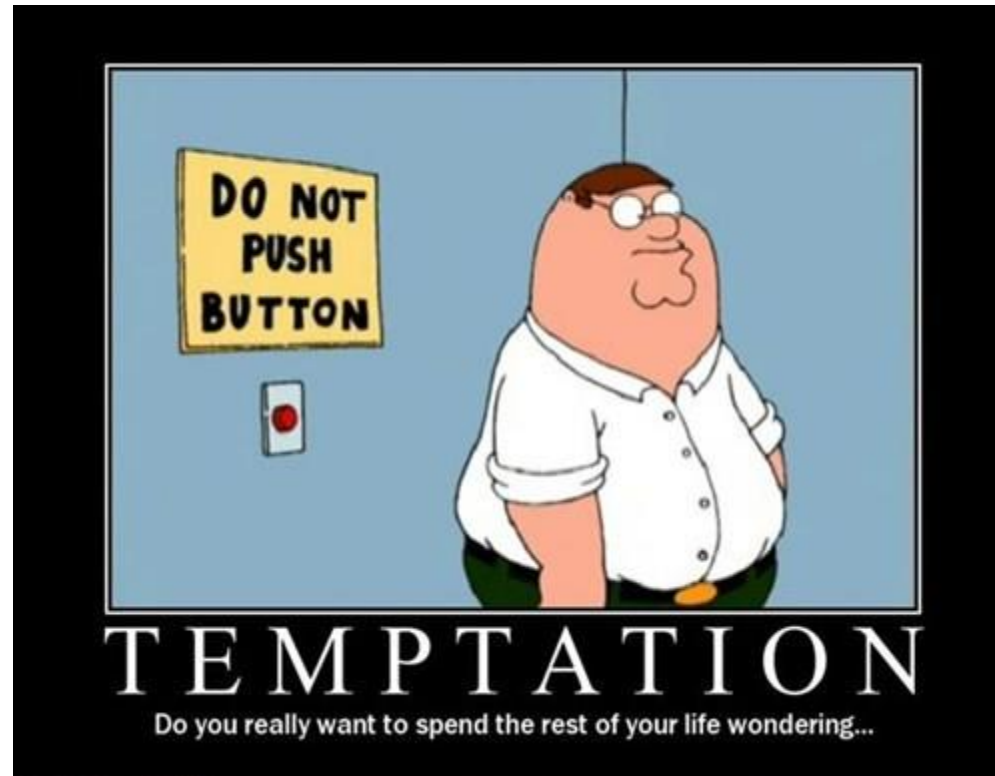
Event
Hub

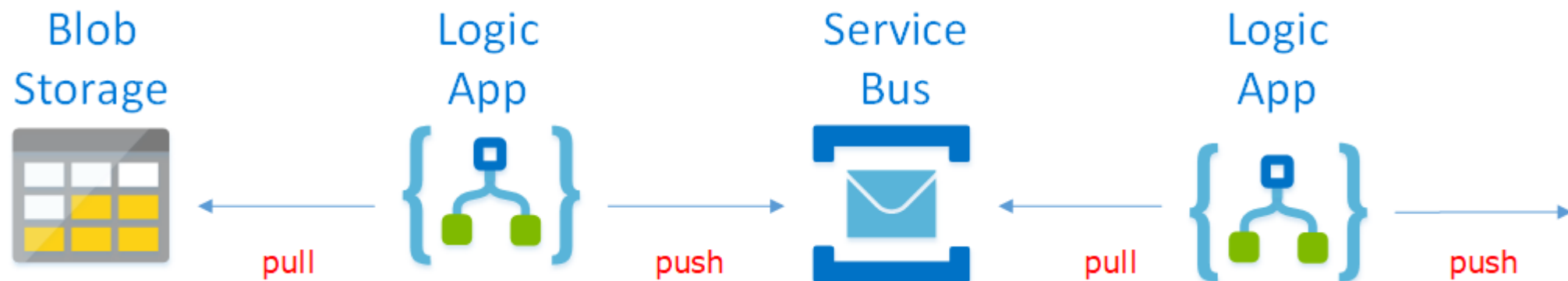


Signal R

Service	Purpose	Type	When to use
Event Grid	Reactive Programming	Events	React to change
Event Hub	Big data pipeline	Streams	Telemetry & data
Service Bus	Enterprise messaging	Commands	Transactional actions

Why a push model?





When a message is received in a topic subscription (auto-complete) ⓘ ...

*Topic name
example-topic ✕

*Topic subscription name
example-topic ✕

Subscription type
Main ▼ ✕

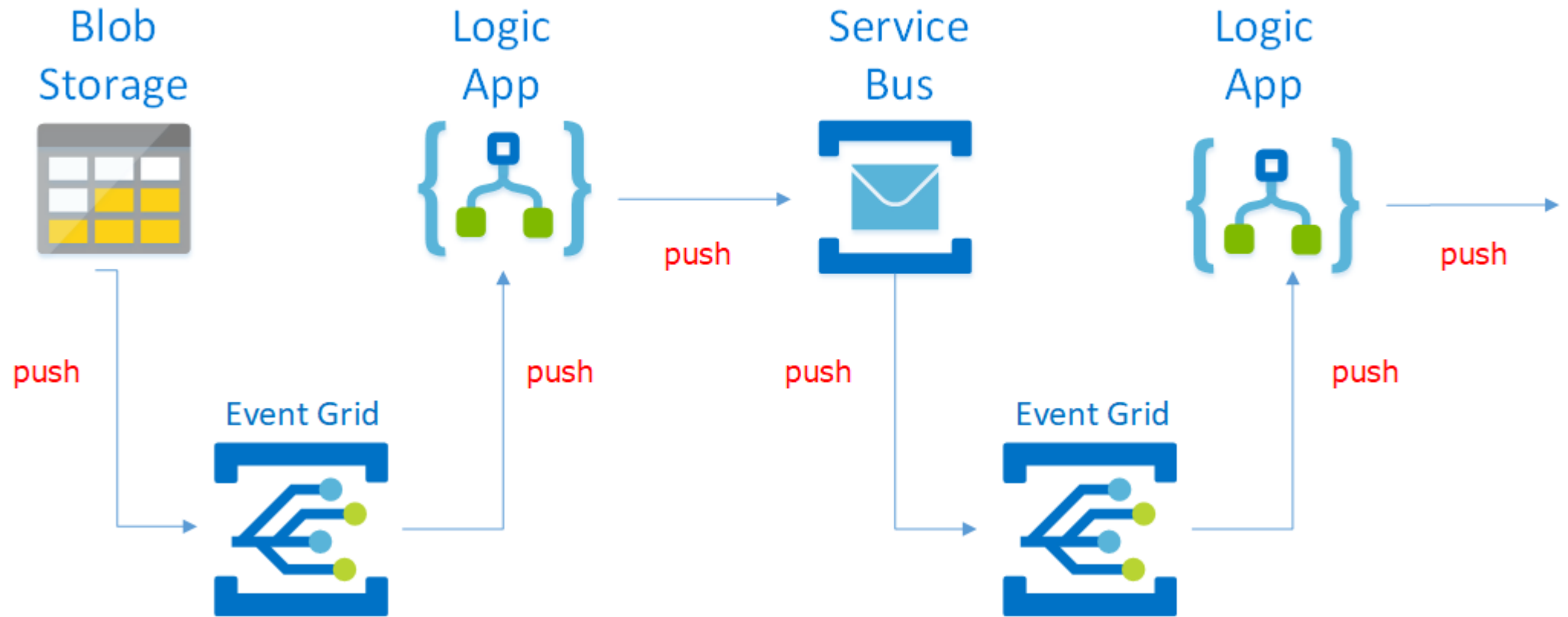
How often do you want to check for items?

*Interval
3

*Frequency
Minute ▼

Add new parameter ▼

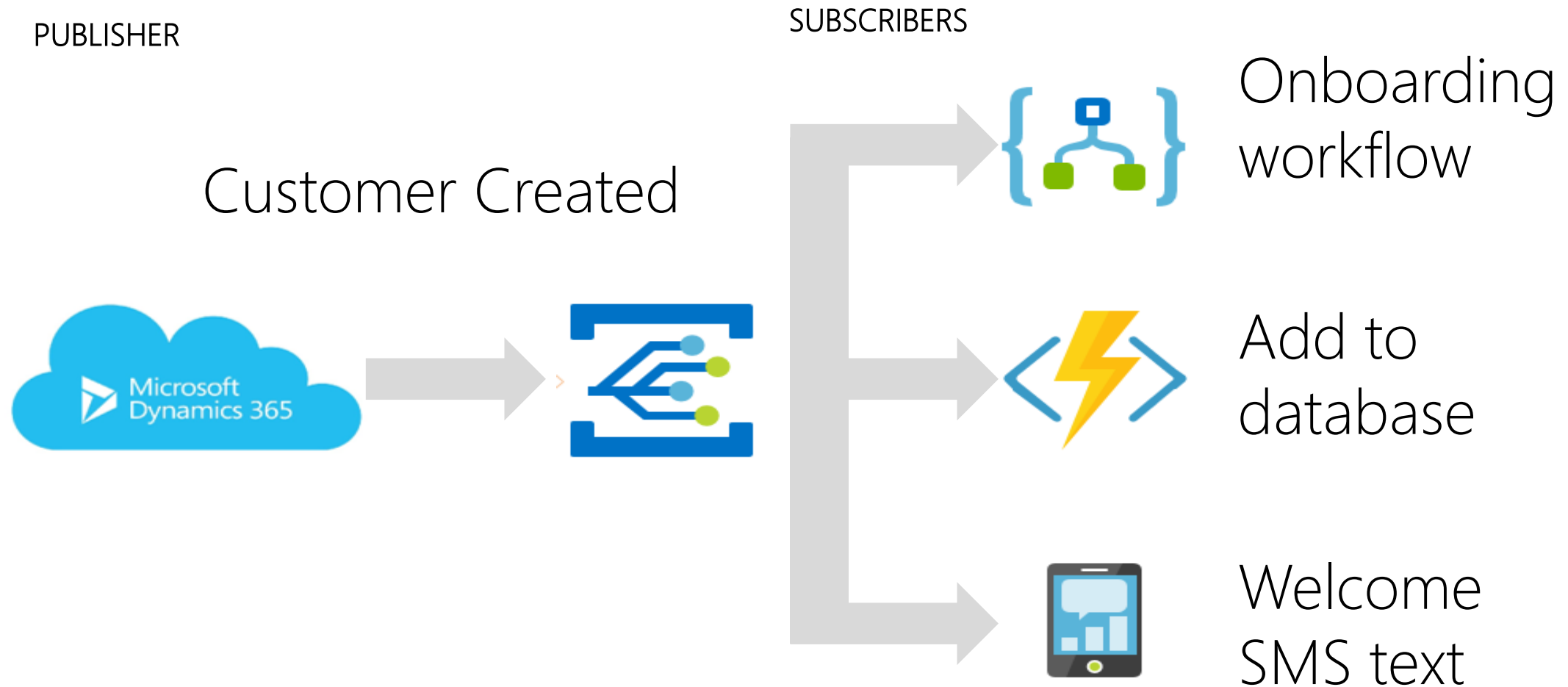
Connected to demo-servicebus-connection. [Change connection.](#)



Microsoft.Storage.BlobCreated

Microsoft.ServiceBus.ActiveMessagesAvailableWithNoListeners

Multiple Subscriber Push





LIVE DEMO?

HALF YOUR EVENTS ARE MINE

	Type	Description
topic	string	Full resource path to the event source. This field isn't writeable. Event Grid provides this value.
subject	string	Publisher-defined path to the event subject.
eventType	string	One of the registered event types for this event source.
eventTime	string	The time the event is generated based on the provider's UTC time.
id	string	Unique identifier for the event.
data	object	Event data specific to the resource provider.
dataVersion	string	The schema version of the data object. The publisher defines the schema version.
metadataVersion	string	The schema version of the event metadata. Event Grid defines the schema of the top-level properties. Event Grid provides this value.

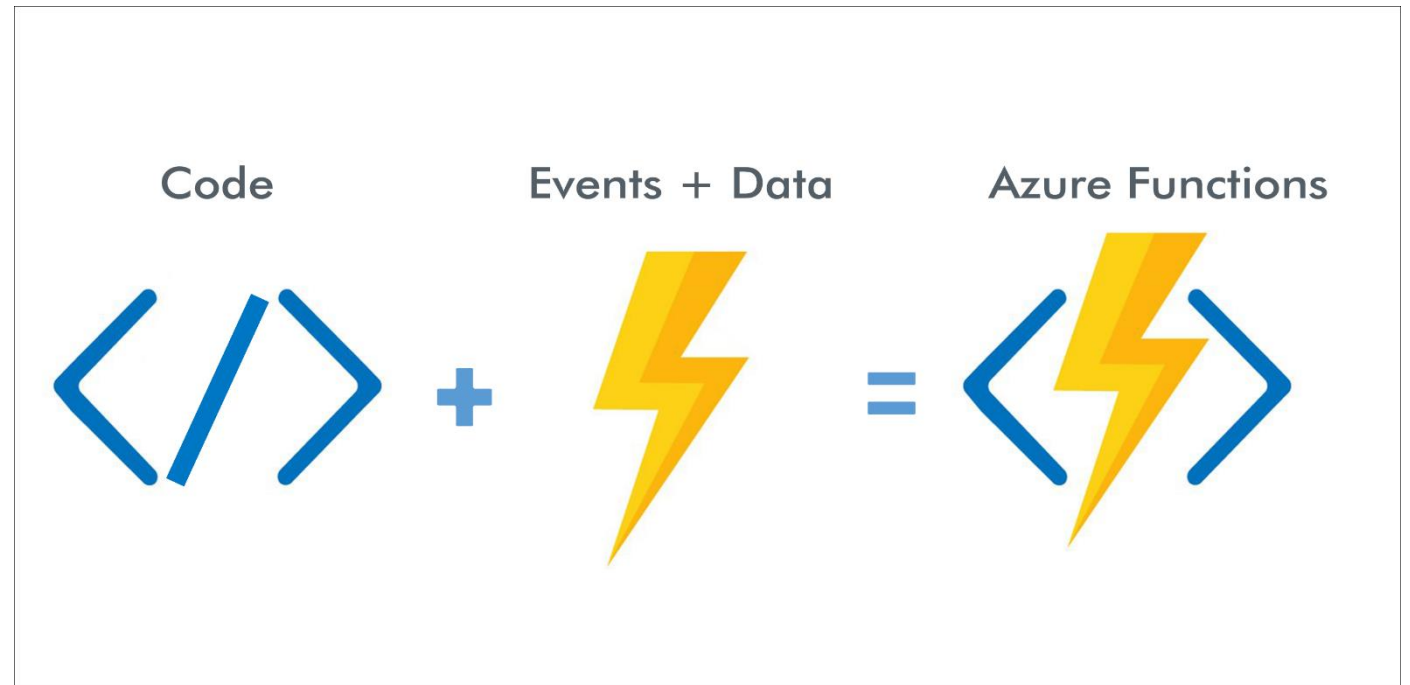
Event Schemas – Cloud Events

- <https://cloudevents.io/>
- Common way to describe Events
- Led by Serverless Working Group
- Cloud Native Computing Foundation
- Specification version 0.2 (0.1 == Event Grid)
- GitHub - <https://github.com/cloudevents/spec>
- <https://github.com/aliencube/CloudEvents.NET>

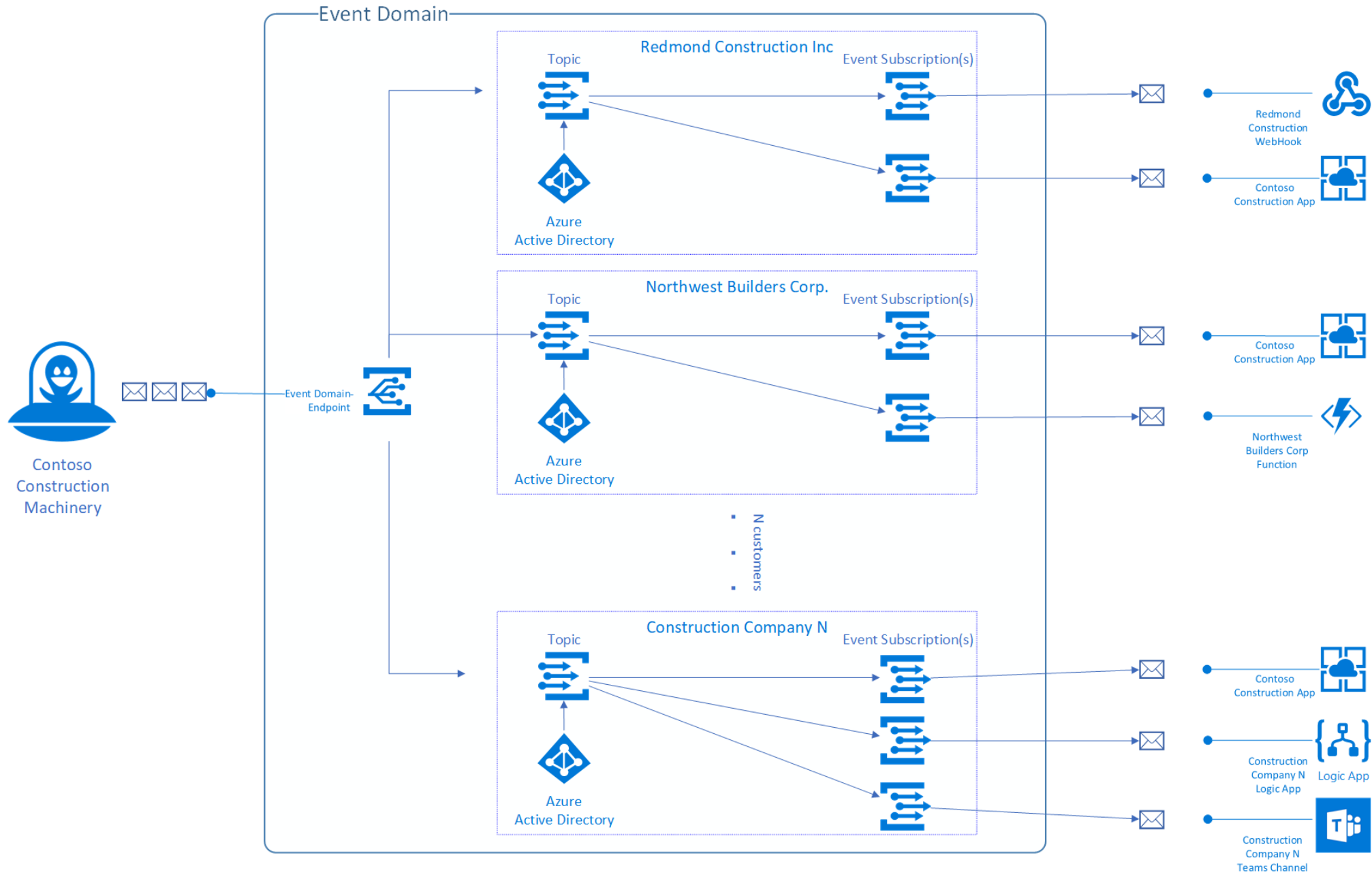


Triggers

- Event Grid
- Event Hubs
- Graph Events
 - subscription
 - resource
- Blob Storage
- Cosmos DB
- Queue Storage
- Service Bus

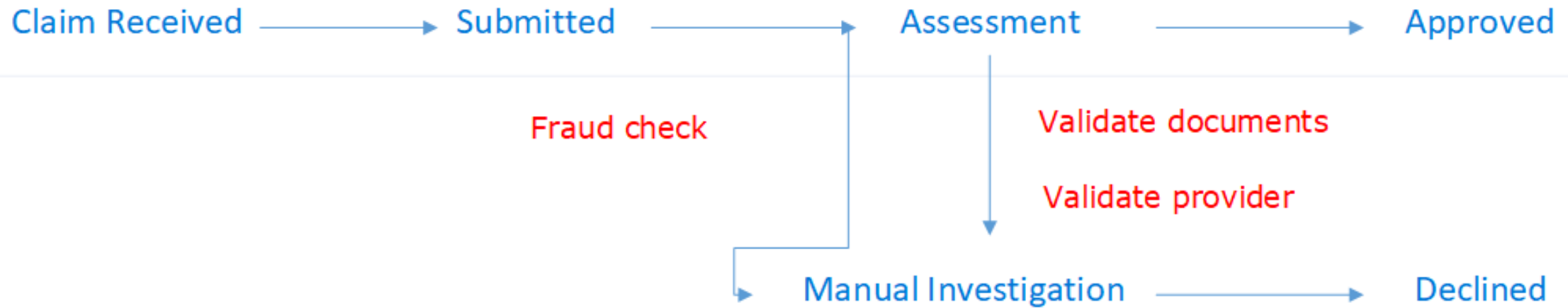


Event Grid Domains

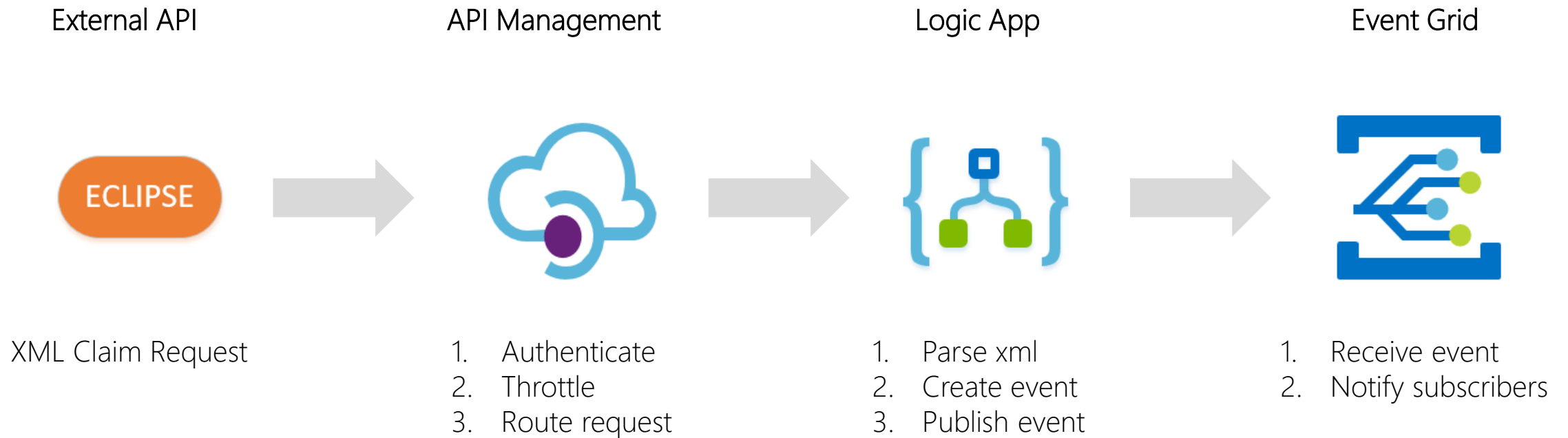


Demo 2 Process Flow

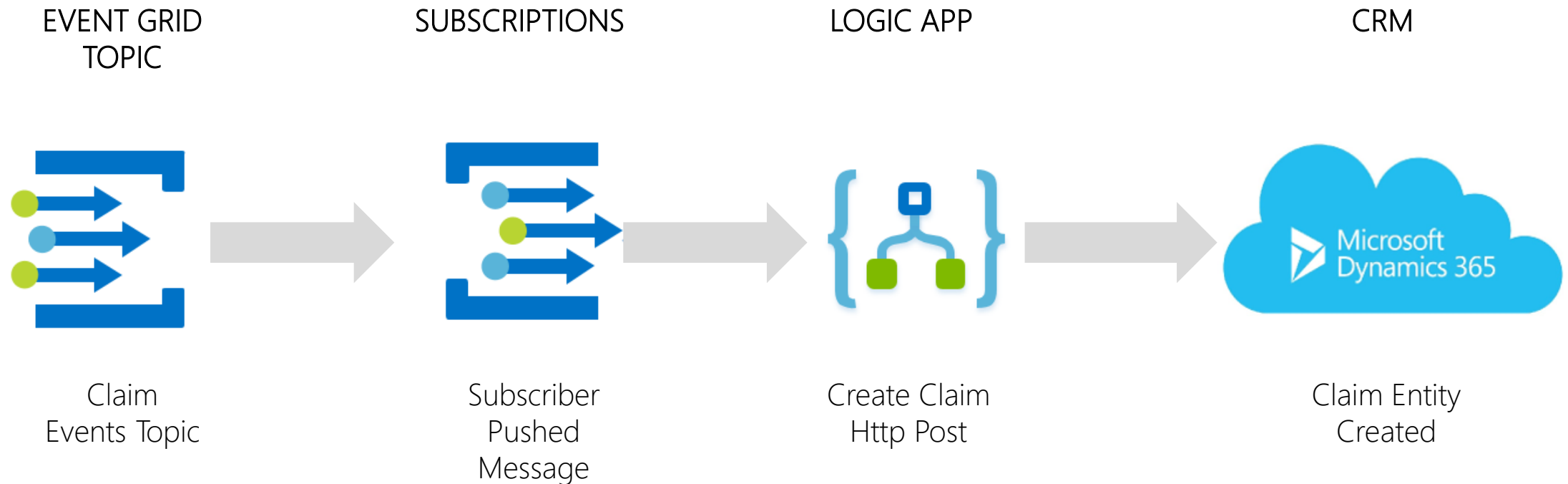
Happy path



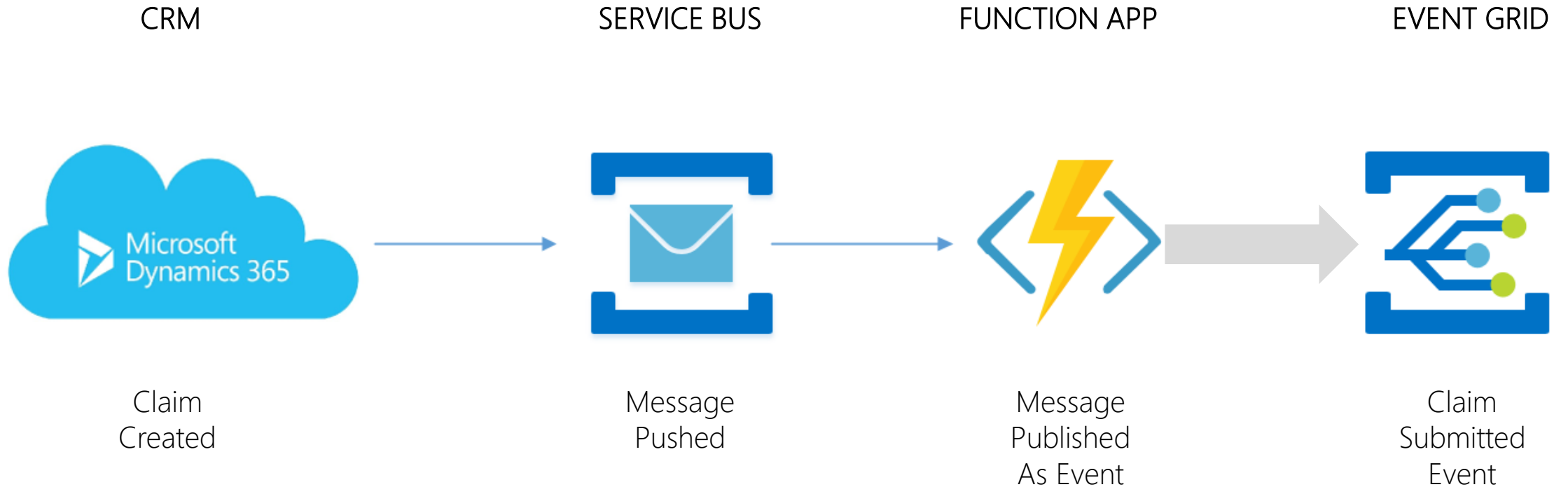
Flow 1- inbound to event

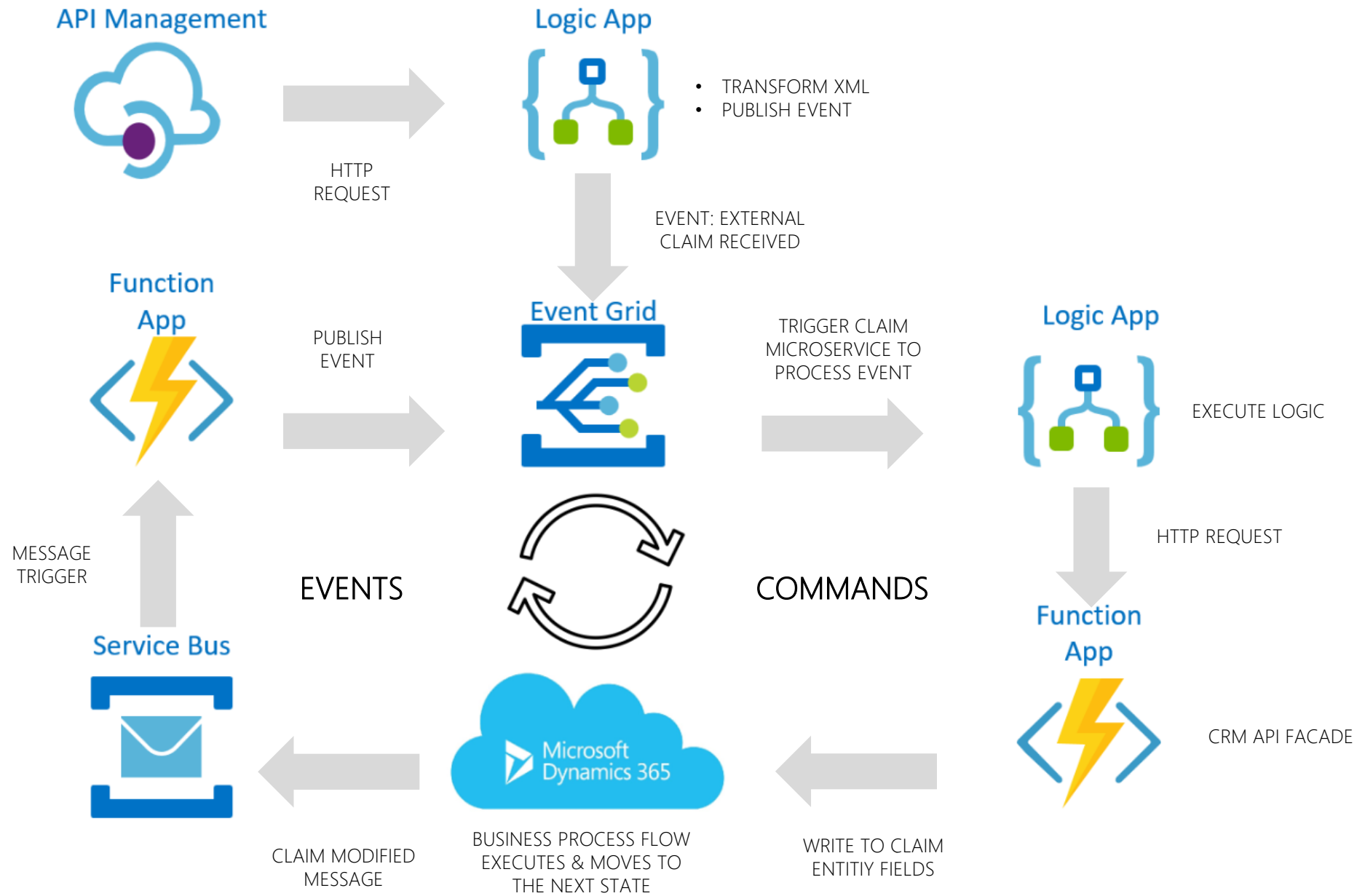


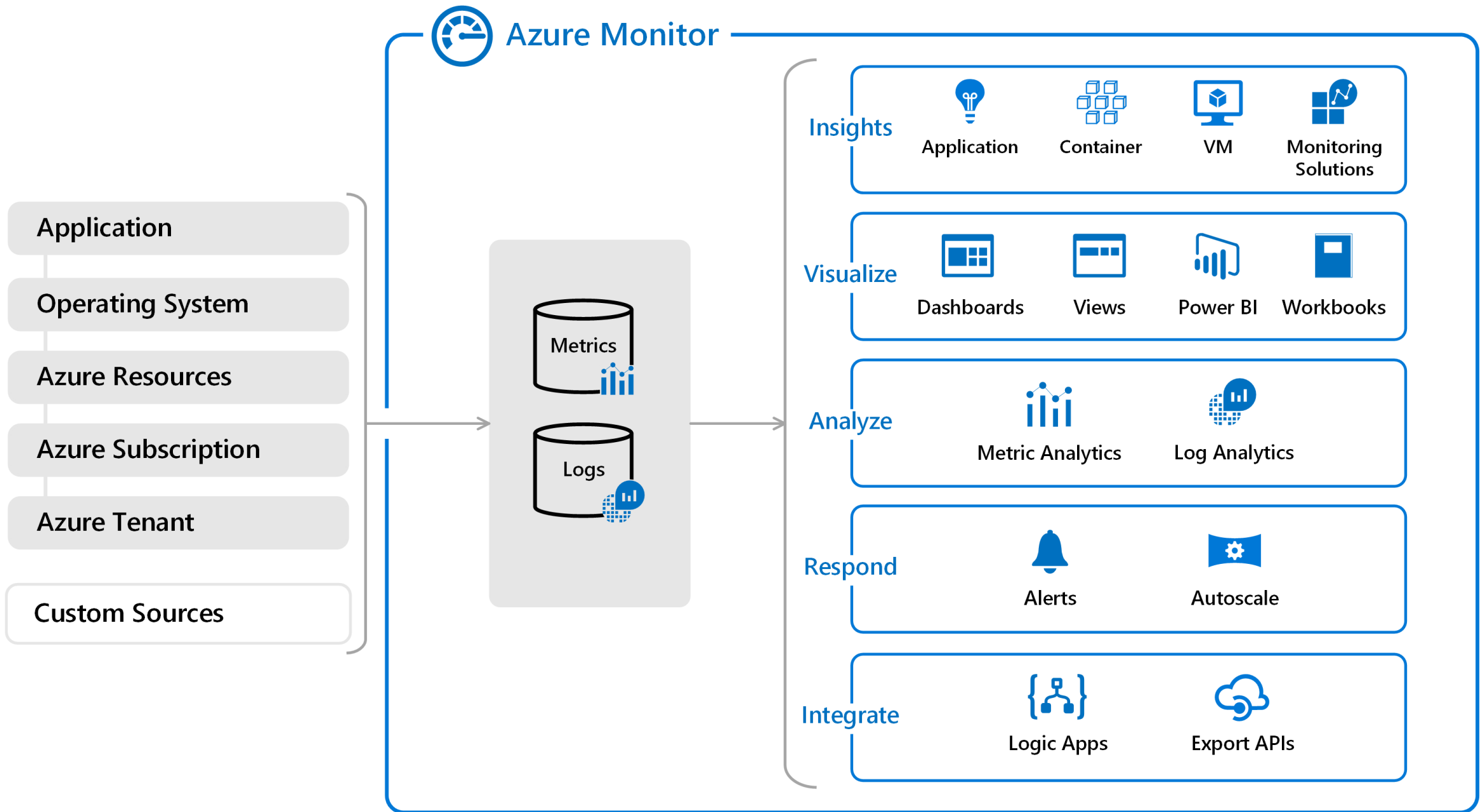
Flow 2 – subscriber to command



Flow 3 – event published







Final Demo



<https://azure.microsoft.com/en-au/services/event-grid/>



Thanks!

#PushDontPull



Chris McKelt

chris@mckelt.com

@chris_mckelt

McKelt.com

Security

Publishers	Create Subscription	Management Access
<p>Only for custom topics</p> <ul style="list-style-type: none">Key authentication using aeg-sas-key headerSAS Token using aeg-sas-token header <p>r={resource}& e={expiration}& s={signature}</p>	<p>RBAC</p> <p>Microsoft.EventGrid/ EventSubscriptions/Write permission on the required resource</p> <p>For Azure Publishers: /subscriptions/{id}/ resourceGroups/{rg-name}/ providers/{provider}/ {res-type}/{resource-name}</p> <p>Custom topics /subscriptions/{id}/ resourceGroups/{rg-name}/ providers/Microsoft.EventGrid/ topics/{topic-name}</p>	<p>RBAC</p> <ul style="list-style-type: none">Microsoft.EventGrid/*/readMicrosoft.EventGrid/*/writeMicrosoft.EventGrid/*/deleteMicrosoft.EventGrid/ eventSubscriptions/ getFullUrl/actionMicrosoft.EventGrid/topics/ listKeys/actionMicrosoft.EventGrid/topics/ regenerateKey/action <p>+ Custom roles</p>

<https://docs.microsoft.com/en-us/azure/event-grid/security-authentication>

FAQs

- 500 Event Subscriptions per topic
- 100 custom topics per Azure Subscription
- 1,000 Event Grid subscriptions
- https endpoints. Other endpoints will be supported later.
- exponential back off for all deliveries. If your WebHook does not return a 2xx, the retry begins immediately.
- 24 hours retry before message deleted (unless dead lettered)

Pricing

NUMBER OF OPERATIONS

Published events	5 million operations
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Delivery attempts	11 million operations (1 million for second delivery attempt)
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Advanced match	1 million operations
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Monthly free grant	- 100,000 operations
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Total operations	16.9 million
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Price per million operations	x \$0.824
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Total monthly cost	\$13.923
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Product Comparison

	Kafka	Kinesis	Solace	Event Hubs	Event Grid
Cloud / On-Prem	Both	Cloud Only	Both	Cloud Only	Cloud Only
Managed Service	✗	✓	✓	✓	✓
Auto-Scaling	✓	✗		✗	✓
Replay	✓	✗	✓	✓	✗
Event Sourcing	✓	✗	✓	✓*	✗
Integrations	Kafka	AWS services	Open Source connectors available	Azure services, Kafka	Azure services, anything via HTTP/Webhooks
Protocols	Kafka	HTTP	HTTP, AMQP, MQTT, JMS, Web Sockets, Native	HTTP, AMQP, Kafka	HTTP
Open Source	✓	✗	Closed source, but open protocol	✗	✗
Max Message Size	No Limit	1MB	No Limit	256K	64K

*via archiving

Event Grid – Daily metrics

1.3 PB/day|

ingress

2 PB/day

egress

2,200,000,000,000

Requests per day

99.9998%|

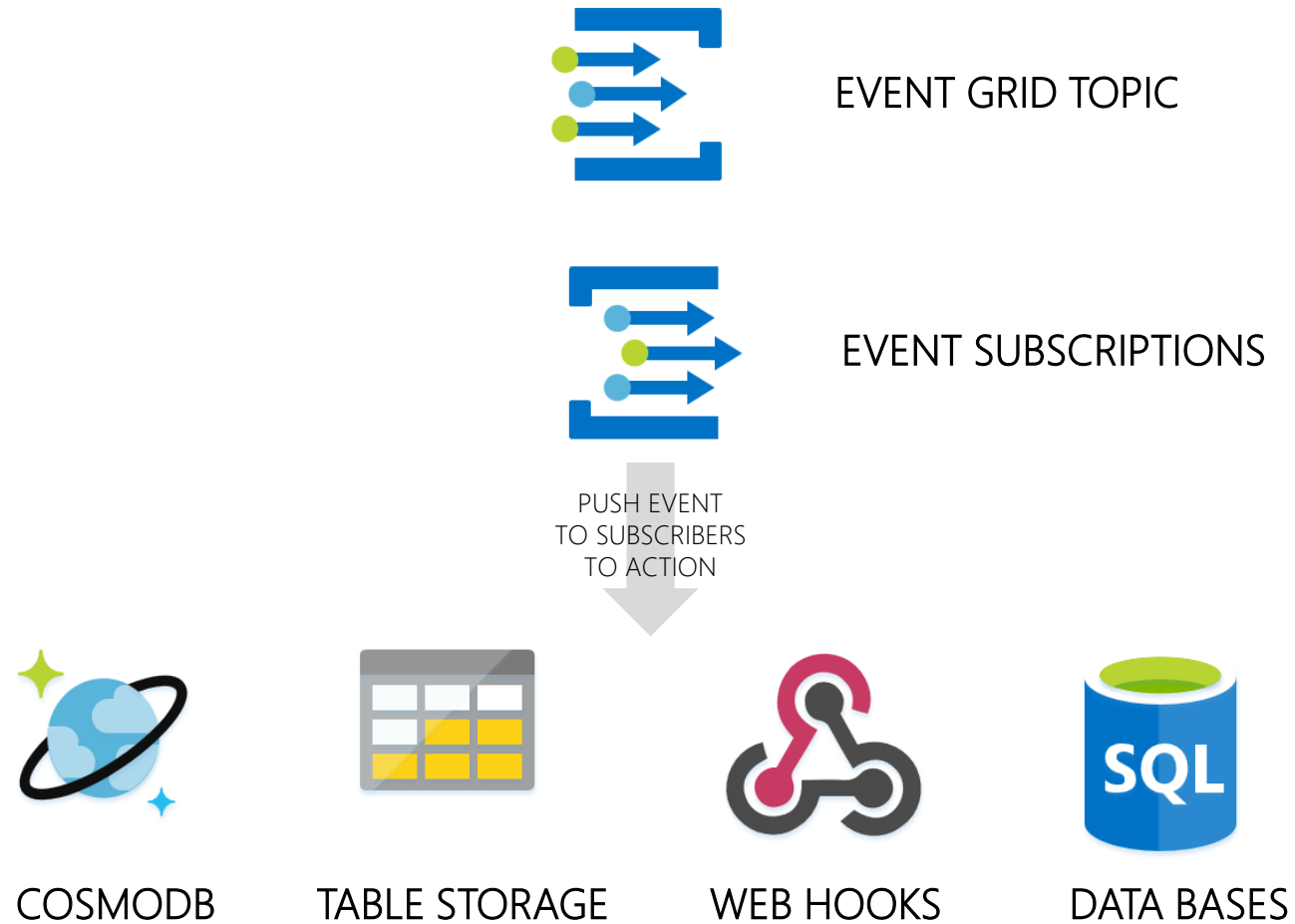
Success Rate

Figures reported by Microsoft, 30 Mar 2019

D365	Event
	External Request Initialized
Initialised	Claim Submitted → Fraud Check
Assessment	Claim In Assessment → Documents Check → Provider Check [FAILED]
Investigation	Claim Under Manual Investigation
Complete	Claim Approved Claim Rejected
ERROR	Claim Error

- Each entity (Claim) has a 'Status' (Claim Status)
- BPF business rules triggered from field changes
- Status changes
- Event broadcast
- Microservices react to event and write back results to Entity fields
- BPF business rules triggered from field

How does Event Grid do this?



Links