

# Microsoft Azure

*A Primer for Building Serverless Cloud Data Solutions*

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# Agenda

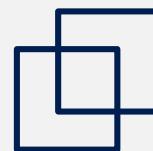
- [1] . Introduction to Azure Cloud
- [2] . What is “Serverless”
- [3] . Demo #1 – Streaming Data
- [4] . Demo #2 – Vision Intelligence
- [5] . More Serverless Architectures
- [6] . Getting Started in Azure
- [7] . Wrap Up and Summary

# Introduction Azure Primer

# Microsoft Azure Cloud Platform



Productive



Hybrid



Intelligent



Trusted



Productive



Hybrid



Intelligent



Trusted

42

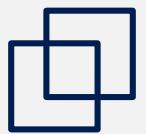
Azure regions (Dec 2017)

<https://azure.microsoft.com/en-us/regions/>





Productive



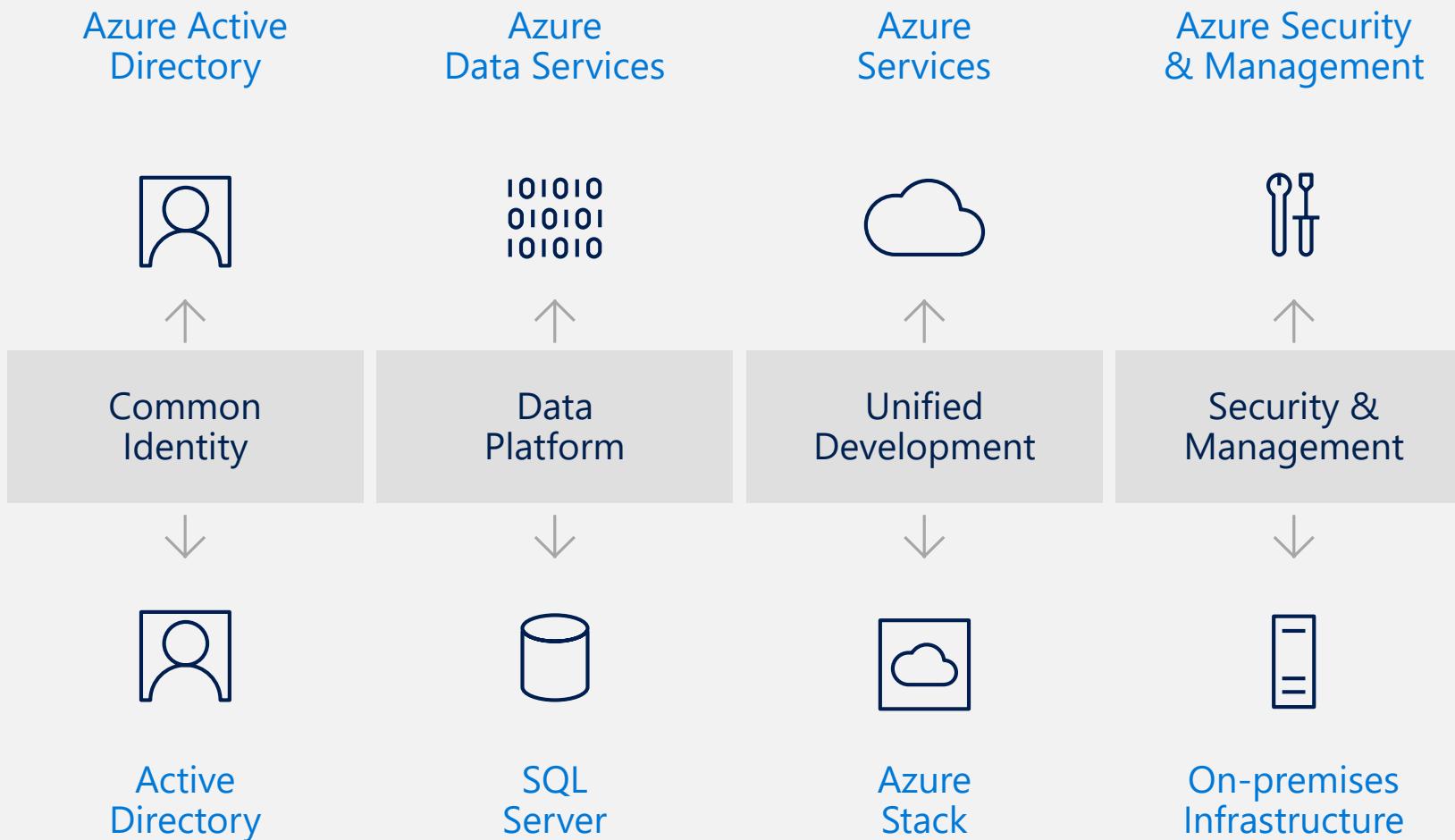
Hybrid



Intelligent



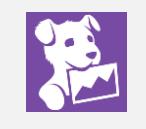
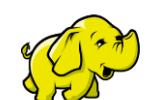
Trusted



<https://azure.microsoft.com/en-us/overview/hybrid-cloud/>

# Build and innovate with choice and flexibility

<https://azure.microsoft.com/en-us/overview/productivity/>

<b>DevOps</b>	 Nagios®	 VAGRANT	 ANSIBLE	 GRUNT				 Xamarin	
<b>Management</b>	 CHEF™	 puppet labs	 ANSIBLE	 SALTSTACK			 mist.io	 libcloud	 SCALR CLOUD MANAGEMENT
<b>Applications</b>		 Joomla!	 Drupal™		 APPRENDA				
<b>App frameworks &amp; tools</b>	 php	 nodeJS		 JS		 IJ	 eclipse		
<b>Databases &amp; middleware</b>	 Hadoop	 redis	 CLEARDB	 cloudera	 MySQL™	 mongoDB.		 Couchbase	
<b>Infrastructure</b>			 redhat	 SUSE		 bitnami	 ORACLE® LINUX	 FreeBSD	 docker

# Comply with industry and regional requirements

<https://www.microsoft.com/en-us/TrustCenter/Security/default.aspx>

## GLOBAL



ISO 27001



ISO 27018



ISO 27017



ISO 22301



SOC 1 Type 2



SOC 2 Type 2



SOC 3



CSA STAR  
Self-Assessment



CSA STAR  
Certification



CSA STAR  
Attestation

## US GOV



Moderate  
JAB P-ATO



High  
JAB P-ATO



DoD DISA  
SRG Level 2



DoD DISA  
SRG Level 4



DoD DISA  
SRG Level 5



SP 800-171



FIPS 140-2



Section 508  
VPAT



ITAR



CJIS



IRS 1075

## INDUSTRY



PCI DSS  
Level 1



CDSA



MPAA



FACT UK



Shared  
Assessments



FISC Japan



HIPAA /  
HITECH Act



HITRUST



GxP  
21 CFR Part 11



MARS-E



IG Toolkit UK



FERPA



GLBA



FFIEC

## REGIONAL



Argentina  
PDPA



EU  
Model Clauses



UK  
G-Cloud



China  
DJCP



China  
GB 18030



China  
TRUCS



Singapore  
MTCS



Australia  
IRAP/CCSL



New Zealand  
GCIO



Japan My  
Number Act



ENISA  
IAF



Japan CS  
Mark Gold



Spain  
ENS



Spain  
DPA



India  
MeitY



Canada  
Privacy Laws

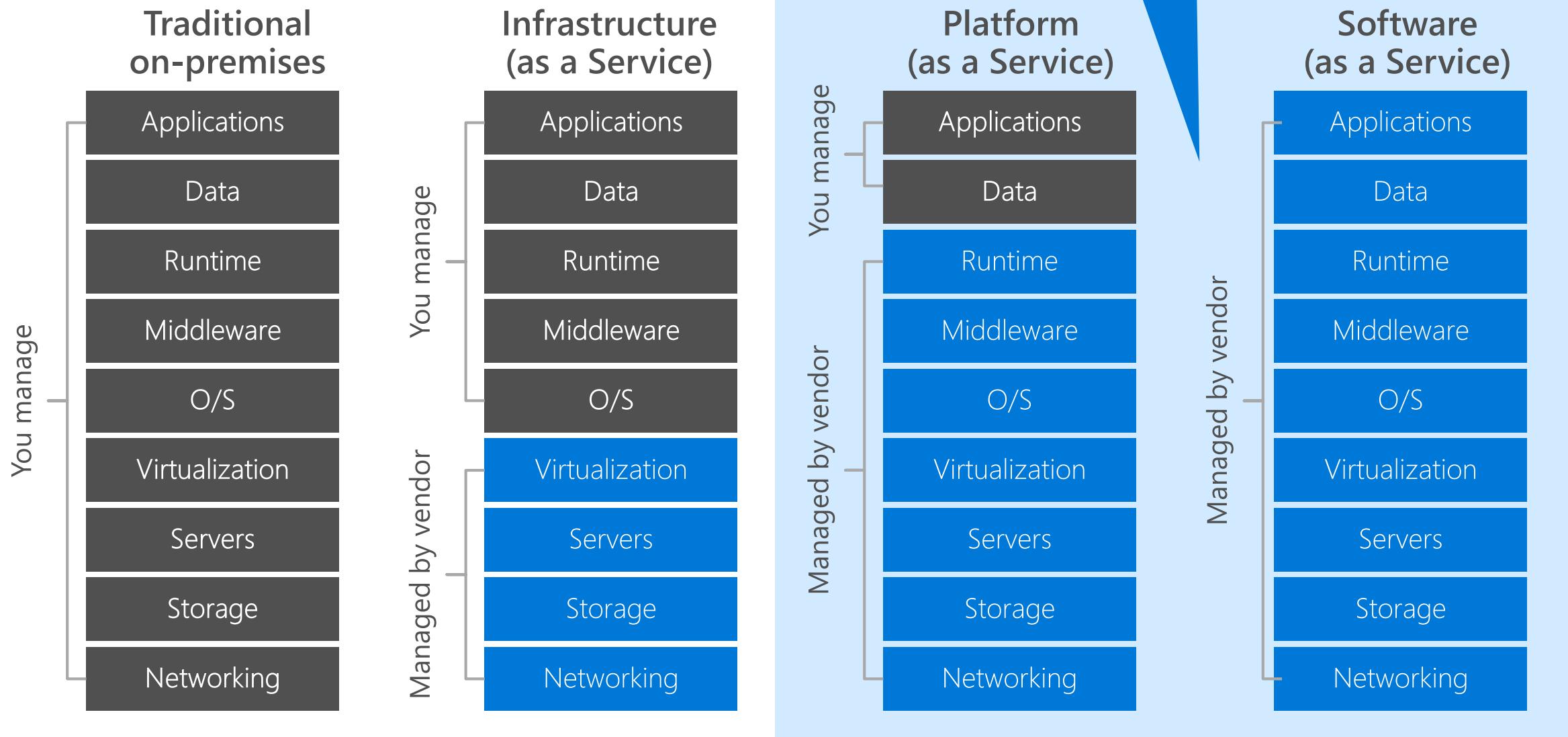


Privacy  
Shield



Germany IT  
Grundschutz  
workbook

# Cloud service models



# Azure Services – Which One?

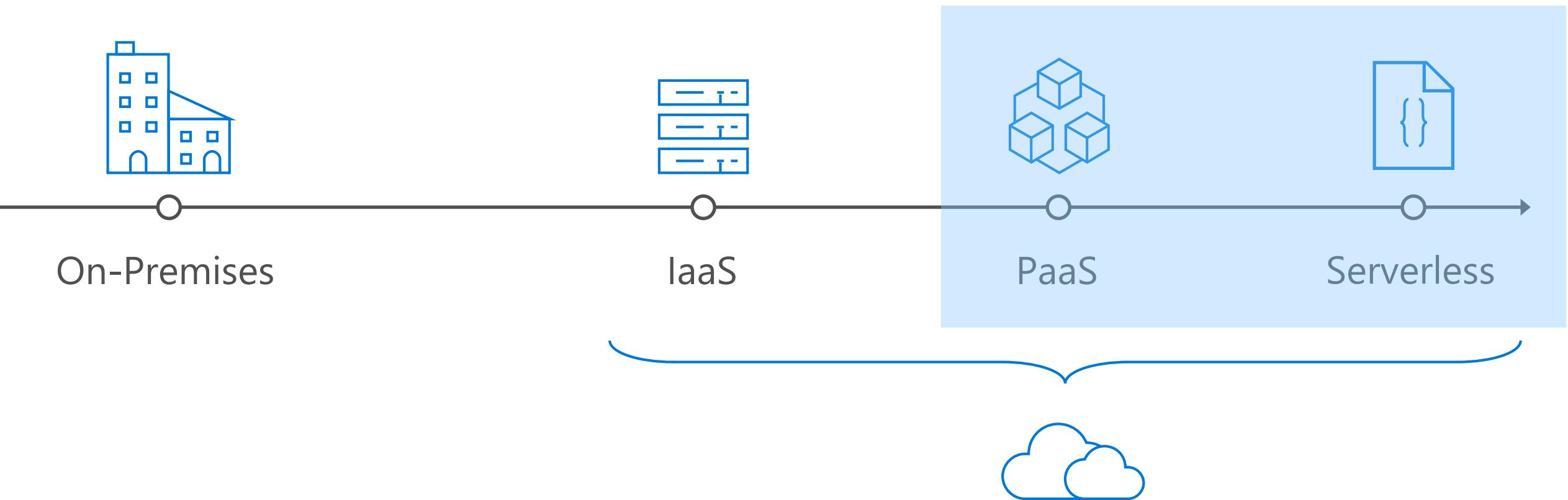
<http://azureinteractives.azurewebsites.net/Azure101Cards/default.html>



# Modern Data Applications

## What exactly is “Serverless”?

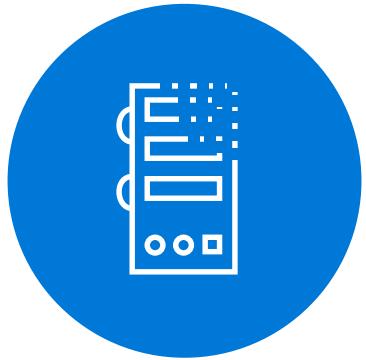
# The “evolution” of application platforms



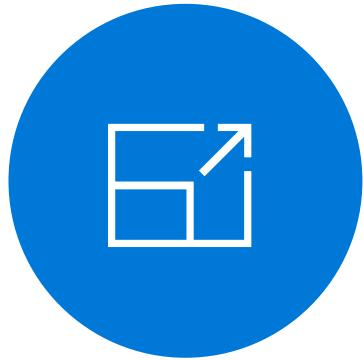
# What is Serverless?

<https://azure.microsoft.com/en-us/overview/serverless-computing/>

<https://blogs.msdn.microsoft.com/appserviceteam/2017/09/19/processing-100000-events-per-second-on-azure-functions/>



Abstraction  
of servers

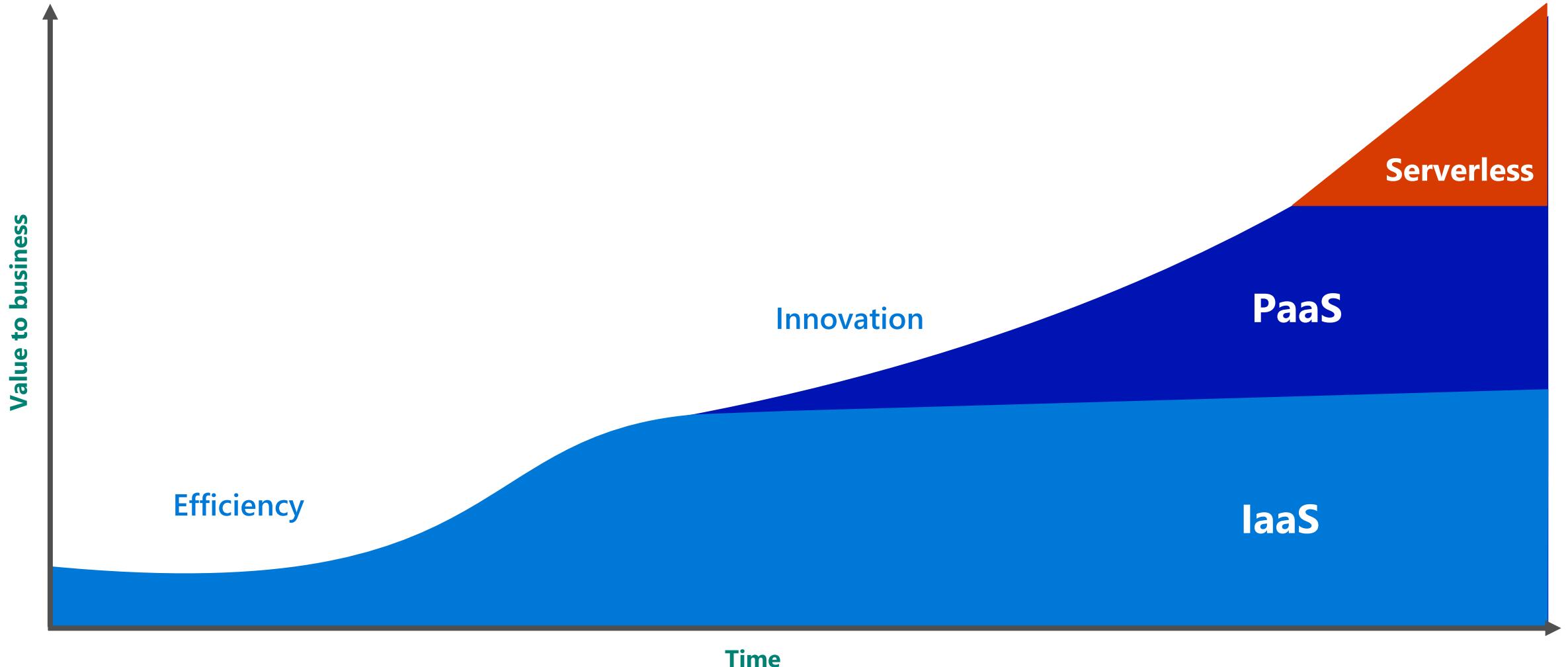


Event-driven/  
instant scale



Micro-billing

# Build apps faster with Serverless



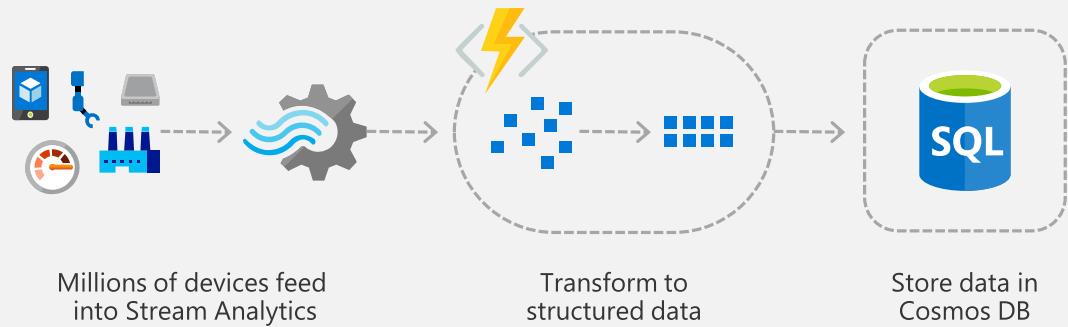
# Serverless application platform components

<b>Development</b>		<b>Platform</b>			
 IDE support		 Functions		 Logic Apps	 Event Grid
 Integrated DevOps		<ul style="list-style-type: none"><li>• Developer productivity</li><li>• Triggers and Bindings</li><li>• Flexible deployment options</li></ul>		<ul style="list-style-type: none"><li>• Visual designer</li><li>• 170+ connectors</li><li>• Functions orchestration</li></ul>	<ul style="list-style-type: none"><li>• Manage all events in one place</li><li>• Near real-time delivery</li><li>• Broad coverage</li></ul>
 Local development					
 Monitoring					
 Visual Debug History		 Database	 Storage	 Security	 IoT
					 Analytics
					 Intelligence

# Scenarios

Anything that needs to respond to events

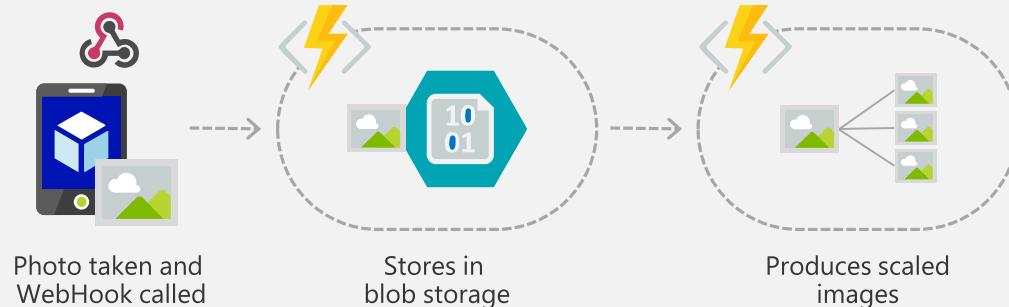
## Real-time stream processing



## Timer-based processing



## Mobile app backends



## Real-time bot messaging

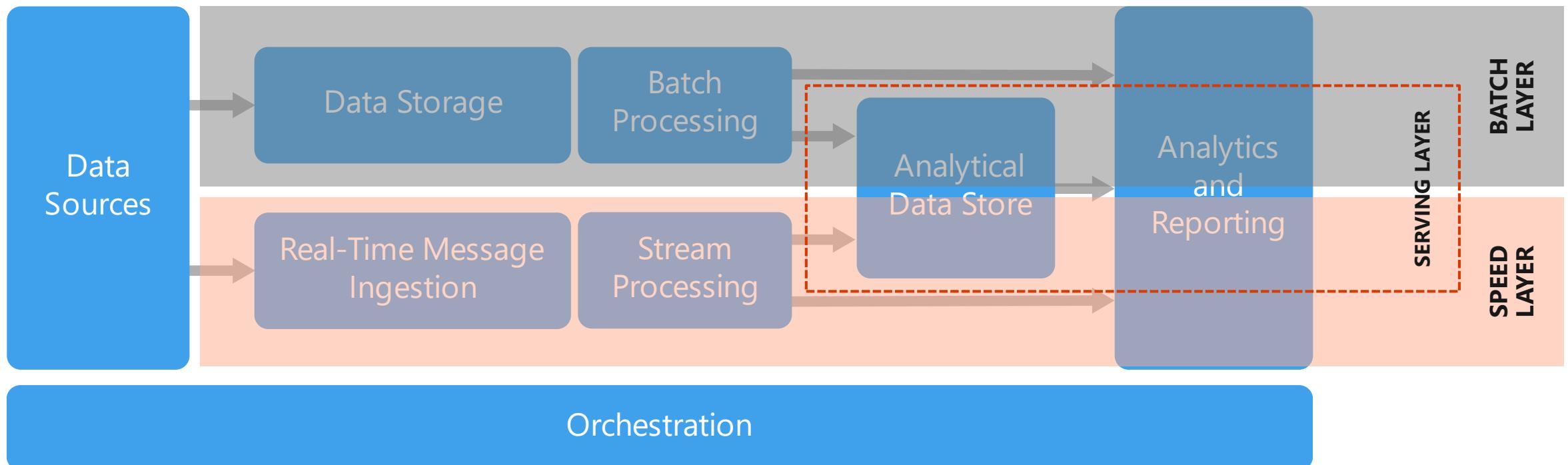


# Demonstration

## Scalable Streaming Data

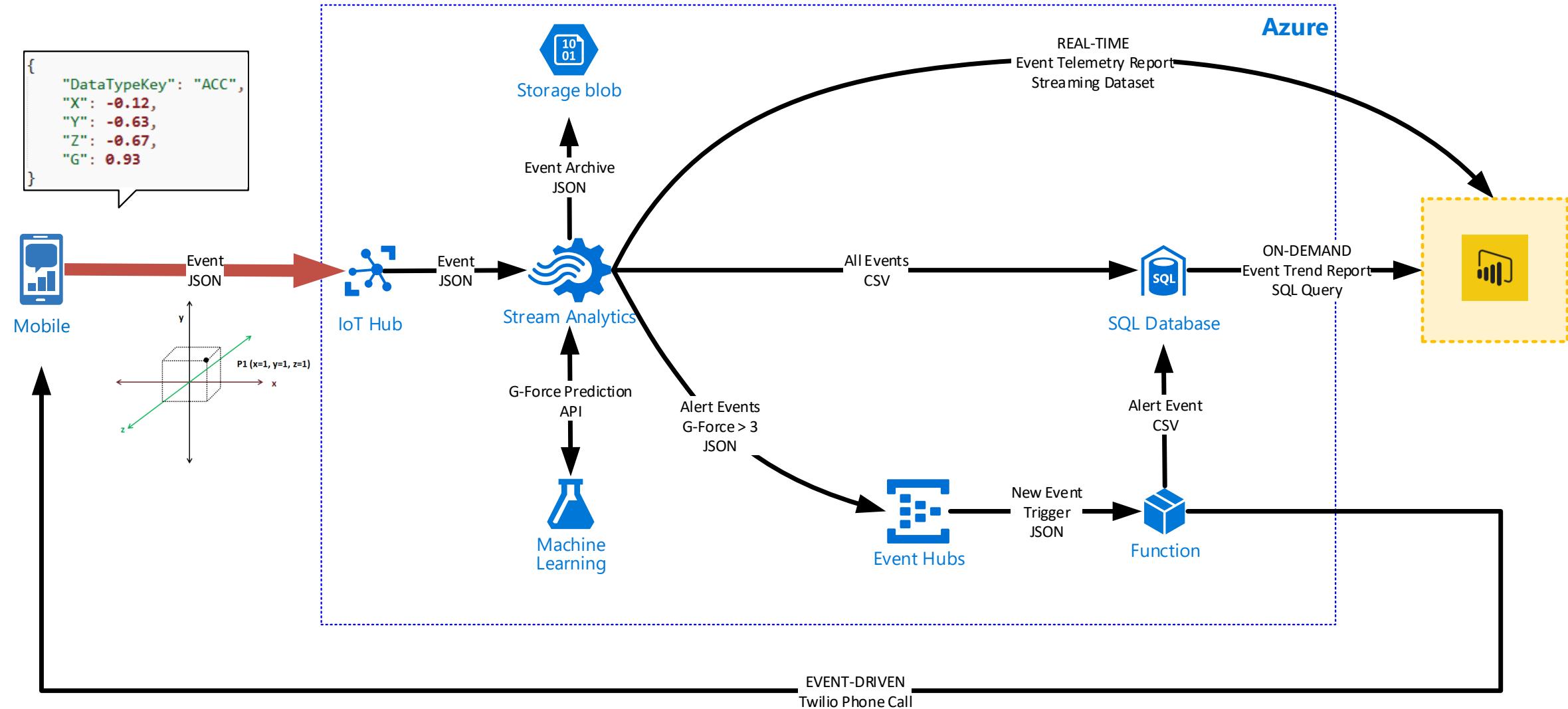
# What is the LAMBDA architecture?

*"The Objective of **Lambda Architecture** is to leverage the combined power of both **batch** & **real-time** processing to address the business scenarios where it requires both **historic view of the data** as well as getting insight into the **data in real-time** as business happens."*

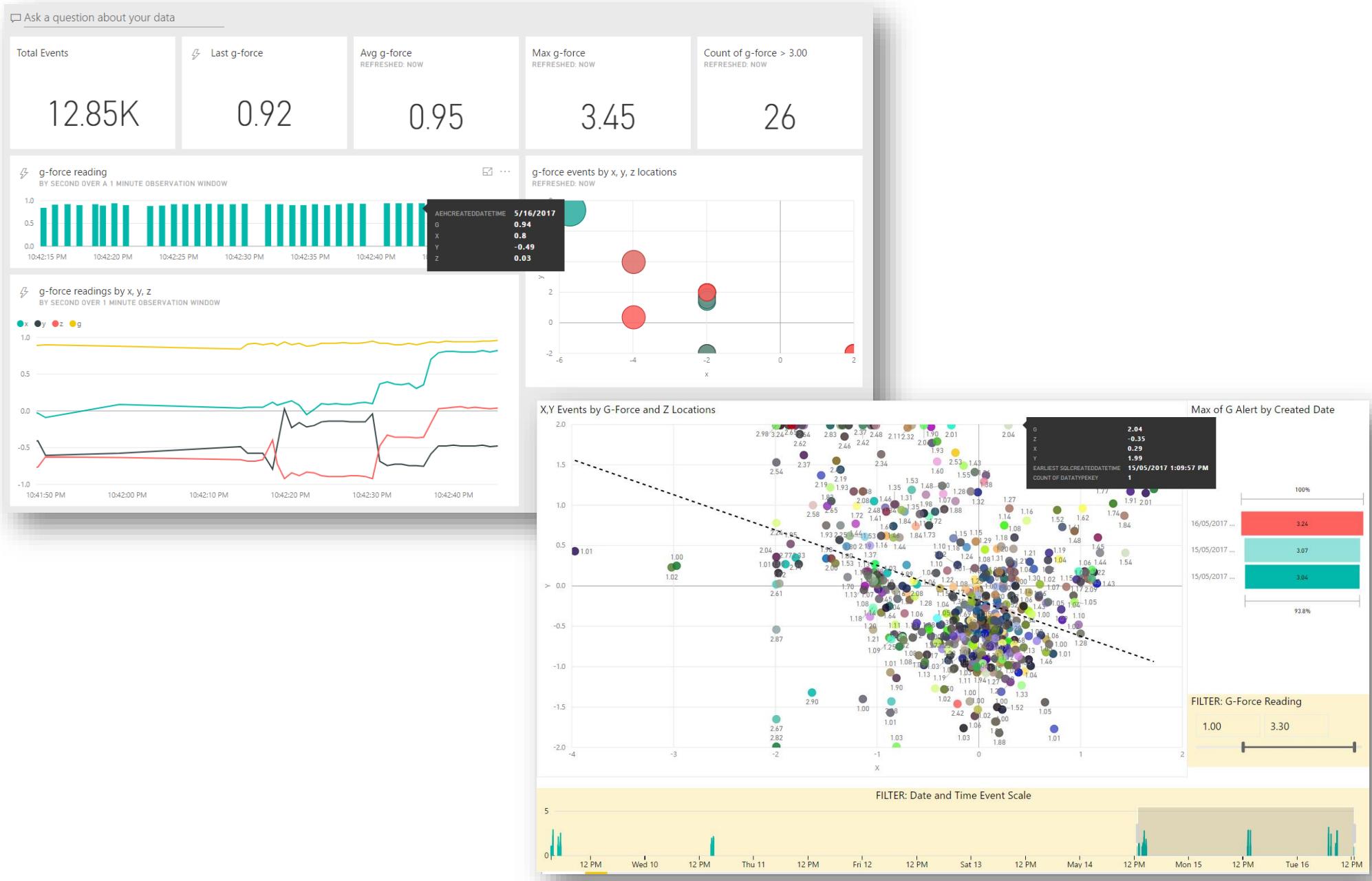
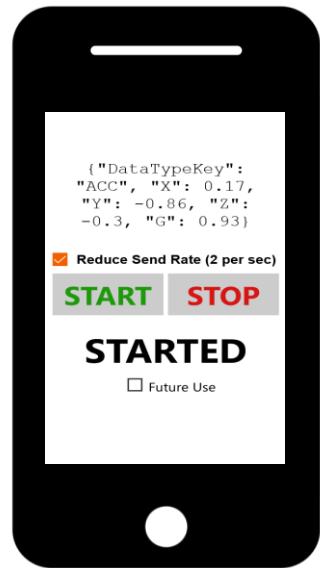


<https://social.technet.microsoft.com/wiki/contents/articles/33626.lambda-architecture-implementation-using-microsoft-azure.aspx>  
<https://gallery.cortaintelligence.com/Solution/Telemetry-Analytics>

# Demonstration → Mobile G-Force Solution - !



# Demonstration → Mobile G-Force Solution - !



# Demonstration

## Cognitive Vision Intelligence

# Demonstration

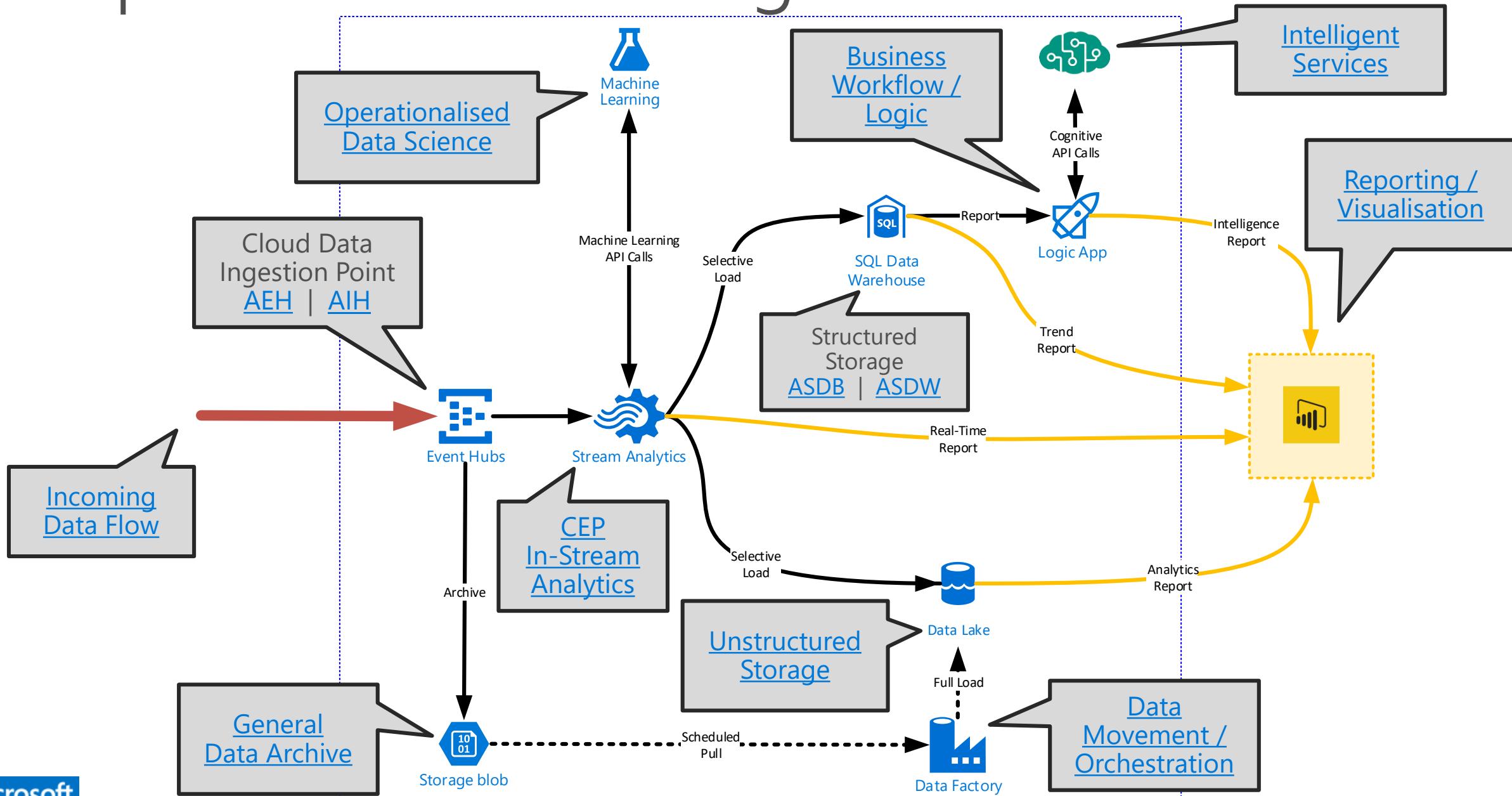
## Intelligent Kiosk

Intelligent Kiosk (github) - <https://github.com/Microsoft/Cognitive-Samples-IntelligentKiosk>  
Intelligent Kiosk (Win 10 App) - <https://www.microsoft.com/store/apps/9nblggh5qd84>

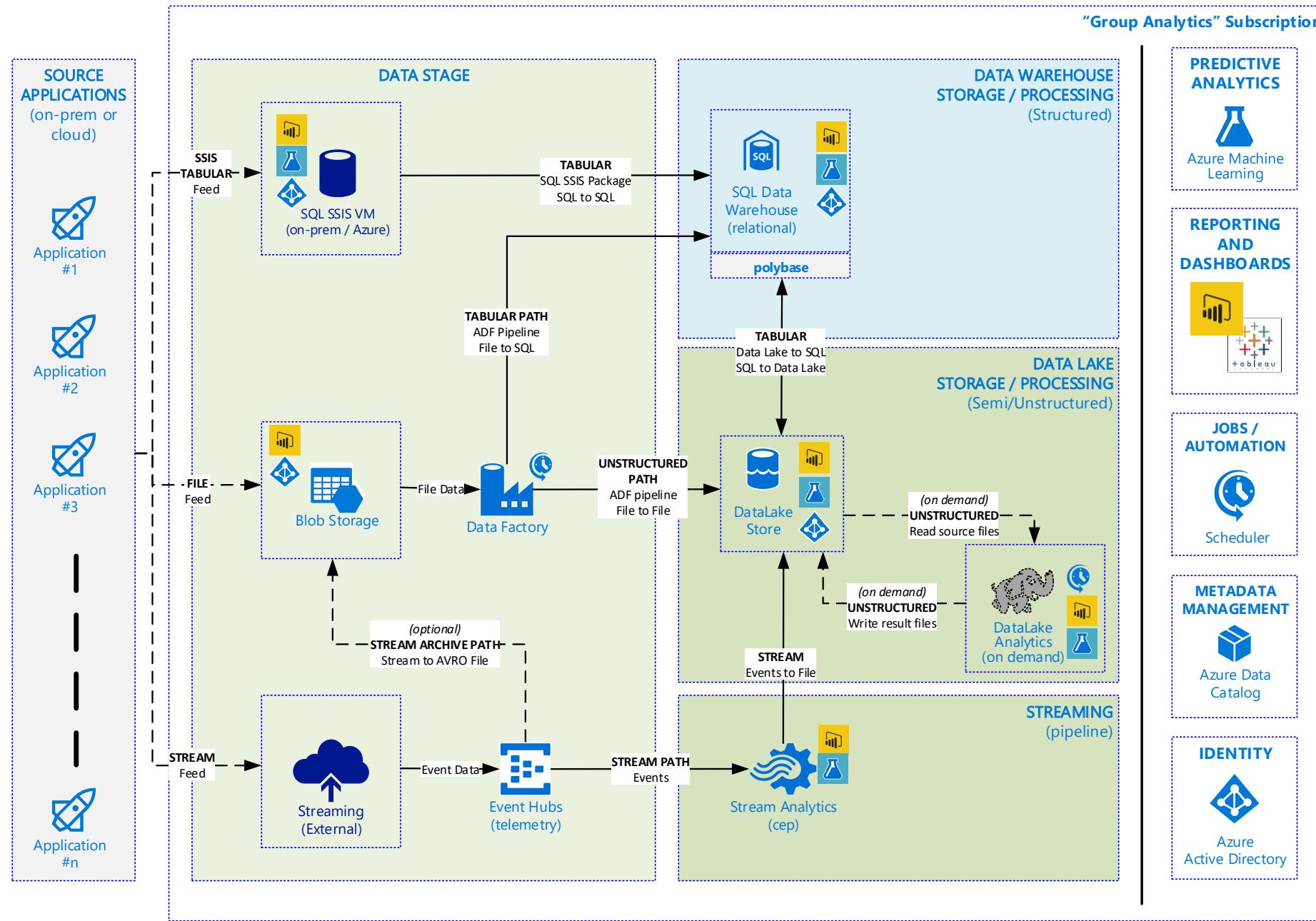
# Other Serverless Samples...

## Azure Solution Architectures

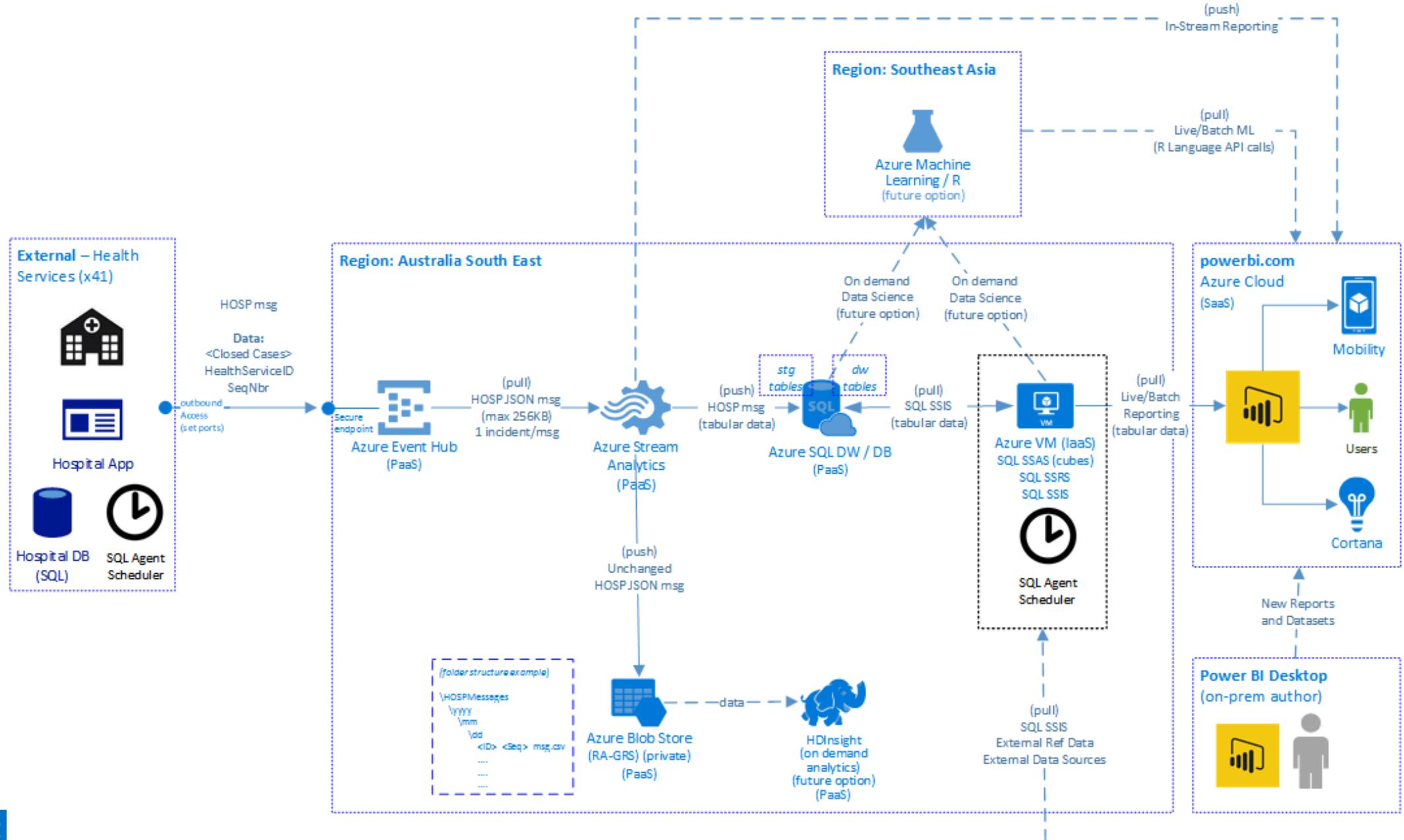
# Components of Streaming Solutions



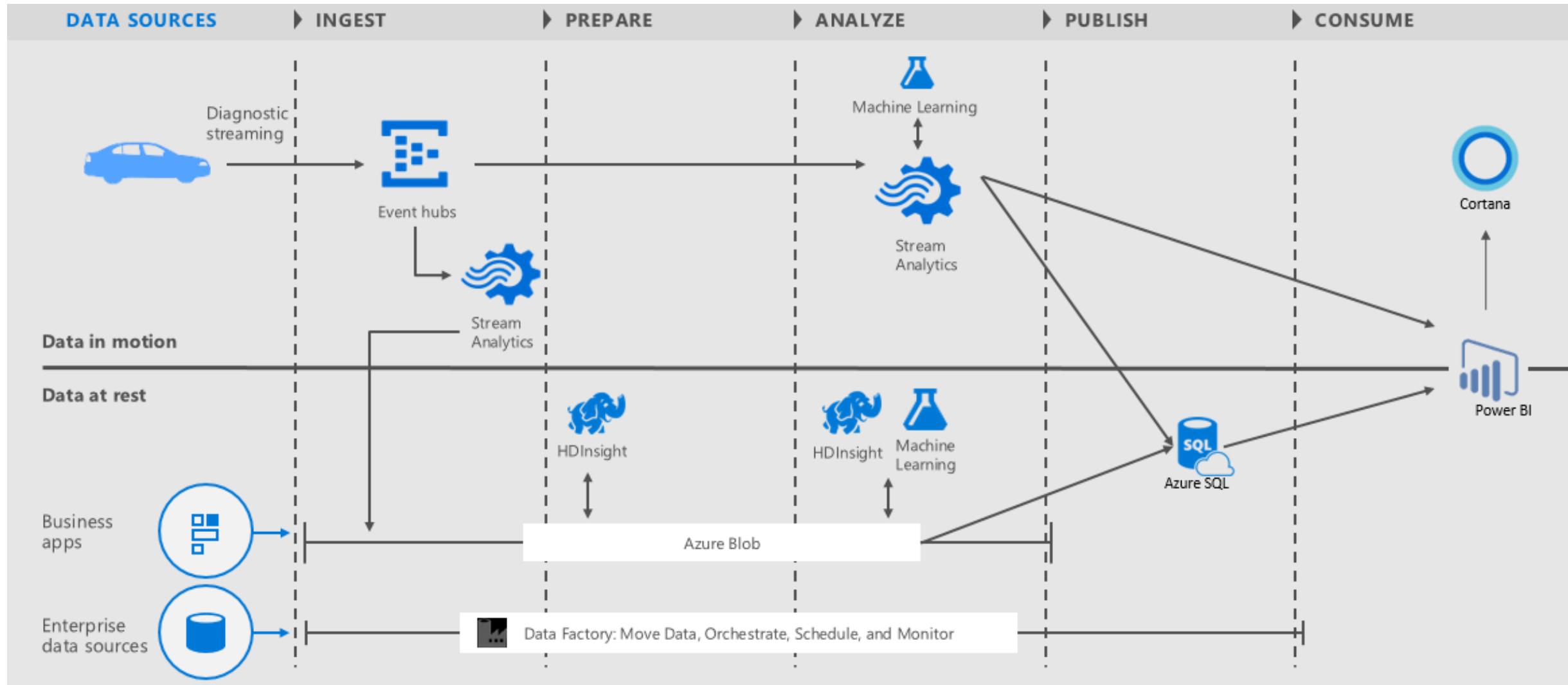
# Example Architecture – 1 – Modern DW (simple)



# Example Architecture – 3 – Streaming Event DW



# Example Architecture – 4 – IoT Streaming Analytics



<https://gallery.cortanaintelligence.com/Solution/Vehicle-Telemetry-Analytics-9>

<https://docs.microsoft.com/en-us/azure/machine-learning/cortana-analytics-playbook-vehicle-telemetry>

<https://docs.microsoft.com/en-us/azure/machine-learning/cortana-analytics-playbook-vehicle-telemetry-deep-dive>

# Cortana Intelligence Gallery – Deploy EVEN MORE Solutions!

Browse all Industries Solutions Experiments Machine Learning APIs Custom Modules Learning More

Refine by

CATEGORIES  Solution  Experiment  Machine Learning API  Competition  Tutorial  Collection  Notebook  Custom Module  Classroom Training  Video Training

SHOW  Microsoft content only

TAGS  R  Classification  Python  test  Linear Regression

Show all

ALGORITHMS USED  Two-Class Boosted Decision Tree  Two-Class Support Vector Machine  Two-Class Logistic Regression  Linear Regression  Two-Class Averaged Perceptron

Show all

LANGUAGE  R  Python2

Results

You've selected: Solution  Clear all

Sort by: New and Noteworthy

 SOLUTION Predicting Length of Stay in Hospitals This solution enables a predictive model for Length of Stay for in-hospital admissions. Length of Stay (LOS) is defined in number of days from the initial admit date to the date that the patient is discharged from any ... 4883 510 27 days ago Microsoft

 SOLUTION Vehicle Telemetry Analytics Super computers have moved out of the lab and are now parked in our garage! These cutting-edge automobiles contain a myriad of sensors, giving them the ability to track and monitor millions of events every sec... 5169 793 18 days ago Microsoft

 SOLUTION Energy Demand Forecasting Accurately forecasting spikes in demand for products and services can give a company a competitive advantage. This solution focuses on demand forecasting within the energy sector 5551 1180 20 days ago Microsoft

 SOLUTION Marketing Campaign Optimization This solution demonstrates how to build and deploy a machine learning model with SQL Server 2016 with R Services to recommend actions to maximize the purchase rate of leads targeted by a campaign 4885 780 20 days ago Microsoft

 SOLUTION Predictive Maintenance for Aerospace This Predictive Maintenance solution monitors aircraft and predicts the remaining useful life of aircraft engine components 6636 1370 20 days ago Microsoft

 SOLUTION IT Anomaly Insights Cortana Intelligence IT Anomaly Insights solution helps IT departments within large organizations quickly detect and fix issues based on underlying health metrics from IT infrastructure (CPU, Memory, etc.) services 4883 510 27 days ago Microsoft

 SOLUTION Data Warehousing and Data Science with SQL Data Wareh... Most enterprises require a centralized data warehouse for the purpose of advanced analytics and reporting. Traditionally, this required IT organizations to manually set up a number 5169 793 18 days ago Microsoft

# Getting Started in Azure

# Get Azure...?

- Your Enterprise Agreement (EA)
  - Various options – best option/model currently being discussed with your Microsoft AM
  - Would be linked to your corporate identity/login/account
- Azure 30 day free account up to \$260 (time boxed to 30 days)
  - <https://azure.microsoft.com/en-au/free/>
  - Would be linked to your personal identity/login/account
- MSDN
  - There are free monthly Azure credits within MSDN subscriptions. Rolls over month to month
  - <https://azure.microsoft.com/en-us/pricing/member-offers/msdn-benefits-details/>
  - Would be linked to your corporate identity/login/account
- Research Programs and Grants
  - Free credits available for specific research programs = <https://www.microsoft.com/en-us/research/academic-program/microsoft-azure-for-research/>
  - You can apply for a Microsoft Azure for Research Grant = <http://research.microsoft.com/en-us/projects/azure/default.aspx>

# Learn Azure...? Free Online-Training

edX – Free online courses on Microsoft Azure

45+ Free Azure Courses = [https://www.edx.org/course?search\\_query=azure](https://www.edx.org/course?search_query=azure)

- Introduction to Azure - <https://www.edx.org/course/introduction-microsoft-azure-microsoft-azure201x>
- Architecting Azure Solutions - <https://www.edx.org/course/architecting-microsoft-azure-solutions-microsoft-dev205bx-3>
- Developing Azure Solutions - <https://www.edx.org/course/developing-microsoft-azure-solutions-microsoft-dev233-1>
- Developing Apps and Bots - <https://www.edx.org/course/developing-intelligent-apps-bots-microsoft-dat211x-1>
- Deliver a DW in the Cloud - <https://www.edx.org/course/delivering-data-warehouse-cloud-microsoft-dat220x-0>
- Delivery Big Data Solutions with Machine Learning - <https://www.edx.org/course/developing-big-data-solutions-azure-microsoft-dat228x>
- Provision SQL Databases in Azure - <https://www.edx.org/course/provisioning-databases-azure-sql-server-microsoft-dat219x-0>

# Learn Azure...? Free 1x day In-Person Training

<https://azure.microsoft.com/en-us/community/events/?Country=Australia&query=azure+discovery+day>



**Reserve your spot. Accelerate your learning.**

Microsoft Azure is a growing collection of integrated cloud services – analytics, computing, database, storage, mobile, networking, the web – to help you move faster, work smarter and achieve more.

Its potential is unlimited if you know how to unlock it. Which is why we offer Azure Discovery Days: free sessions led by Microsoft Azure experts and built to help you extract extra value out of Azure.

**Think big, then delve deeper**

Each Discovery Day offers an Azure overview, plus primers on security, billing, identity, storage, networking and compute. We'll also cover these core topics.

- Administer Azure via the Azure Portal & PowerShell
- Create & configure VMs in Azure to connect securely to On-Premises
- Monitoring & Recovery Services
- Monitoring and operational Insights
- Automation and Azure Quick Start Templates
- MyApps portal & Self Service capabilities
- Multi Factor Authentication
- Protecting, encrypting, and tracking documents

**Pick your city. Start your journey.**

# Learn Azure...? Full In-Person Training

Course & Link	Description
<a href="#"><b>Implementing Microsoft Azure Infrastructure</b></a>	This training explores Microsoft Azure Infrastructure Services (IaaS) and several PaaS technologies such as Azure Web Apps and Cloud Services from the perspective of an IT Professional. This training provides an in-depth examination of Microsoft Azure Infrastructure Services (IaaS); covering Virtual Machines and Virtual Networks starting from introductory concepts through advanced capabilities of the platform.
<a href="#"><b>Developing Microsoft Azure Solutions</b></a>	This course is intended for students who have experience building ASP.NET and C# applications. Students will also have experience with the Microsoft Azure platform and a basic understanding of the services offered. This course offers students the opportunity to take an existing ASP.NET MVC application and expand its functionality as part of moving it to Azure. This course focuses on the considerations necessary when building a highly available solution in the cloud.
<a href="#"><b>Infrastructure and Architecture Bootcamp for OSS Experts</b></a>	This training explores Microsoft Azure Infrastructure Services (IaaS) and several PaaS technologies such as Azure Web Apps and Cloud Services from the perspective of an IT Professional that specializes in open source technologies. This training provides an in-depth examination of Microsoft Azure Infrastructure Services (IaaS); covering Virtual Machines and Virtual Networks starting from introductory concepts through advanced capabilities of the platform. The student will learn best practices for configuring virtual machines for performance, durability, and availability using features built into the platform.
<a href="#"><b>Architecting Azure IaaS and Hybrid Solutions</b></a>	The Azure IaaS and Hybrid Architect workshop is designed to prepare the architect to design solutions with Microsoft Azure. This workshop is focused on designing solutions using Infrastructure as a Service (IaaS) and other technologies to enable hybrid solutions such as data centre connectivity, hybrid applications, and other hybrid use cases such as business continuity with backup and high availability. Individual case studies will focus on specific real-world problems that represent common IaaS and Hybrid scenarios and practices. Students will also experience several hands-on labs to introduce them to some of the key services available

# Learn Azure...? Azure Architecture References

## Azure Architecture Centre

- <https://docs.microsoft.com/en-au/azure/architecture/>
  - Reference Architectures - <https://docs.microsoft.com/en-us/azure/architecture/reference-architectures/>
  - Application Architectures - <https://docs.microsoft.com/en-us/azure/architecture/guide/>
  - Azure Design Patterns - <https://docs.microsoft.com/en-au/azure/architecture/patterns/>
  - Azure Service Releases / Updates - <https://azure.microsoft.com/en-us/updates/>
  - Azure Service Roadmap - <https://azure.microsoft.com/en-us/roadmap/>

## Global Azure Blog

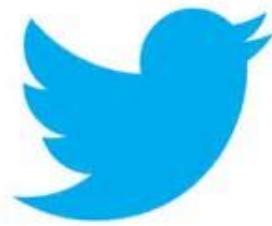
- <https://azure.microsoft.com/en-us/blog/>

## Azure Ideas and Feedback

- <https://feedback.azure.com/forums/34192--general-feedback>

# Brand Management Solution Templates

.....This is your homework assignment for today!.....



Deploys via wizard  
Takes ~10 mins

~\$200 / month

[https://appsource.microsoft.com/en-us/product/web-apps/microsoft-powerbi.pbisointemplate\\_cmpgnbrandmgnt\\_twitter?tab=Overview](https://appsource.microsoft.com/en-us/product/web-apps/microsoft-powerbi.pbisointemplate_cmpgnbrandmgnt_twitter?tab=Overview)



[https://appsource.microsoft.com/en-us/product/web-apps/microsoft-powerbi.pbisointemplate\\_cmpgnbrandmgnt\\_facebook?tab=Overview](https://appsource.microsoft.com/en-us/product/web-apps/microsoft-powerbi.pbisointemplate_cmpgnbrandmgnt_facebook?tab=Overview)



[https://appsource.microsoft.com/en-us/product/web-apps/microsoft-powerbi.pbisointemplate\\_cmpgnbrandmgnt\\_news?tab=Overview](https://appsource.microsoft.com/en-us/product/web-apps/microsoft-powerbi.pbisointemplate_cmpgnbrandmgnt_news?tab=Overview)



# Appendix

# Build apps faster

## Functions

- Consumption and provisioned options
- Local development and advanced DevOps with detailed monitoring
- Bindings to first and third-party services
- Open source runtime

## Logic Apps

- Rich portal visual designer and Visual Studio integration
- Switch statements and loops
- 120+ connectors to SaaS and PaaS, with custom connector support
- ARM template-based for easy reuse

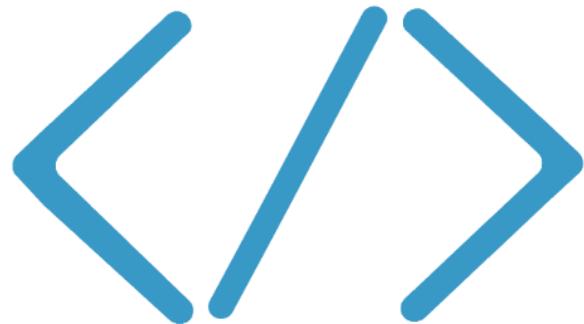
## Event Grid

- Manage all events in one place
- Near real-time delivery
- Broad coverage of publishers and subscribers

# Appendix - Azure Functions

# Introducing Functions

Code



Azure Functions



Events + data



# Use bindings in your code

```
Input  Trigger (data)
```

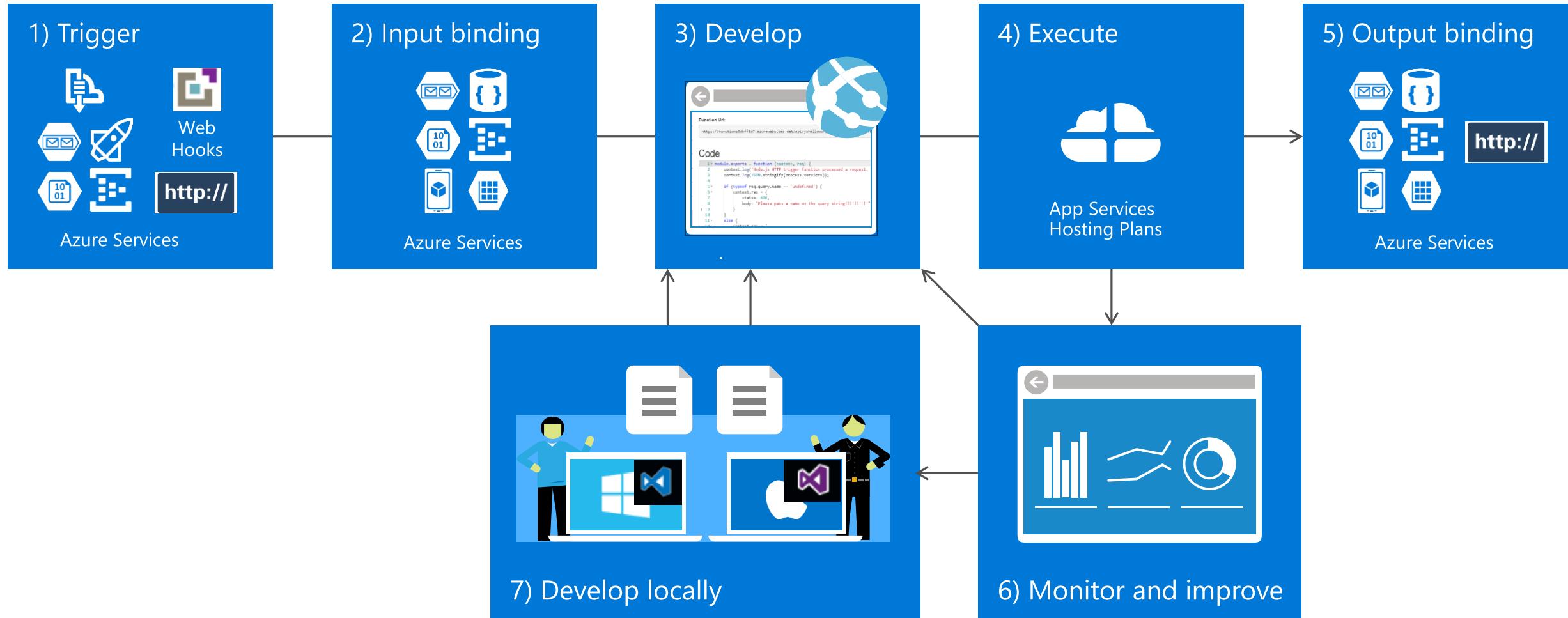
```
module.exports = function(context, req) {
  if (req.query.name || (req.body && req.body.name)) {
    context.res = {
      // status: 200, /* Defaults to 200 */
      body: "Hello " + (req.query.name || req.body.name)
    };
    context.log('Person entity name: ' + context.bindings.inputTable.Name);
  }
  else {
    context.res = {
      status: 400,
      body: "Please pass a name on the query string or in the request body"
    };
  }
  Output
  context.done();
};
```

```
"bindings": [
  {
    "authLevel": "function",
    "type": "httpTrigger",
    "direction": "in",
    "name": "req"
    "type": "http",
    "direction": "out",
    "name": "res"
    "type": "table",
    "name": "inputTable",
    "tableName": "inTable",
    "connection": "AzureWebJobsDashboard",
    "direction": "in"
  }
]
```

# Triggers and Bindings

Type	Service	Trigger	Input	Output
Schedule	Azure Functions	✓		
HTTP (REST or webhook)	Azure Functions	✓		✓
Blob Storage	Azure Storage	✓	✓	✓
Events	Azure Event Hubs	✓		✓
Queues	Azure Storage	✓		✓
Queues and topics	Azure Service Bus	✓		✓
Storage tables	Azure Storage		✓	✓
SQL tables	Azure Mobile Apps		✓	✓
No-SQL DB	Azure DocumentDB		✓	✓
Push notifications	Azure Notification Hubs			✓
Twilio SMS Text	Twilio			✓
SendGrid email	SendGrid			✓

# Seamless DevOps experience with Functions



# Appendix - Azure Logic Apps

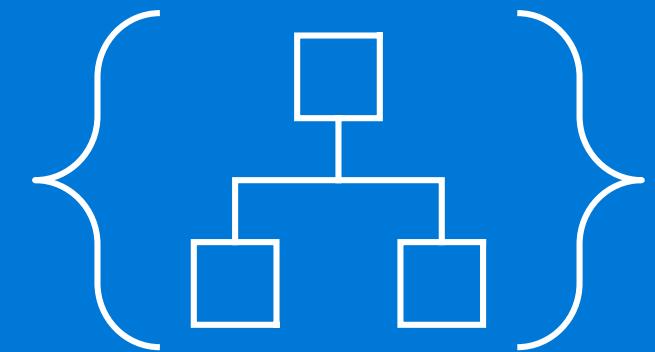
# Azure Logic Apps

Powerful Integration  
and Workflow Engine born in Azure

Fast integrations using a visual designer  
and workflow creation with triggers and actions

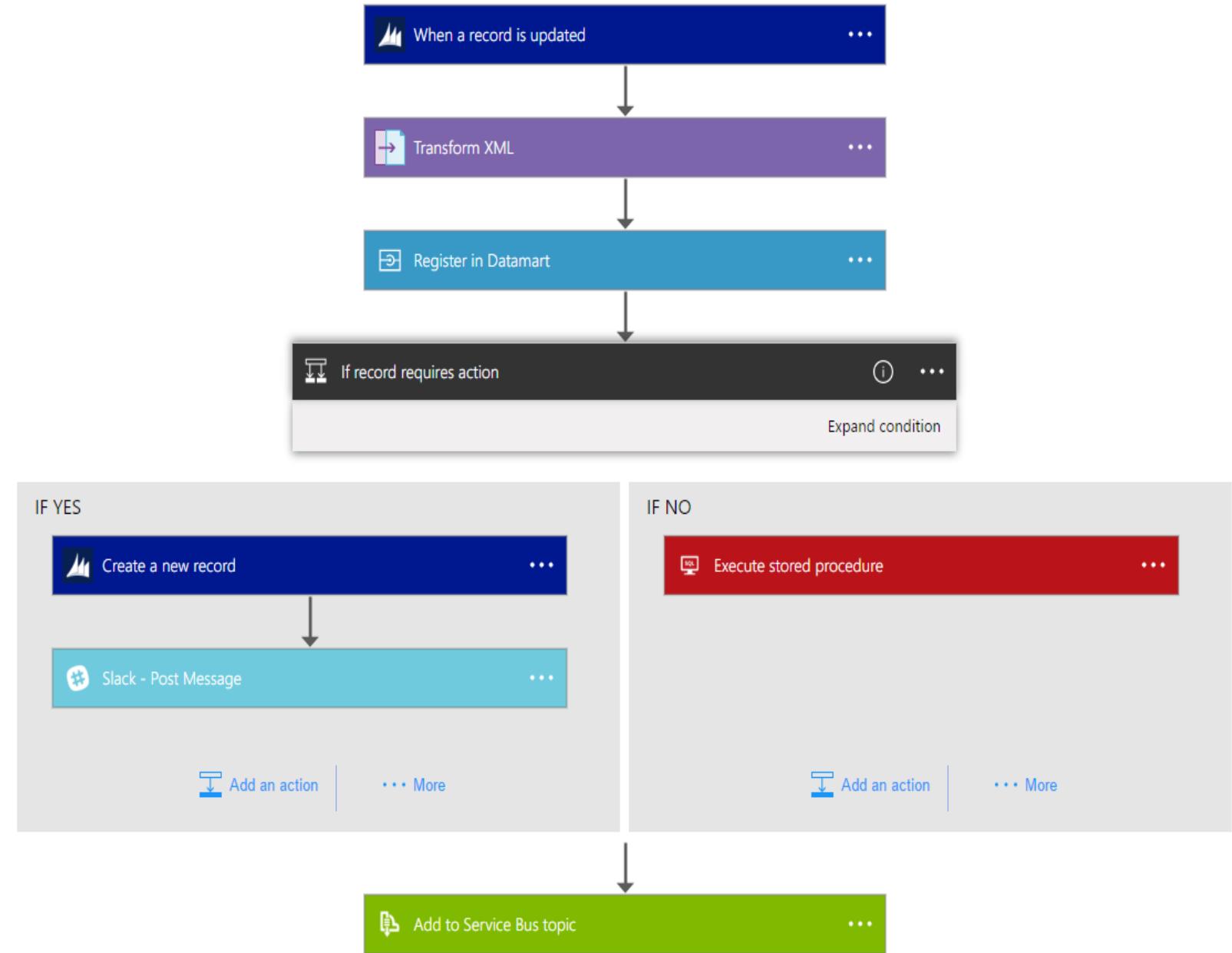
Connect applications, data and services

Connect and orchestrate Azure Functions



# Logic Apps Workflow Designer

Workflow in the cloud  
Powerful control flow  
Connect disparate  
applications  
No code designer  
for rapid creation  
Also works within Visual  
Studio for added CI/CD



# Logic Apps

## Cloud APIs and platform functionality

- Over 170 built-in connectors
- Hosted and managed within the platform
- Scales to meet your needs
- First class designer experience
- Rapid development

## API connections

- Authenticate once and reuse
- Differentiate connection configuration
- Simple to deploy
- Portal experience for managing API Connections

### SaaS

- appFigures
- Asana
- Azure API Management
- Azure App Services
- Azure Automation
- Azure Cognitive Face API
- Azure Cognitive LUIS
- Azure Cognitive Text Analytics
- Azure Cognitive Vision
- Azure Data Lake Store
- Azure Document DB
- Azure Event Hub
- Azure Functions
- Azure Machine Learning
- Azure Resource Manager
- Azure Service Bus
- Azure SQL
- Azure Storage Blob
- Azure Storage Queues
- Basecamp
- Bing Search
- BitBucket
- Bitly
- Blogger
- Box
- Buffer
- Campfire
- Chatter
- Common Data Service
- Disqus
- DocuSign
- Dropbox
- Dynamics AX Online
- Dynamics CRM Online
- Dynamics CRM Service Bus
- Dynamics Financials
- Dynamics Operations
- Easy Redmine
- Eventbrite
- Facebook
- FreshBooks
- Freshdesk
- GitHub
- Gmail
- Google Calendar
- Google Contacts
- Google Drive
- Google Sheets
- Google Tasks
- GoTo Meeting
- GoTo Training
- GoTo Webinar
- Harvest
- HelloSign
- Infusionsoft
- JIRA
- Insightly
- Instagram
- Instapaper
- MailChimp
- Mandrill
- Medium
- Microsoft Project Online
- Microsoft Translator
- MSN Weather
- Muhimbi PDF
- Office 365
- Office 365 Users
- Office 365 Video
- OneDrive
- OneDrive for Business
- OneNote
- Outlook.com
- Outlook Tasks
- PagerDuty
- Pinterest
- Pipedrive
- Pivotal Tracker
- Power BI
- Project Online
- Redmine
- Salesforce
- Salesforce Chatter
- SendGrid
- SharePoint Online
- Slack
- SmartSheet
- SparkPost
- Stripe
- Survey Monkey
- Todoist
- Toodledo
- Trello
- Twilio
- Twitter
- Typeform
- UserVoice
- VS Team Services
- Webmerge
- Wordpress
- Wunderlist
- Yammer
- YouTube
- Zendesk

### Protocols/native

- HTTP, HTTPS
- HTTP Webhook
- FTP, SFTP
- SMTP
- RSS
- Compose, Query, Parse JSON
- Wait
- Terminate
- Workflow

### XML and EDI

- XML Validation
- Transform XML (+Mapper)
- Flat File Encode
- Flat File Decode
- X12
- EDIFACT
- AS2
- Integration Account Artifact Lookup

### Hybrid

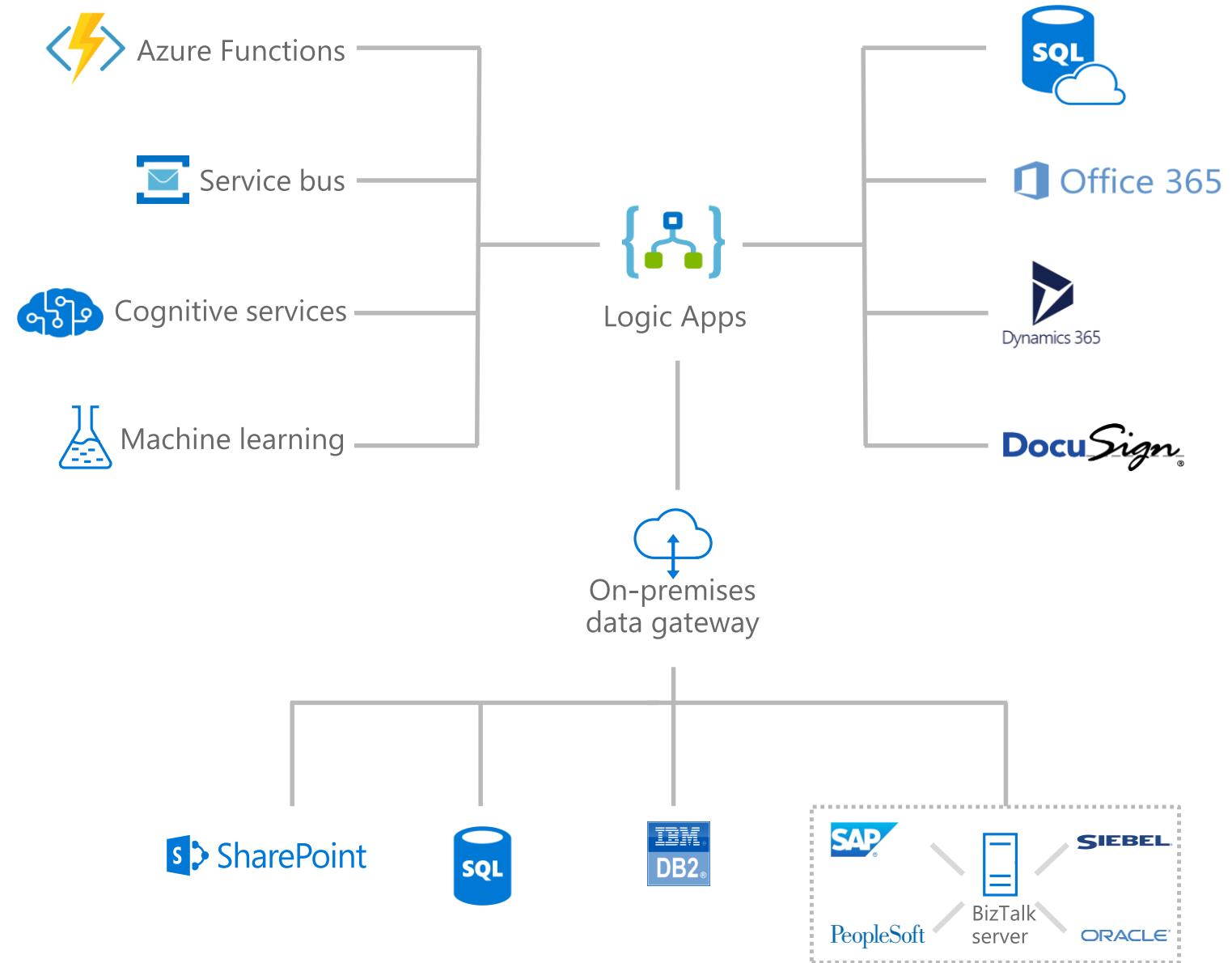
- BizTalk Server
- File System
- IBM DB2
- Informix
- Oracle DB
- SharePoint Server
- SQL Server
- SAP
- Websphere MQ

Logic Apps  
connectors—  
Over 170  
and growing



....and more!

# Logic Apps connects everything

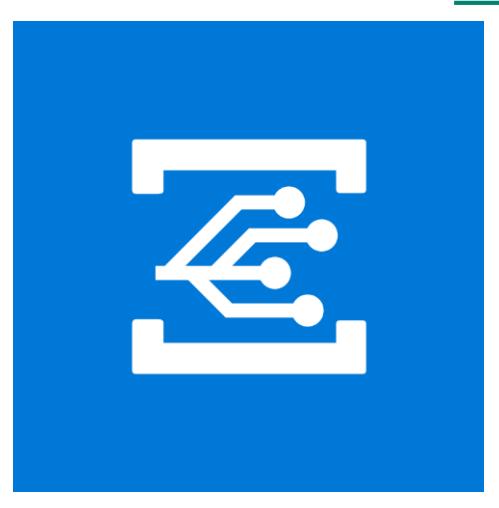


# Appendix - Azure Event Grid

# Manage all events in one place

## Event publishers

-  Blob Storage
-  Resource Groups
-  Azure Subscriptions
-  Event Hubs
-  Custom Events

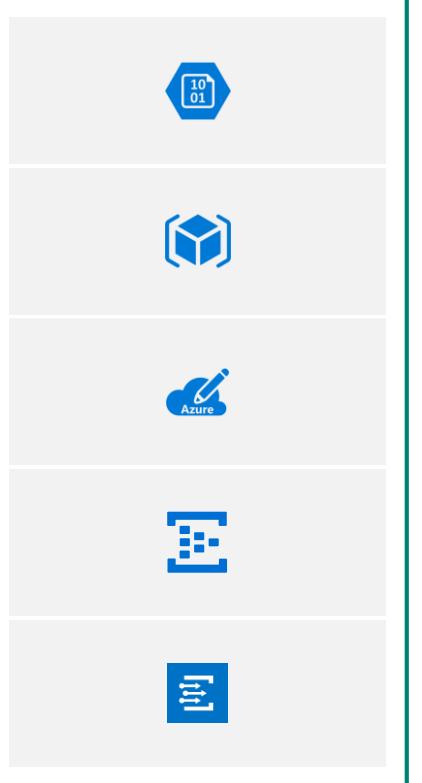


## Event handlers

-  Azure Functions
-  Logic Apps
-  Azure Automation
-  WebHooks

# Manage all events in one place

## Event publishers



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:

Resource group:  Use existing

Topic Type:

Event Types:

Subscriber Type:

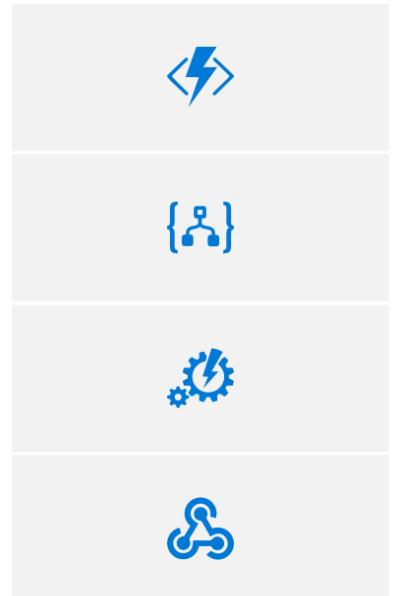
Prefix Filter:  Optional

Suffix Filter:  Optional

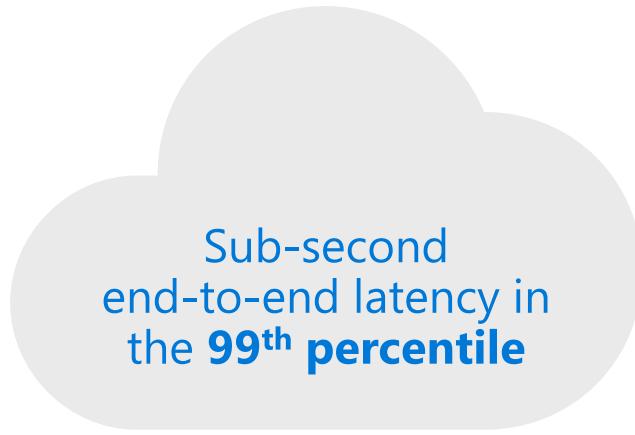
Filter Case Sensitive

**Create**

## Event handlers



# Ensure reliability and performance in your apps



Sub-second  
end-to-end latency in  
the **99<sup>th</sup> percentile**

Near real-time



**10,000,000** events  
per second per  
region

Massive scale-out



**24-hour** retry with  
exponential back off  
for events not  
delivered

High reliability

# Benefit from broad coverage



## Publishers

### Immediately available

- Blob Storage
- Resource Groups
- Azure Subscriptions
- Event Hubs
- Custom Events

### Coming soon

Azure Automation, Azure Active Directory, API Management, Logic Apps, IoT Hub, Service Bus, Azure Data Lake Store, Cosmos DB



## Subscribers

### Immediately available

- Azure Functions
- Logic Apps
- Azure Automation
- WebHooks

### Coming soon

Fabric Controller, Service Bus, Event Hubs, Azure Data Factory, Storage Queues

# APPENDIX AND REFERENCES

- Online Azure Interactive Services Diagram - <http://azureplatform.azurewebsites.net/en-us/>
- Azure Time Series Insights Service - <https://azure.microsoft.com/en-au/blog/announcing-azure-time-series-insights/>
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- Intelligent Kiosk (github) - <https://github.com/Microsoft/Cognitive-Samples-IntelligentKiosk>
- Intelligent Kiosk (App) - <https://www.microsoft.com/store/apps/9nblggh5qd84>