Modern Applications with Azure Container, Serverless & Messaging Services

Azure Engineering Teams
Azure App Consults

Microsoft

9h00	Opening – Customer Experience on Azure: Azure App Consults and Azure Support Plan
9h10	Azure Messaging: EventHub, Event Grid, Service Bus
10h00	Azure Functions
11h00	Azure Logic Apps
12h00	**Lunch Break** **&** **Ask The Expert**
14h00	Azure Containers
15h00	Azure API Management
16h00	Azure Front Door / CDN

Azure Support

https://azure.microsoft.com/en-us/support/plans/

BASIC	DEVELOPER	STANDARD	PROFESSIONAL DIRECT	PREMIER
	Purchase support	Purchase support	Purchase support	Contact Premier
Available to all Microsoft Azure accounts	Microsoft Azure: Trial and non-production environments	Microsoft Azure: Production workload environments	Microsoft Azure: Business-critical dependence	All Microsoft Products, including Azure: Substantial dependence across multiple products

What are Azure App Consults (AAC)

Service overview

What is it?

- Each consultation is designed to address your development team's questions or challenges
- Your app consult engineer will work to identify prerequisites, provide customized technical guidance, and deliver a summary report, including a detailed action plan

What services are included?

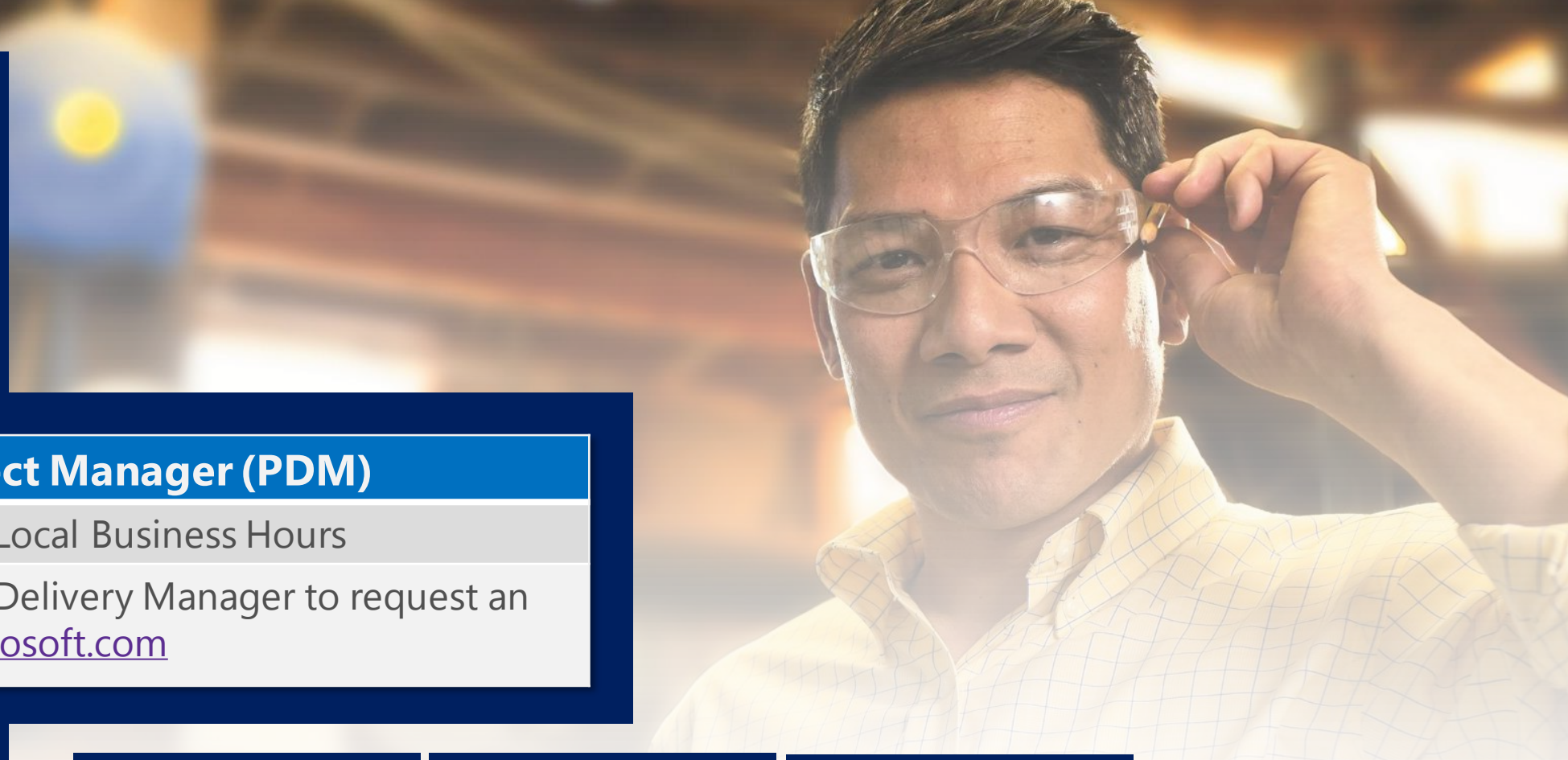
- Architecting
- Designing
- Implementing
- Growing applications on the Microsoft Azure platform

What is the benefit to me?

- Series of dedicated consultations
- Microsoft engineers specializing in Azure technologies and services
- Help you to utilize Azure most efficiently for your specific needs

Getting started

Professional Direct Manager (PDM)
Monday – Friday Local Business Hours
Email the ProDirect Delivery Manager to request an AAC: pdazure@microsoft.com



Identify the internal need for an Azure App Consult

Select a scenario that matches your need

Have your internal ProDirect contact email PD team to initiate a consult

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We're here to help.

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- Support
- Account

Technical and program support

Get the most out of Azure's capabilities by connecting with Microsoft Engineers. Our experts will go beyond standard account help and provide personalized guidance on how to get your Azure solution started, how to optimize your architecture, or help with your technical questions. Connect with us today!

Azure Support
Available 24/7

Get help with your subscription, billing or technical questions, sign in to your Azure account, then click on Help + Support

Access Azure Portal

Azure Development Chat
Available 24/5*

Engage with a Microsoft Engineer who can provide expert assistance with application design and architecture

Chat Now

Azure App Consults
Scheduled within 5 business days

Schedule a live Skype with a Microsoft Engineer who can advise you on design, architecture or system optimization. These typically take 2-4 hours.

Request To Schedule

Microsoft for Startups help

Visit our FAQ page for answers to common questions about your Microsoft for Startups account. If you have additional questions about getting started with your Microsoft for Startups benefits or with Azure development. Chat now with a support engineer Monday through Friday, 24 hours a day.

*Our chat support engineers are available Sunday 23:00 GMT - Saturday 00:00 GMT. Support available in English and Mandarin.

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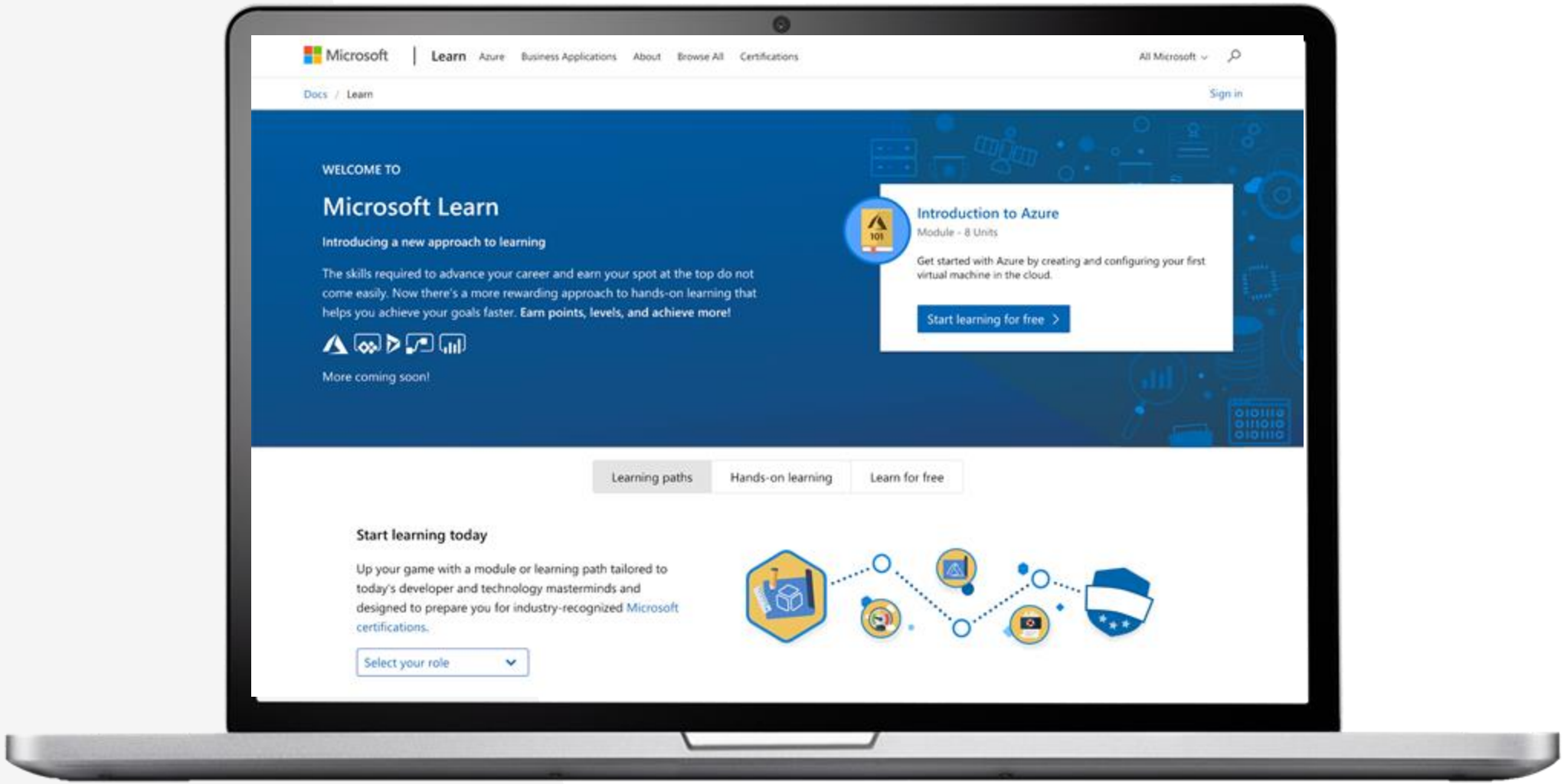
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Introducing a new approach to learning
The skills required to advance your career and earn your spot at the top do not come easily. Now there's a more rewarding approach to hands-on learning that helps you achieve your goals faster. Earn points, levels, and achieve more!
More coming soon!
Introduction to Azure
Module - 8 Units
Get started with Azure by creating and configuring your first virtual machine in the cloud.
Start learning for free
Learning paths
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Learn for free
Start learning today
Up your game with a module or learning path tailored to today's developer and technology masterminds and designed to prepare you for industry-recognized Microsoft certifications.
Select your role

Messaging

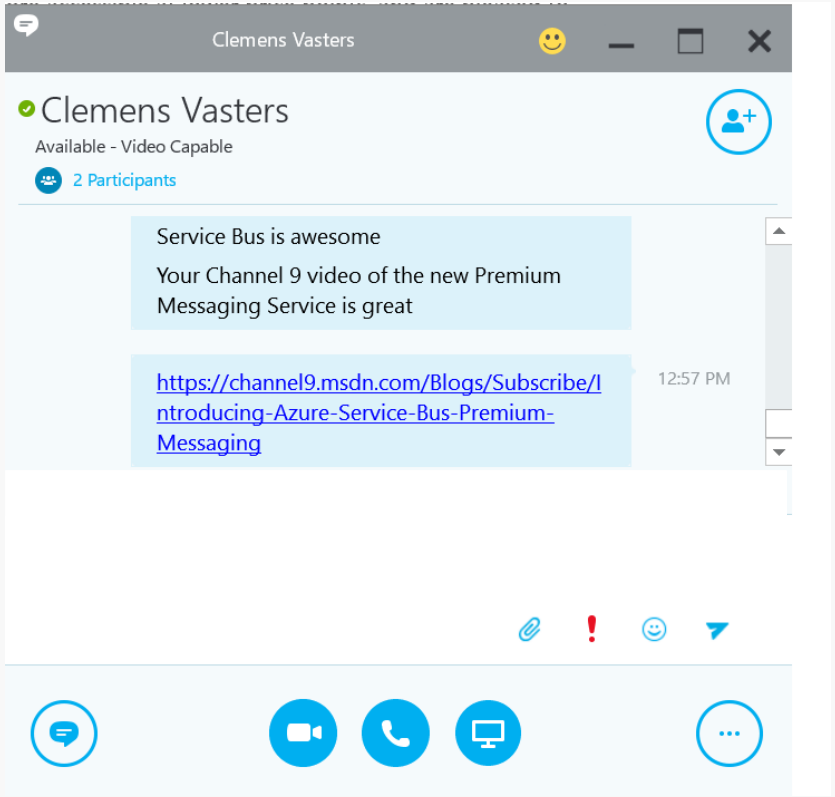
The lines on the architectural diagram

@DanRosanova

Group Principal Program Manager

Microsoft Azure

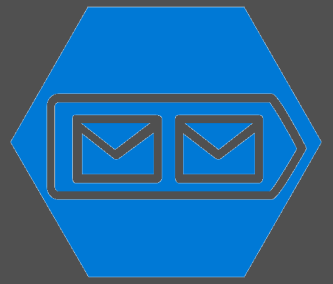
What is “messaging”?



It’s not this…

But it’s not all that different

Azure Messaging Services



Storage Queues

Simple task queues

Service Bus

Enterprise messaging

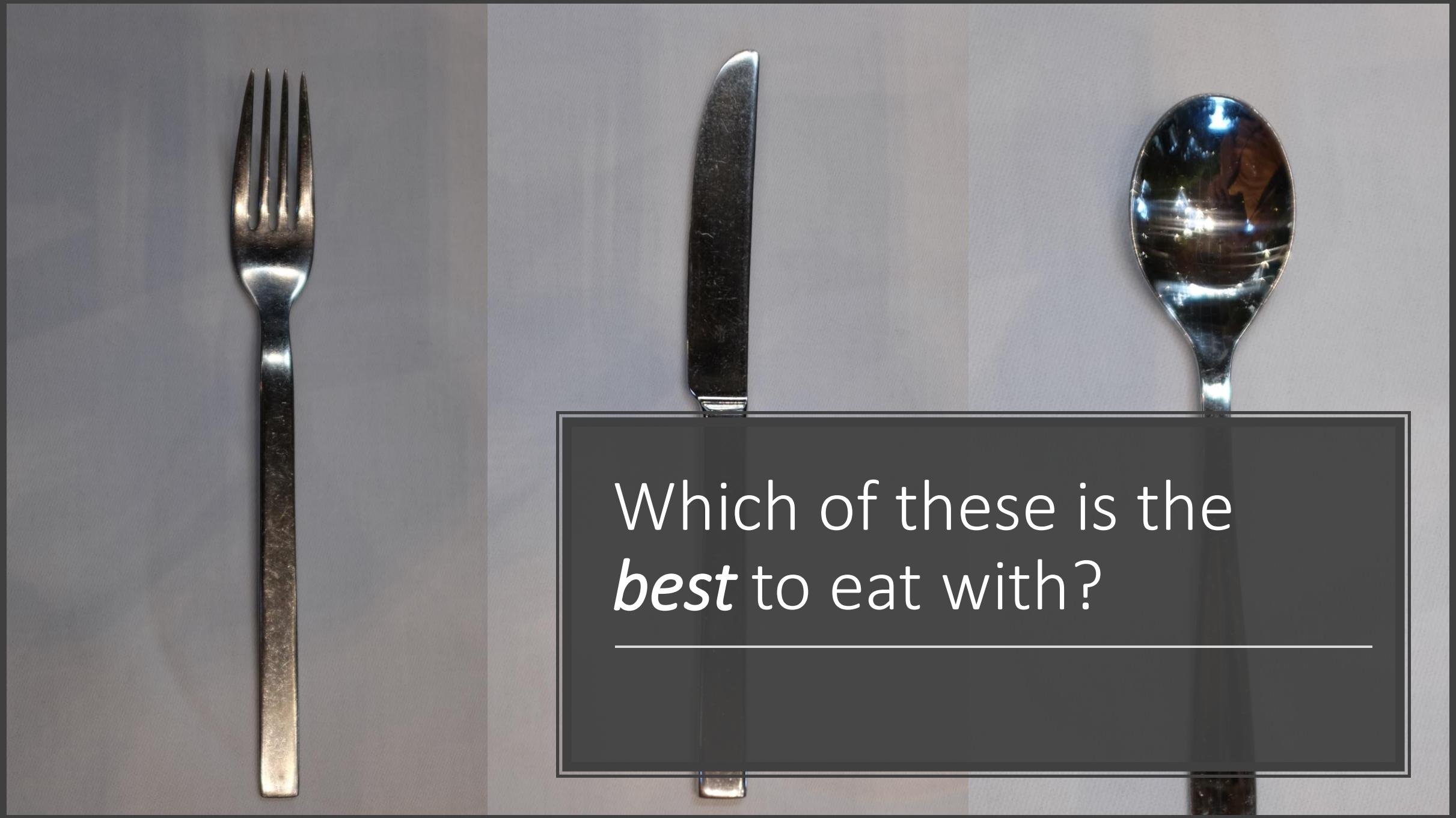
Event Grid

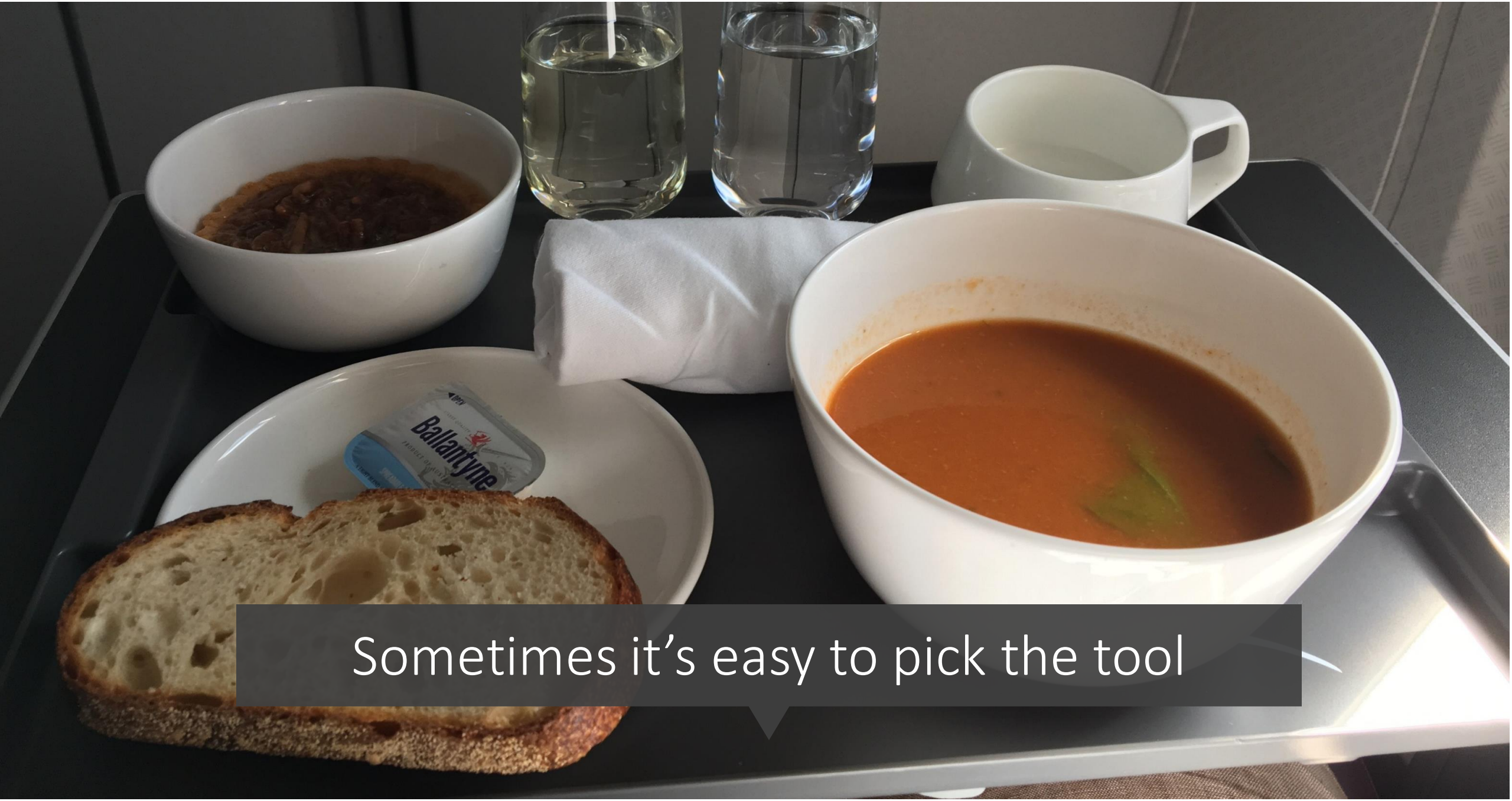
Cross cloud reactive eventing

Event Hubs

Streaming / Kafka

Can’t we just have one service to do it all?


Which of these is the
best to eat with?



Sometimes it’s easy to pick the tool


Sometimes its just not clear which to use


Sometimes you need more than one


Service Bus
Sometimes you need a specialized tool

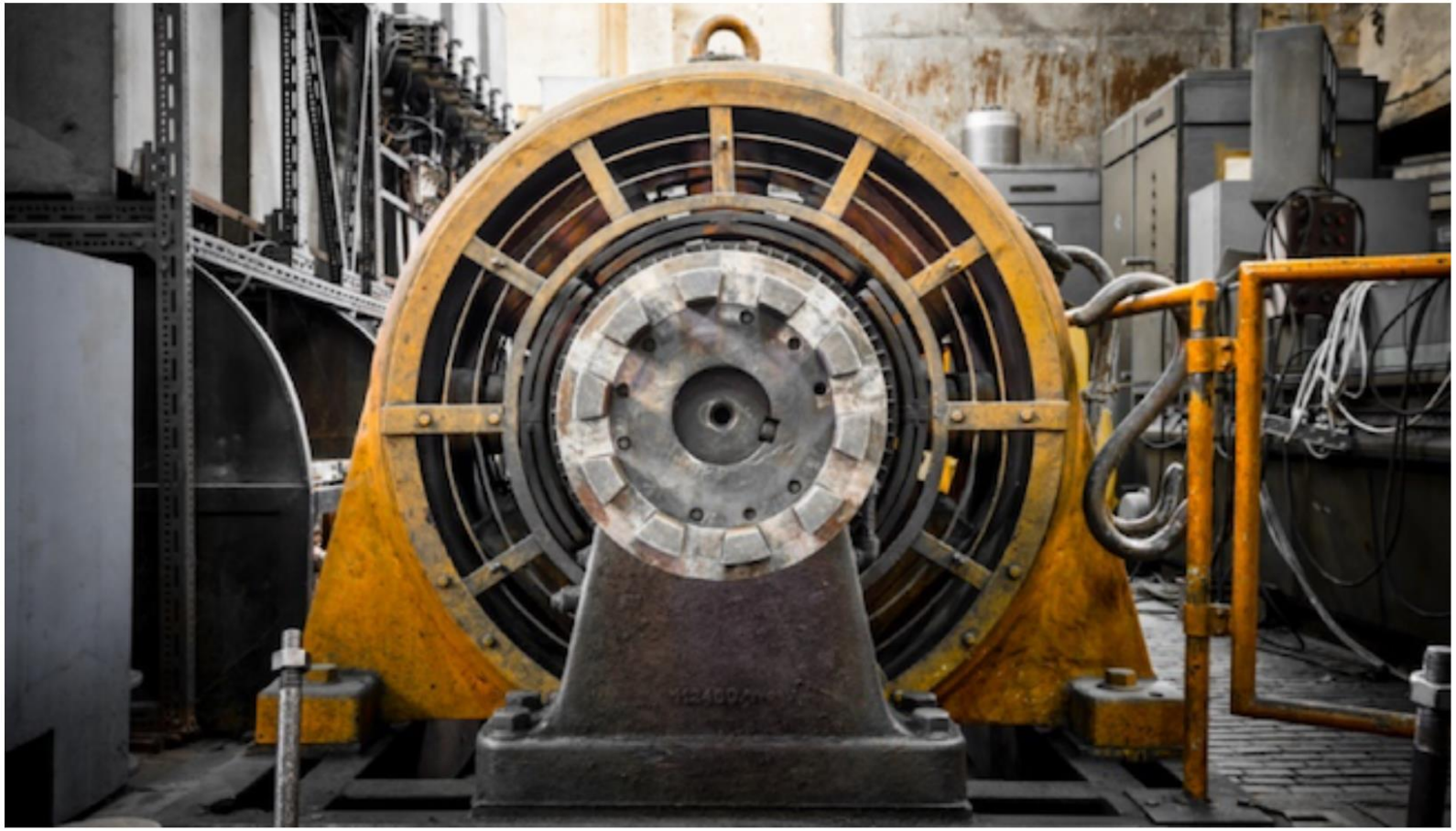
The “one tool” for everything often does nothing well

All Things Distributed

Werner Vogels' weblog on building scalable and robust distributed systems.

A one size fits all database doesn't fit anyone

By Werner Vogels on 21 June 2018 10:00 AM | Permalink | Comments (10)



Contact Info

Werner Vogels
CTO - Amazon.com

werner@allthingsdistributed.com

Other places

https://www.allthingsdistributed.com/2018/06/purpose-built-databases-in-aws.html

Storage Queues

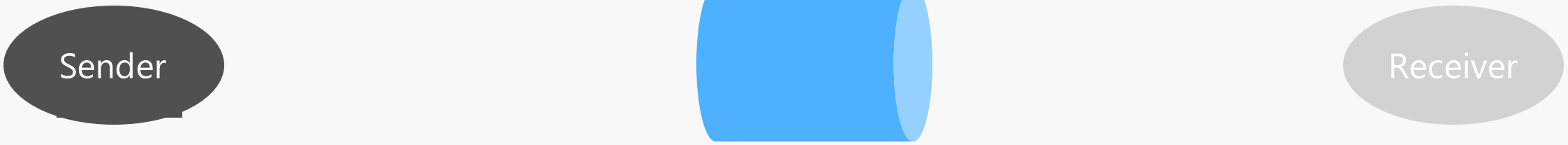
Simple Queues

Storage queues are task queues

- Tasks queues coordinate work across compute (VMs, Functions, etc.)
- The messages in a queue are generally homogeneous
- Low cost
- PayGo
- Few features
- Easy to use

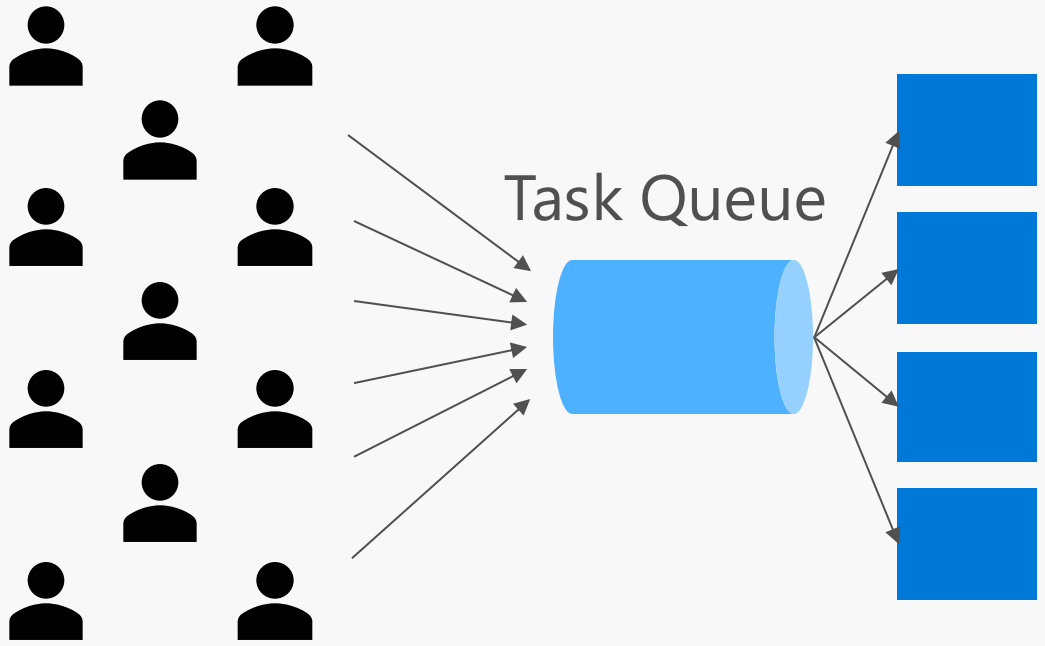
A simple queue

Sender sends message to queue
Queue ACKs receipt
Receiver connects to queue & retrieves message
Receiver ACKs complete (or other action)



Storage Queues in action: the task queue

- Work items generated by users or processes
- Each server doing more of the same “work”
- “Servers” can be VM, Functions, Containers
- Easy to scale compute based on queue depth



Service Bus

Enterprise Messaging

Enterprise Messaging as a Service

Queues & Topics

- Reliable asynchronous communication
- Rich features for temporal control
- Message headers
- Routing and filtering
- Convoys & Sessions (related messages with state)

Features of Service Bus

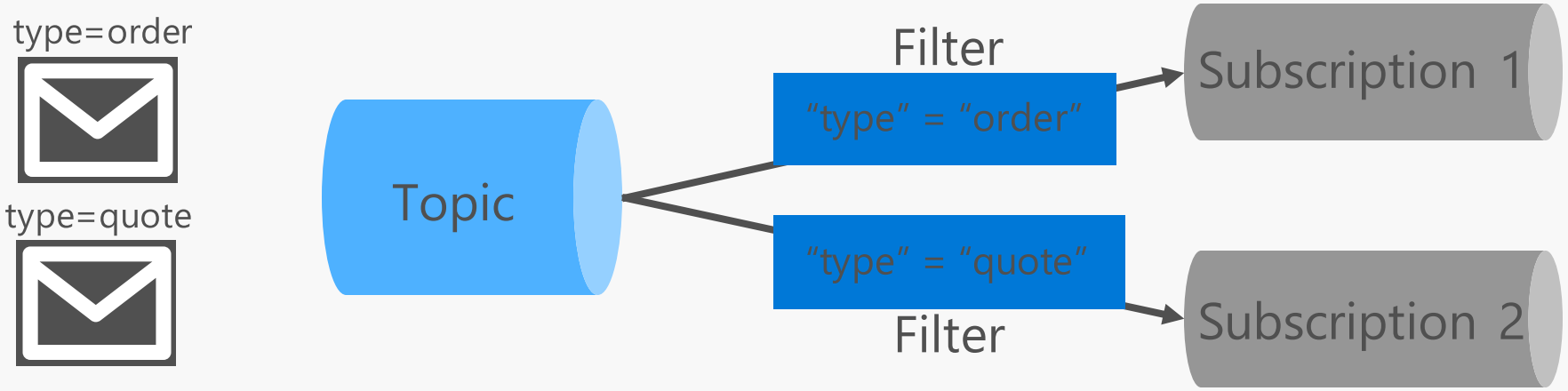
- Scheduled delivery
- Time To Live
- ForwardTo
- Defer
- Sessions
- Batching
- Ordering
- Auto-delete on idle
- OnMessage
- Duplicate detection
- Lambda Filters
- Actions
- Transactions
- Poison message handling

Topics & Subscriptions

Sender only knows about Topic

Receivers only know about Subscriptions

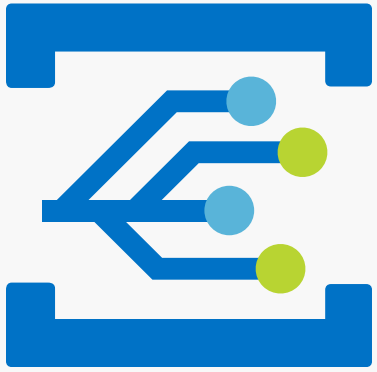
Filters and Actions exist on Subscriptions



Service Bus in action

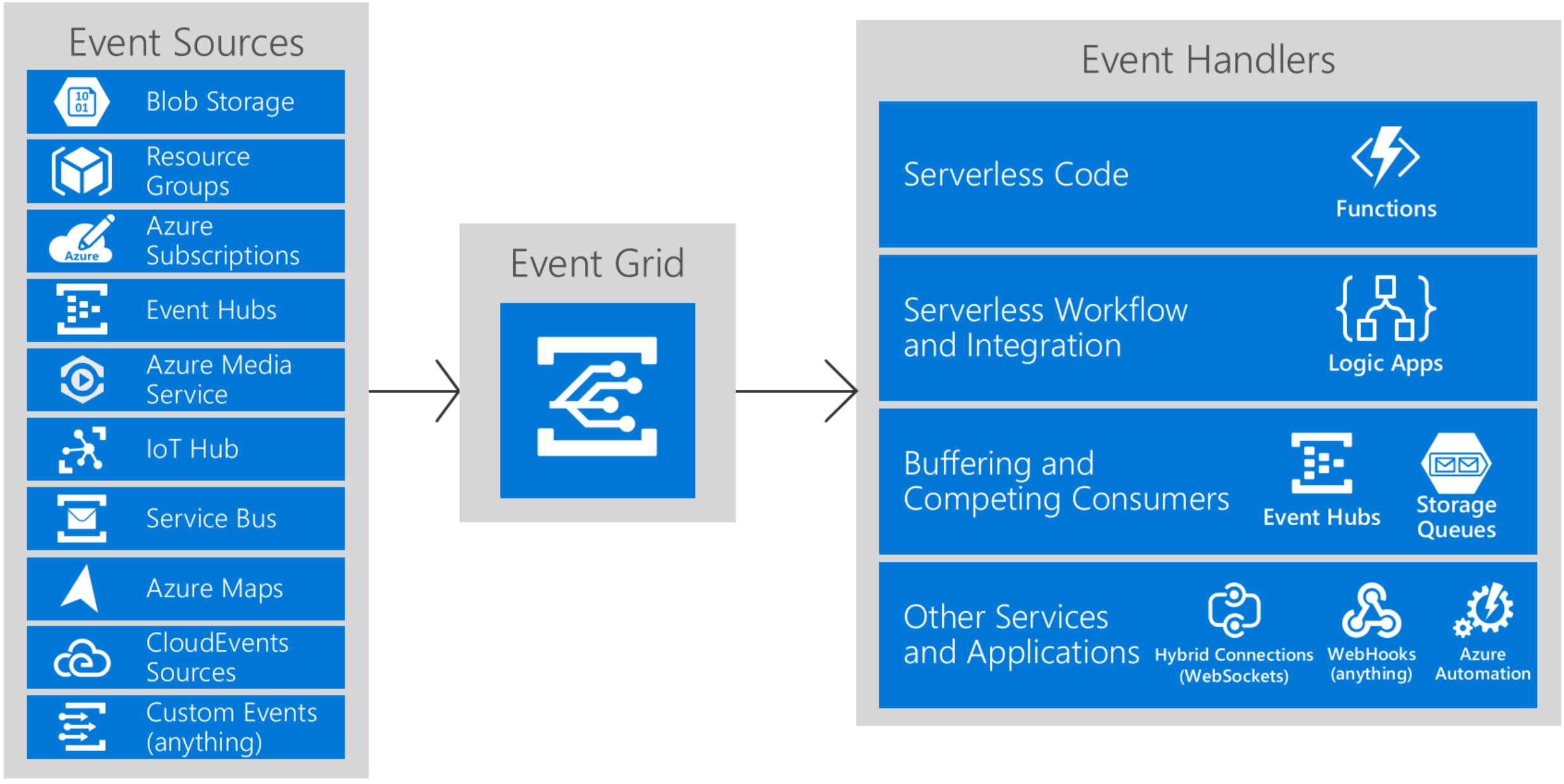
Decoupling and providing durability
Complex flows including scheduling
SharePoint workflow is built on this
Side by side versioning

This sounds interesting…

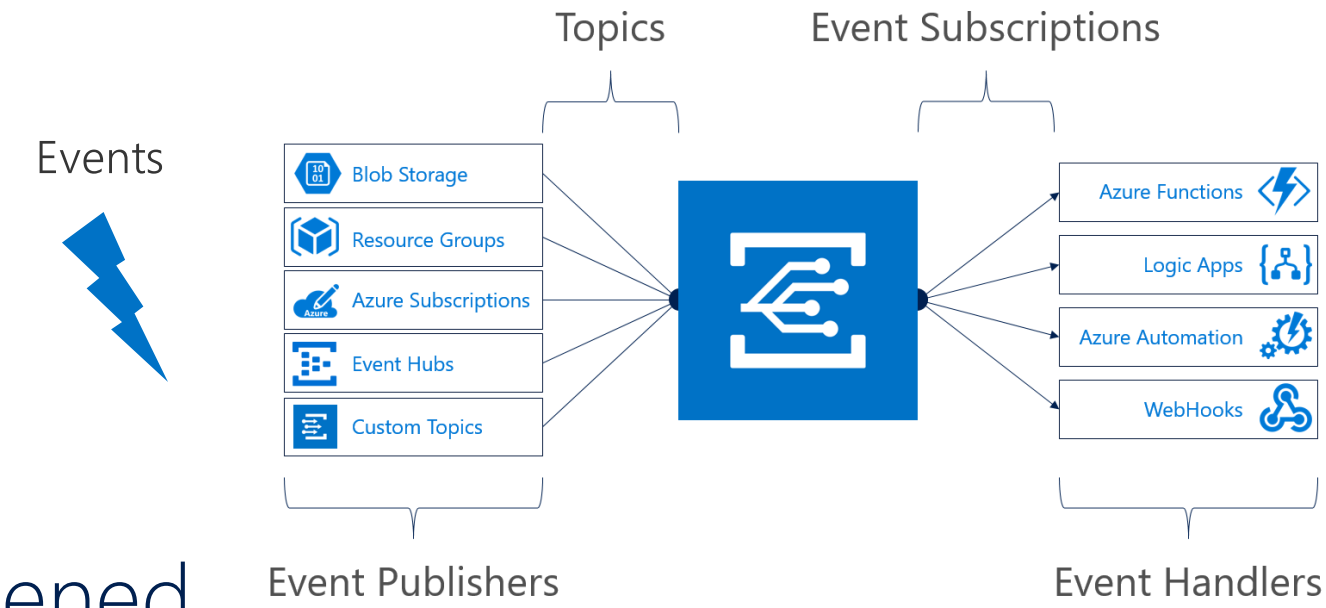


Event Grid

Push based intelligent event routing with publish-subscribe semantics


Event Sources
Blob Storage
Resource Groups
Azure Subscriptions
Event Hubs
Azure Media Service
IoT Hub
Service Bus
Azure Maps
CloudEvents Sources
Custom Events (anything)
Event Grid
Event Handlers
Serverless Code
Functions
Serverless Workflow and Integration
Logic Apps
Buffering and Competing Consumers
Event Hubs
Storage Queues
Other Services and Applications
Hybrid Connections (WebSockets)
WebHooks (anything)
Azure Automation

A deeper look



1. Events: what happened
2. Event Source: 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

What is an Event?


```
[
  {
    "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 Grid: Advanced Filters

Works on the data portion of the event
Supports operators: In / NotIn / BeginsWith / EndsWith
Matches keys within the event data
Supports two levels of nesting
Supports one or more values
Up to 10 advanced filters can be combined in OR

```
AdvancedFilters: [
   {
      Operator: In,
      Key: "data.api",
      Values: ["PubBlockList"]
   }
]
```


```
[
  {
    "topic": "/subscriptions/{subscription-id}/resourceGroups/Stora
    "subject": "/blobServices/default/containers/oc2d2817345i200097
    "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",
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      "url": "https://oc2d2817345i60006.blob.core.windows.net/oc2d2
      "sequencer": "00000000000004420000000000028963",
      "storageDiagnostics": {
        "batchId": "b68529f3-68cd-4744-baa4-3c0498ec19f0"
```

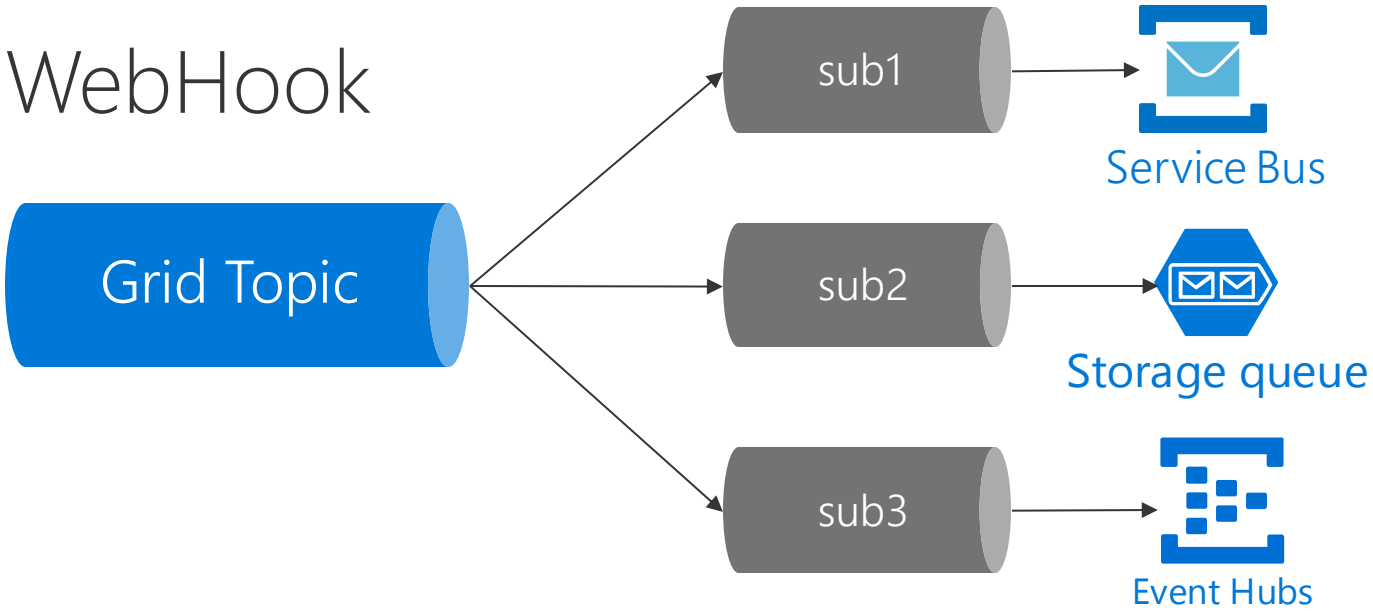
How Event Grid composes with Queues and Streams

Other messaging services can be publishers or subscribers to Event Grid

Sometimes you want WebHook

Sometimes Queue

Others Stream

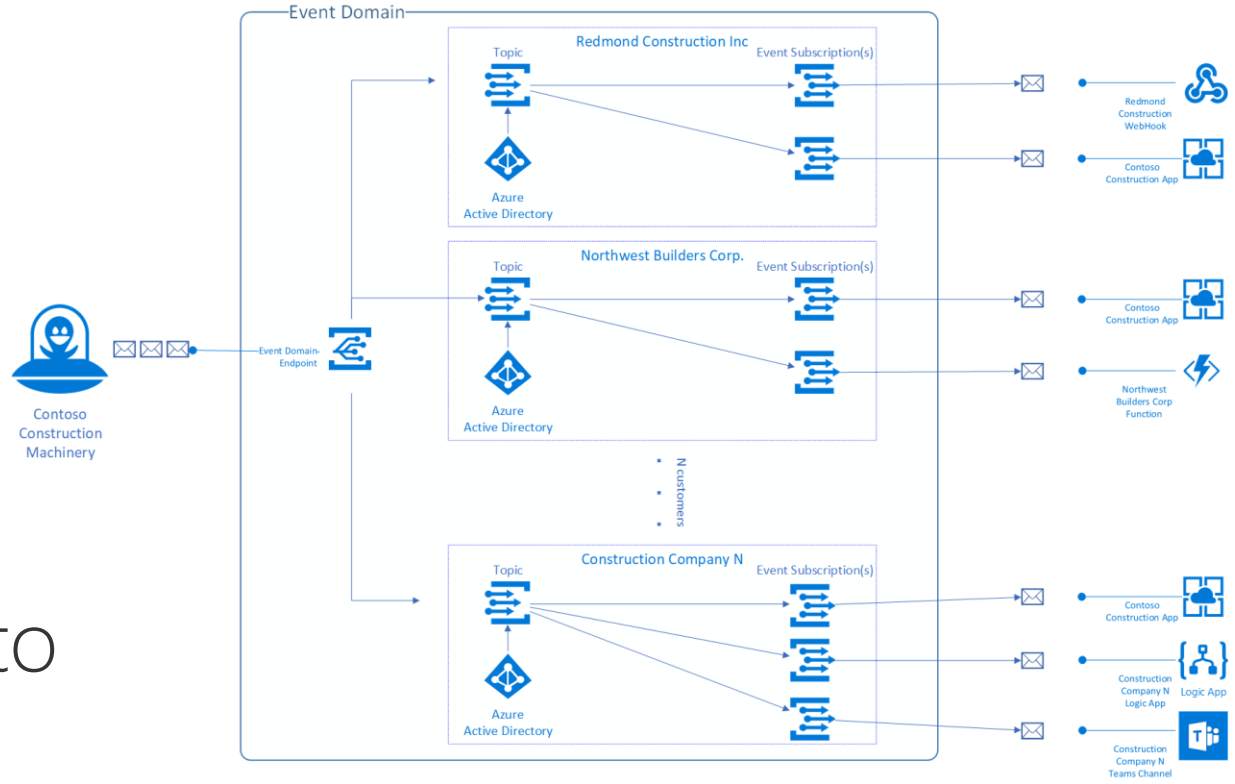


Why: at high scale a queue or log can work better

Grid will give you all of them

Event Domains: your own Grid

- Manage multitenant eventing architectures at scale
- Manage your authorization and authentication
- Partition your topics without managing each individually
- Avoid individually publishing to each of your topic endpoints



What is Event Grid For?

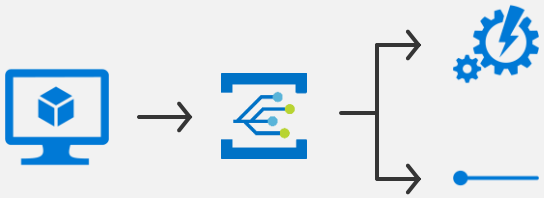
Serverless apps

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

Ops automation

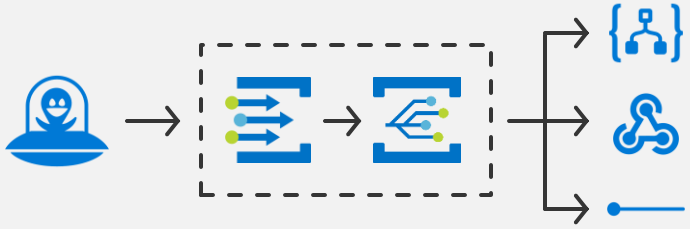
Use a function to run a compliance check on each newly created SQL database

Run PowerShell scripts when events happen in your Azure infrastructure



Third-party integration

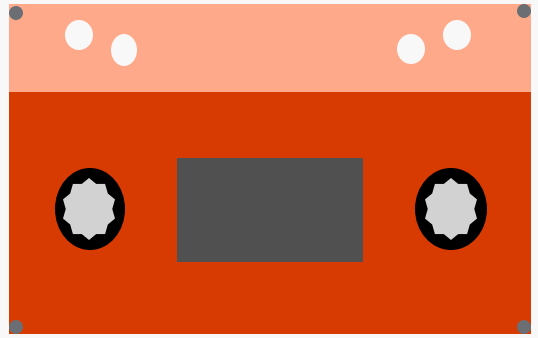
Use custom “drive start” and “drive end” events to log vehicle performance metrics



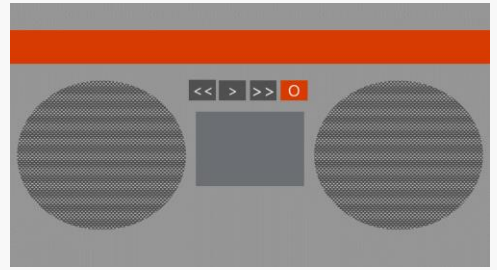
Event Hubs

Distributed log streaming

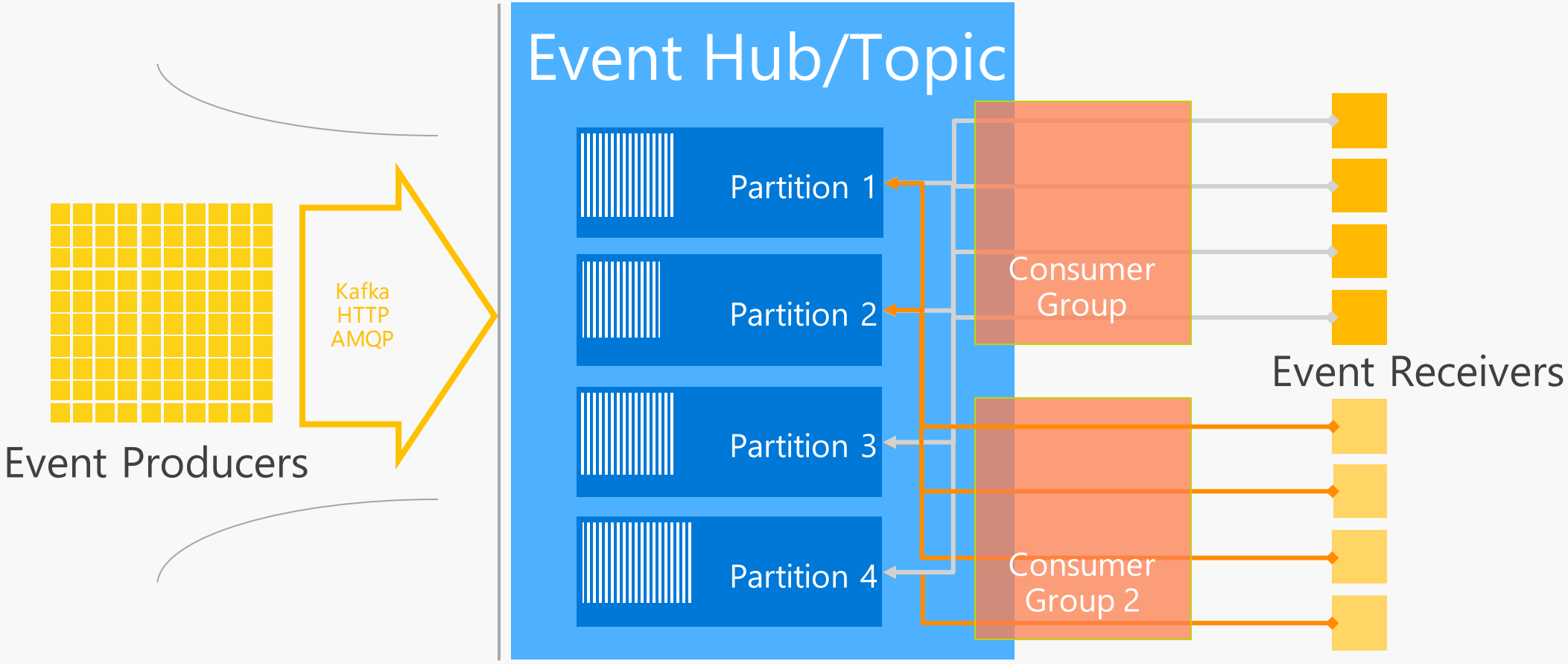
How Event Hubs/Kafka is different from queues



- Records a stream
- Recoding moves forward only
- You can plan the tape over and over again
- A cassette tape actually has Left and Right channels
- When you press record, they both record
- But the data on each channel is different
- The left and right speakers each play one channel
- Event Hubs calls these partitions



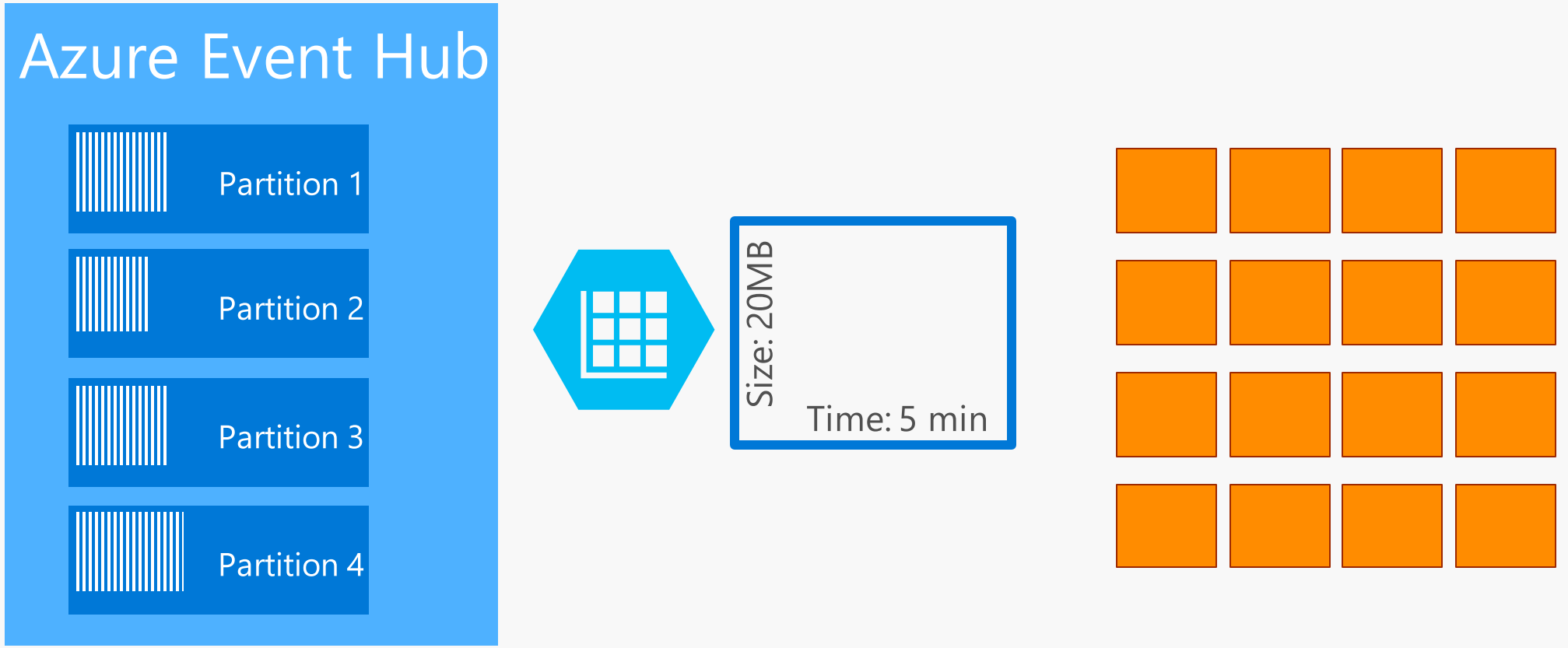
Kafka / Event Hubs conceptual architecture



Event Hubs Capture: batch on stream

- Policy based push to your own storage
- Uses Avro format
- Raises Event Grid events – connect to Functions, ACI, or whatever you like
- Does not impact throughput
- Offloads batch processing from your real-time stream (no pressure drop / no cold water in the shower)

How Capture Works



mytopic - Capture

Event Hubs Instance

Search (Ctrl+/)

Overview
Access control (IAM)
Diagnose and solve problems

Settings
Shared access policies
Properties
Locks
Automation script

Entities
Consumer groups

Features
Capture

Support + troubleshooting
New support request

Save changes Discard

Capture

On Off

Note: Enabling Capture will result in additional charges to this account. Learn more about our pricing here.

Time window (minutes)

5

Size window (MB)

300

Capture Provider

Azure Storage

* Azure Storage Container

Select Container

Storage Account

Sample Capture file name formats

{Namespace}/{EventHub}/{PartitionId}/{Year}/{Month}/{Day}/{Hour}/{Minute}/{Second}

Capture file name format

{Namespace}/{EventHub}/{PartitionId}/{Year}/{Month}/{Day}/{Hour}/{Minute}/{Second}

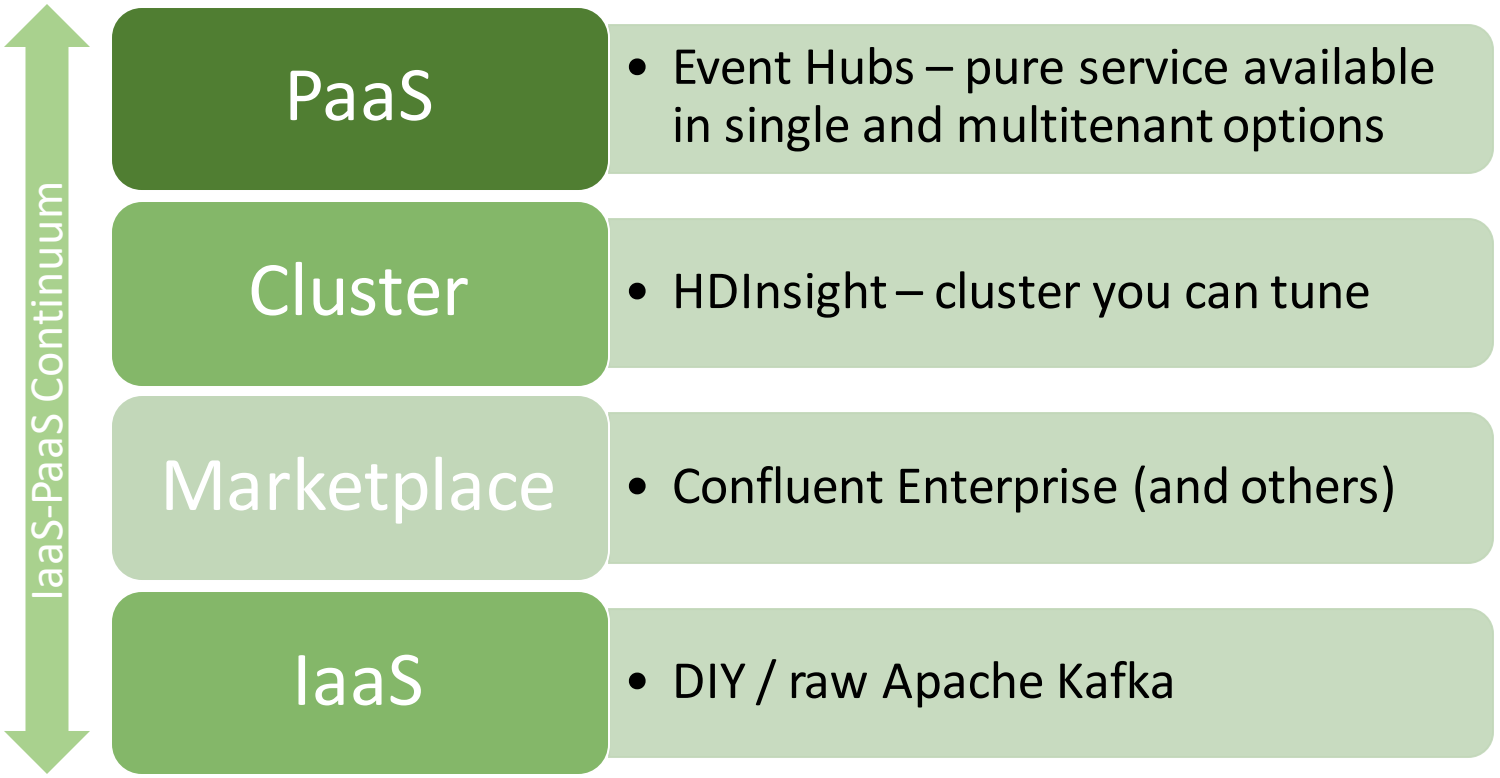
e.g. danskafkahub/mytopic/0/2018/8/27/20/31/58

Azure Event Hubs for Apache Kafka®

- Kafka 1.0 compatible endpoint backed by Event Hubs
- Use your existing Kafka application & tools with Event Hubs
- Only need to change your connection string
- All defaults supported

How we offer Apache Kafka in Azure

Pick the approach that suits you best – Azure will help you succeed



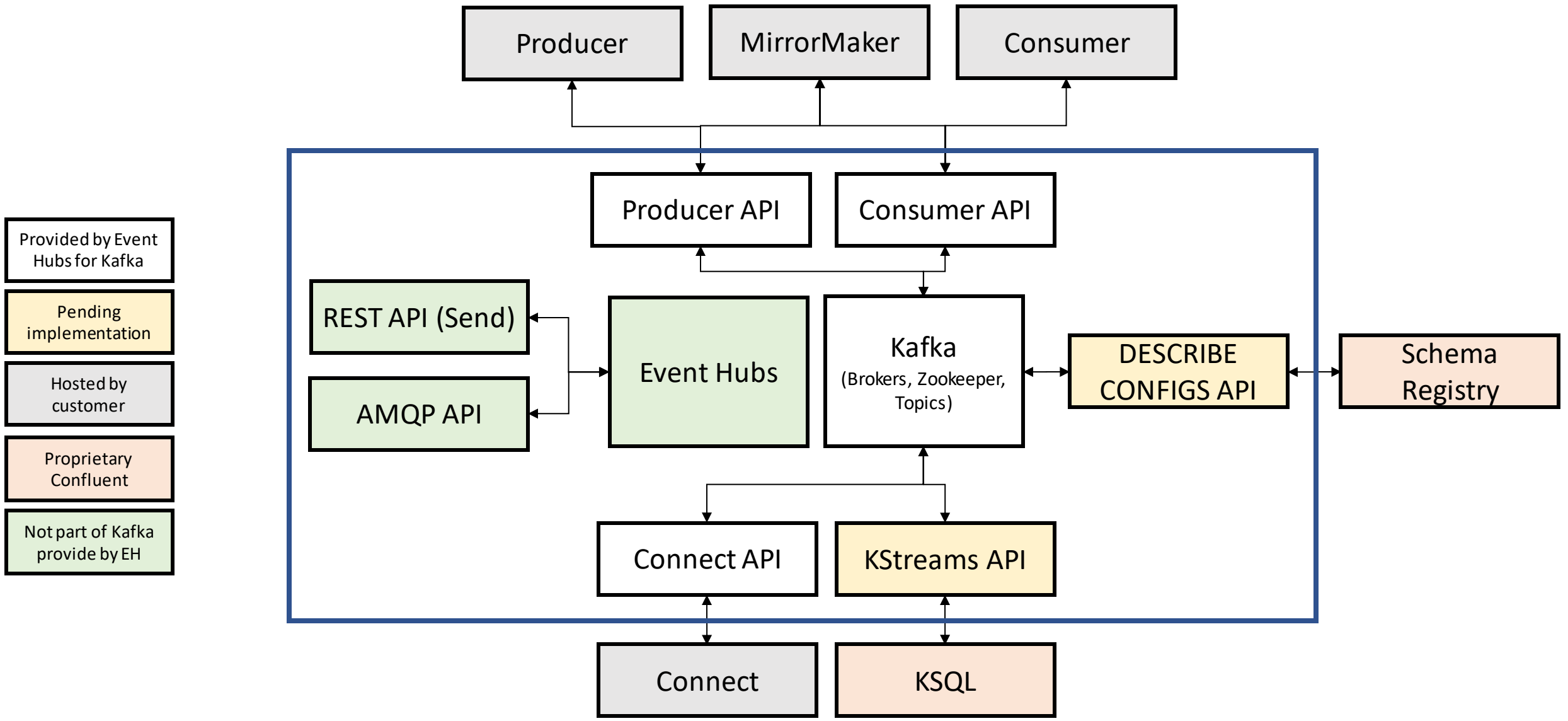
How we started Event Hubs

- Kafka or no Kafka?
- Split the team to try both
- At the time Kafka 0.7.1 was new
- Why we chose what we did
  - Cloud Native
  - Multitenant
  - Zero message loss

What did we do different from Kafka

- Utilizing external storage
- Caching on brokers with gate to prevent dirty reads
  - Ratio of 300 writes per read
- Always replicated before ACK (equivalent to ISR=3 & ACK=-1/ALL)
- Built internally on Service Fabric which has
  - Active orchestrator w/ centralized leader election instead of zookeeper's peer to peer model
  - Single Virtual IP (VIP for entire cluster – no brokers list)
  - Two roles in architecture: gateway for communication and backend for storage

What we offer in Event Hubs for Apache Kafka



Azure Event Hubs

2.2 Trillion Requests every DAY with Event Hubs	**2 PB** Monthly data written to storage by Capture	**99.9998%** Weekly success rate for service	**>80 PB** Monthly Data Volume
50 regions **Running our services**	**95** **Of the 100 largest Azure customers use messaging services**	**50,000+** VMs run our service	**20ms** Average latency send to EH

Event Hubs in action

Streaming telemetry, logs, data

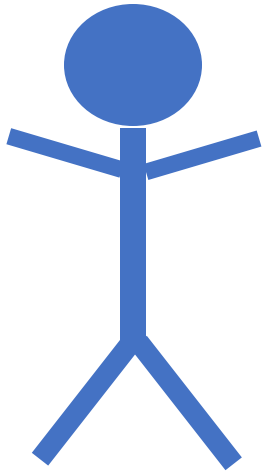
Batch and real-time stream together

Anything you would do with Kafka

Event Sourcing – achieving eventual consistiency

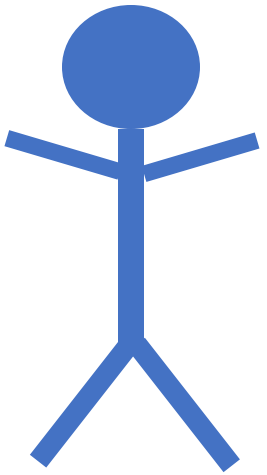
Event Sourcing

- Add head
- Add body
- Add left arm
- Add right arm
- Add left leg
- Add right leg



Event Sourcing

- Add head
- Add body
- Add left arm
- Add right arm
- Add left leg
- Add right leg

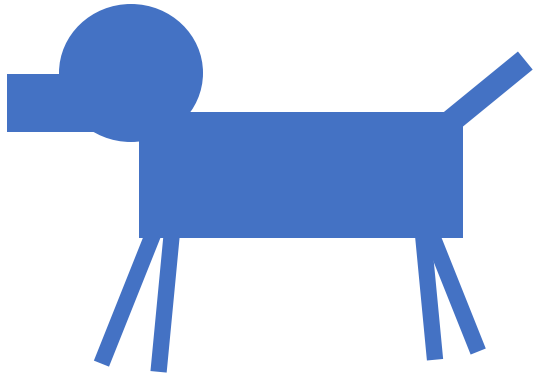


Capabilities we've gain from Event Sourcing

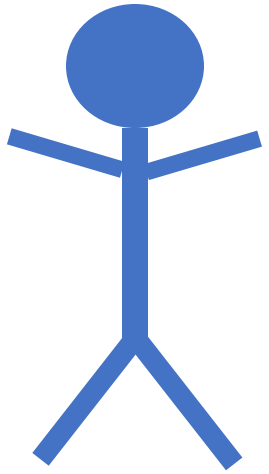
- Complete rebuild
- Temporal query
- Event replay

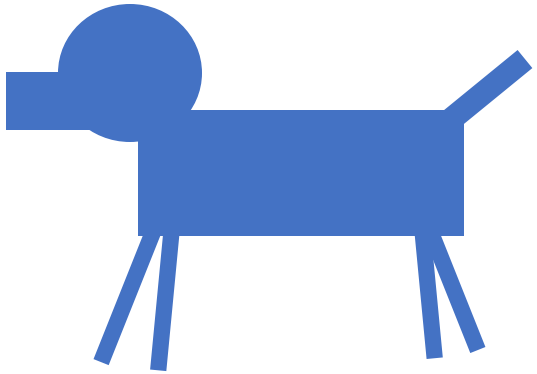
What cool things can you do now?

- Add head
- Add body
- Add left arm
- Add right arm
- Add left leg
- Add right leg



You can have your cake and eat it too!

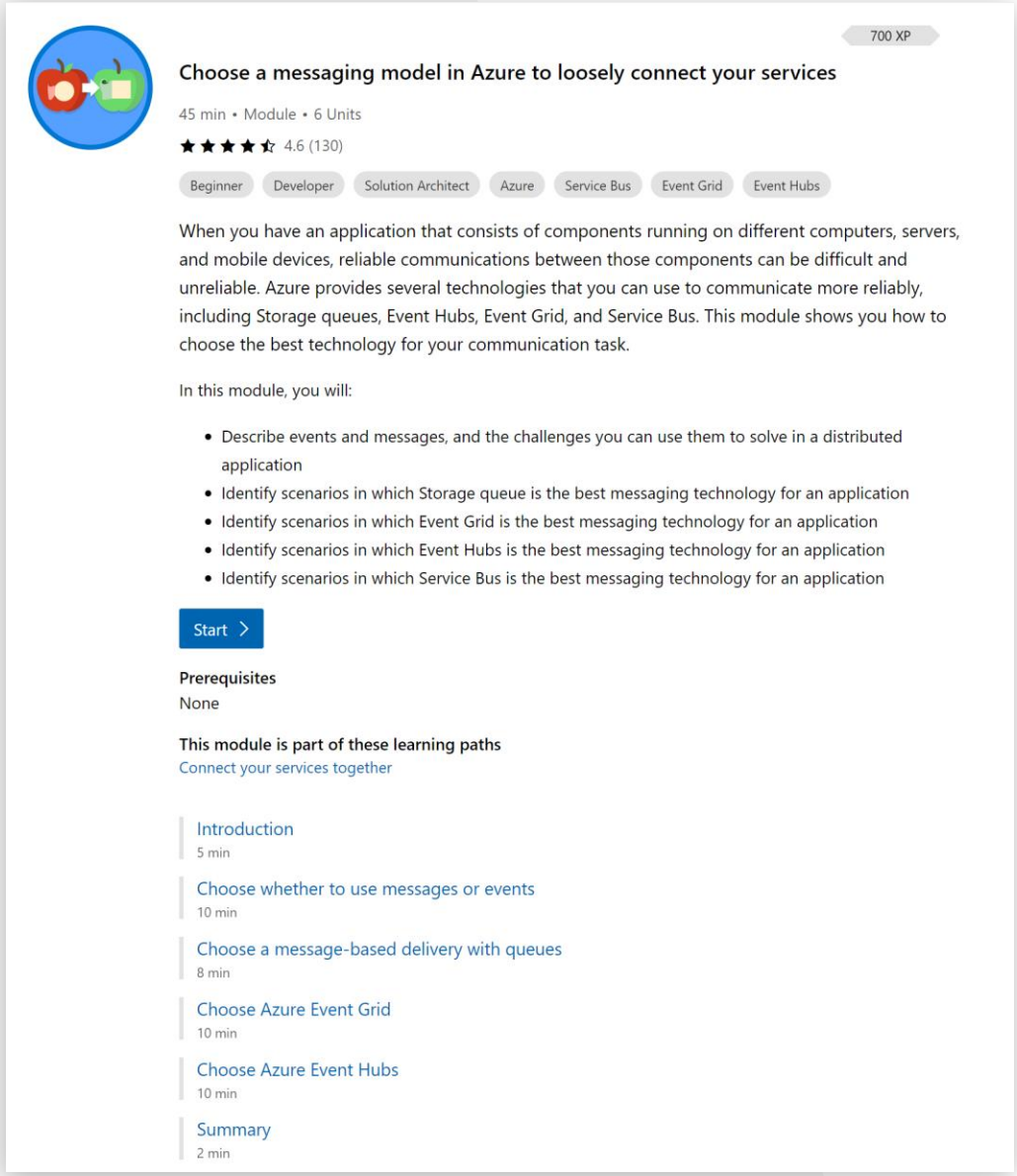




Segmentation of the cloud messaging services

Segment	Simple Queuing	Eventing PubSub	Streaming	Enterprise Messaging
Product	Storage Queues	Event Grid	Event Hubs	Service Bus
What do you care about	• Communication within an app • Individual message • Queue (polling) semantics • Easy to use • Pay as you go • Homogenous queues	• Communication between apps / orgs • Individual message • Push semantics • Filtering and routing • Pay as you go • Fan out	• Many messages in a Stream (think in MBs) • Ease of use and operation • Low cost • Fan in • Strict ordering • Works with other tools	• Instantaneous consistency • Strict ordering • JMS • Non-repudiation & Security • Geo-Replication & Availability • Rich features (de-dupe, scheduling, etc.)
What you care less about	• Ordering of messaging • Instantaneous consistency	• Ordering of messaging • Instantaneous consistency	• Individual message semantics • Server-side cursor • At most once	• Cost • Simplicity
Schwerpunkt (hard point)	• Simple lightweight queue	• Reliable fan out push at massive scale	• High scale distributed log	• Highly indexed full featured message broker
	Serverless		Kafka	Enterprise

One size fits all?



Learning Paths

- Choose a messaging model in Azure to loosely connect your services
- Implement message-based communication workflows with Azure Service Bus
- Enable reliable messaging for Big Data applications using Azure Event Hubs

Serverless and Azure Functions

Build apps faster with serverless technologies

Microsoft

What is serverless?

Full abstraction of servers

Developers can just focus on their code—there are no distractions around server management, capacity planning, or availability.

Instant, event-driven scalability

Application components react to events and triggers in near real-time with virtually unlimited scalability; compute resources are used as needed.

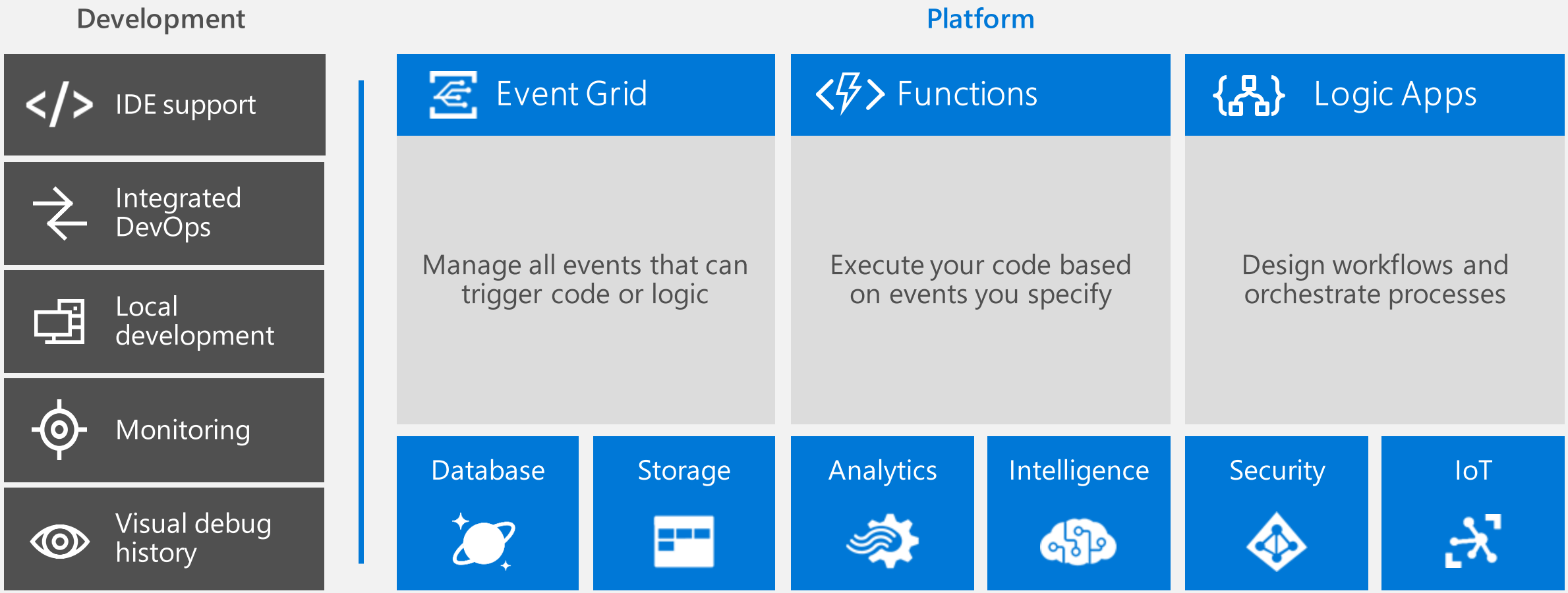
Pay-per-use

Only pay for what you use: billing is typically calculated on the number of function calls, code execution time, and memory used.*

*Supporting services, like storage and networking, may be charged separately.

Full integration with Azure ecosystem

Functions is the center piece of the Serverless platform



FaaS is at the center of serverless

Functions-as-a-Service programming model use functions to achieve true serverless compute

Single responsibility

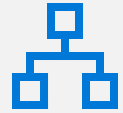
Functions are single-purposed, reusable pieces of code that process an input and return a result

Short lived

Functions don't stick around when finished executing, freeing up resources for further executions

Stateless

Functions don't hold any persistent state and don't rely on the state of any other processes

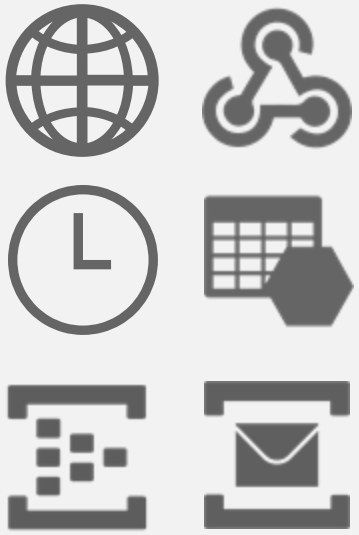


Event driven & scalable

Functions respond to predefined events, and are instantly replicated as many times as needed

Azure Functions

Events



React to timers, HTTP, or events from your favorite Azure services, with more on the way

Code

Author functions in C#, F#, Node.JS, Java, Python, PowerShell, and more

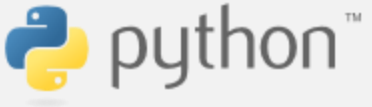
Outputs

Send results to an ever-growing collection of services

Language options

Generally available

Public preview



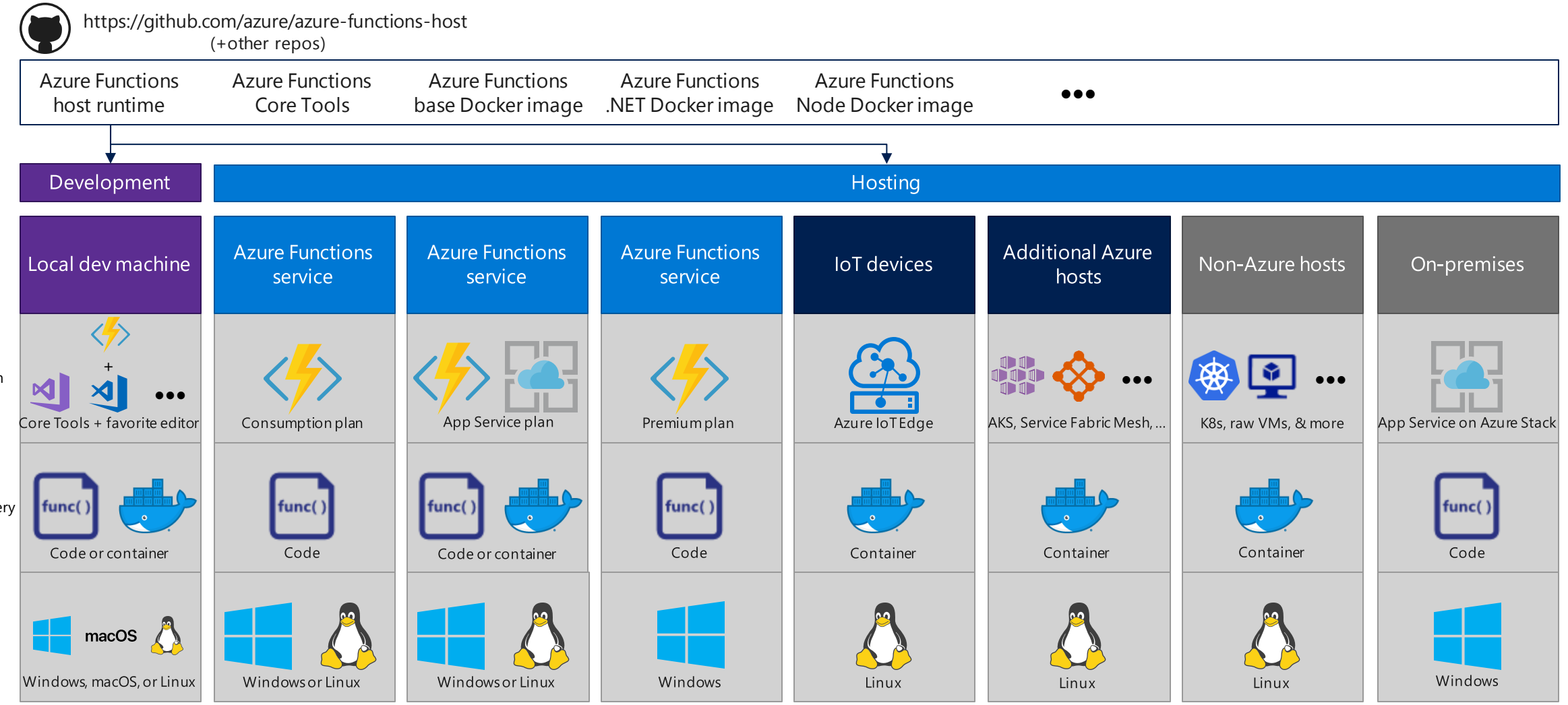
More on the way!

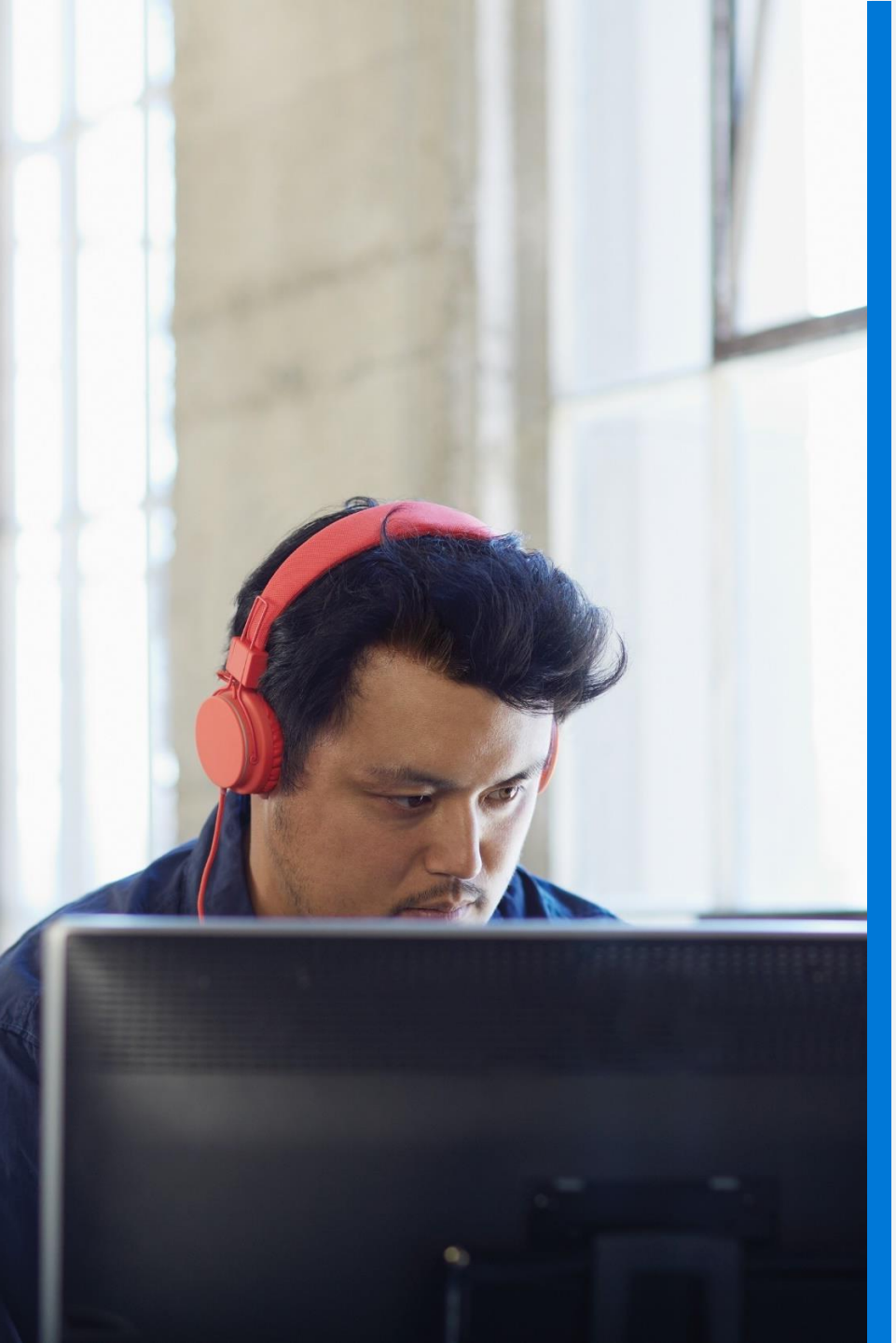
Gain flexibility and develop your way

Hosting options

Consumption	AS Plan	AS Environment	Azure Stack	Runtime	IoT Edge
Serverless	*Basic, Standard, Premium*	*Network isolation*	*On-premises*	*Functions on your server*	*On devices*
Only pay for what you use; charges apply per execution and per GB second	Gain all the advantages of Functions along with Microsoft's financially-backed SLA and the always-on features of an App Service Plan	Use a dedicated App Service cloud environment (ASE) that comes with network isolation for apps, greater scale, and secure connectivity to local vNets	Bring the power of the entire Azure stack to your own data centers	Run Functions on your local server; does not include the entire Azure stack	Deploy custom Azure modules on IoT devices

Functions everywhere





Sample scenarios for Functions

Web application backends

Mobile application backends

IoT-connected backends

Conversational bot processing

Real-time file processing

Real-time stream processing

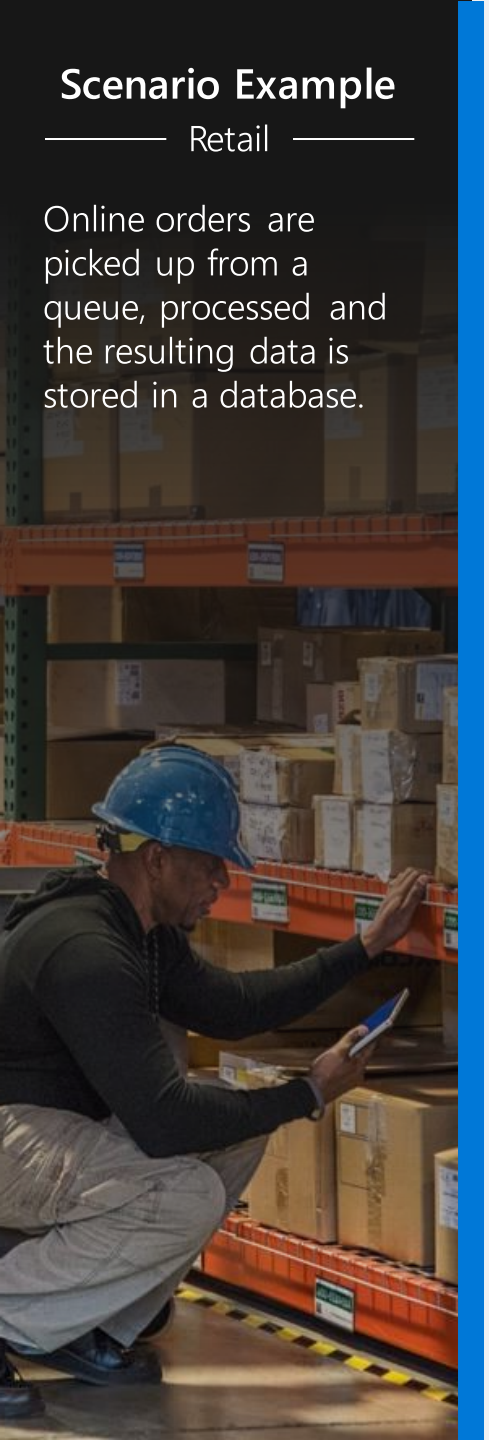
Automation of scheduled tasks

Extending SaaS Applications

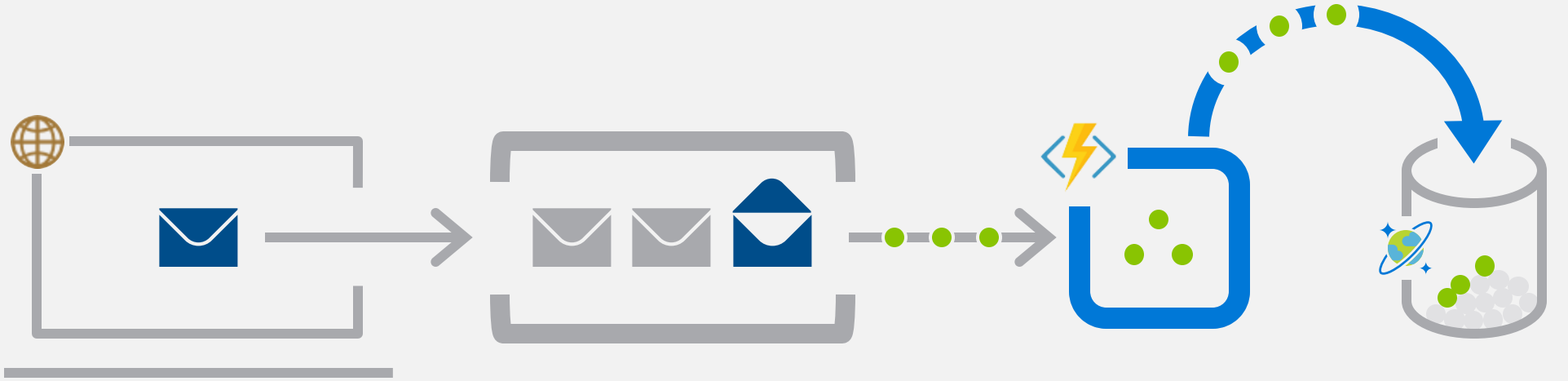
Scenario Example

Retail

Online orders are picked up from a queue, processed and the resulting data is stored in a database.



Web application backends



Request made in a web app

Request queued in Service Bus

A function processes the request...

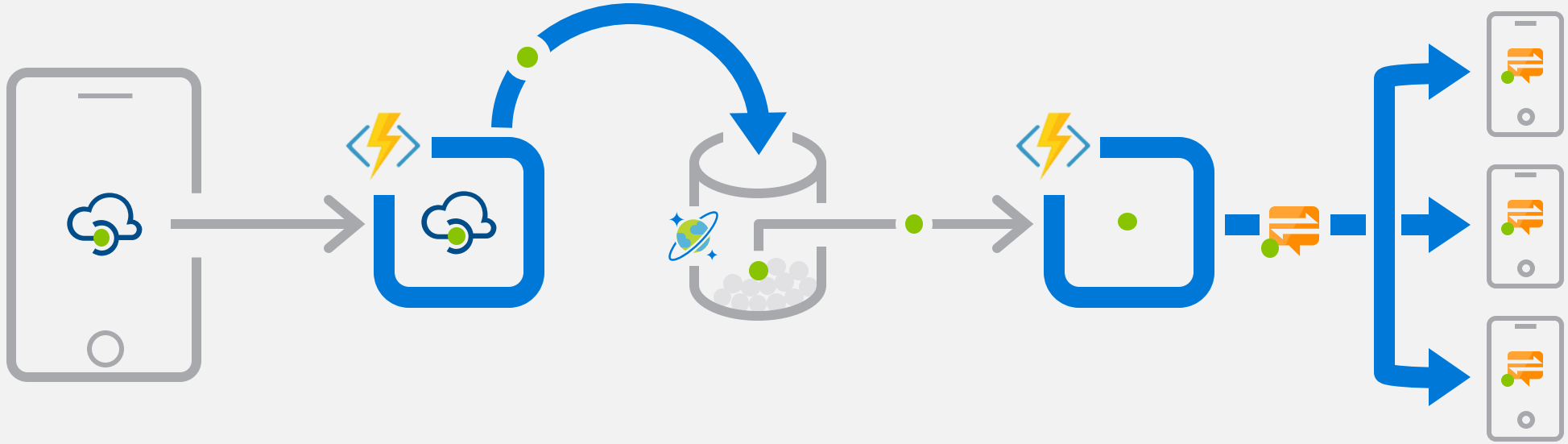
...sends output to Cosmos DB

Scenario Example

— Financial Services —

Colleagues use mobile banking to reimburse each other for lunch: the person who paid for lunch requests payment through his mobile app, triggering a notification on his colleagues' phones.

Mobile application backends



HTTP API call from a mobile app

Call processed by a function

Output data stored in Cosmos DB

Data transfer triggers second function…

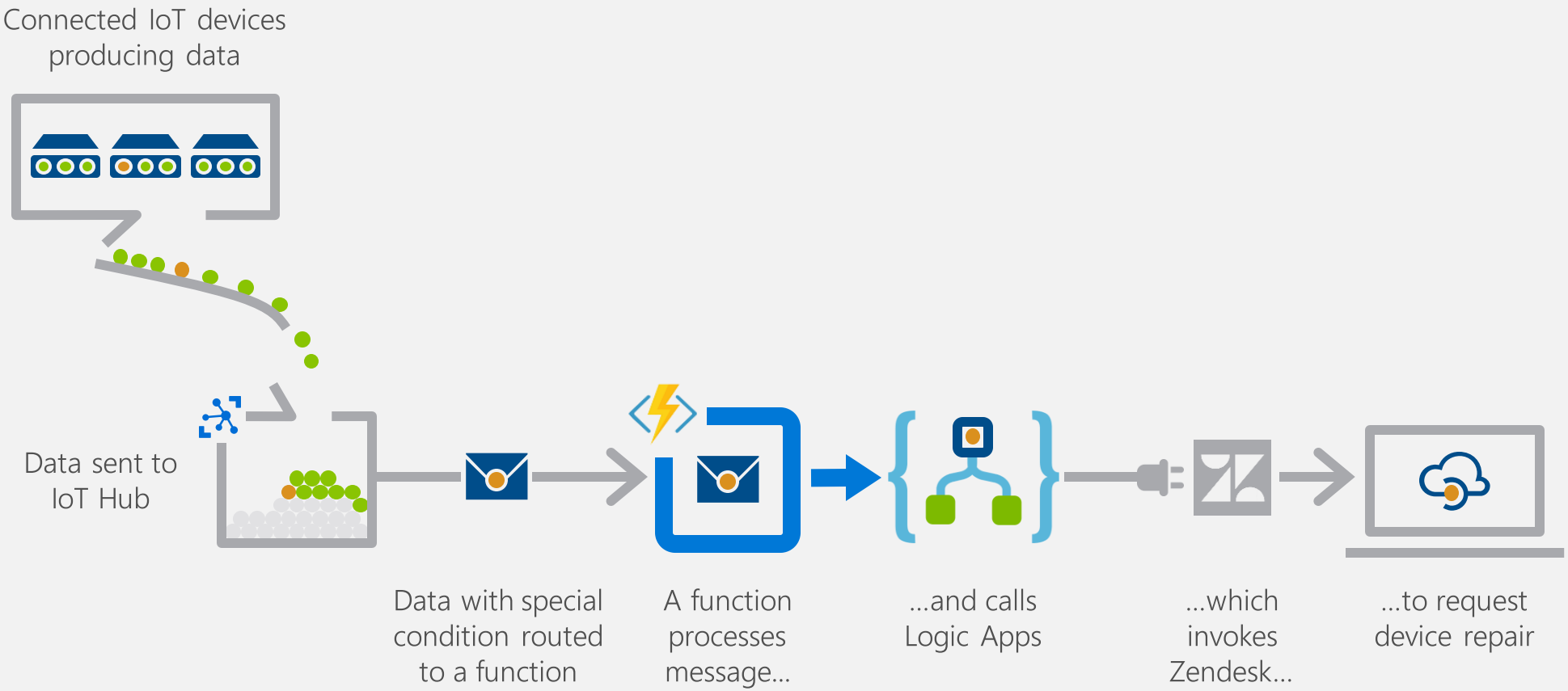
…which sends notifications using Notifications Hub

Scenario Example

— Manufacturing —

A manufacturing company uses IoT to monitor its machines. Functions detects anomalous data and triggers a message to Service department when repair is required.

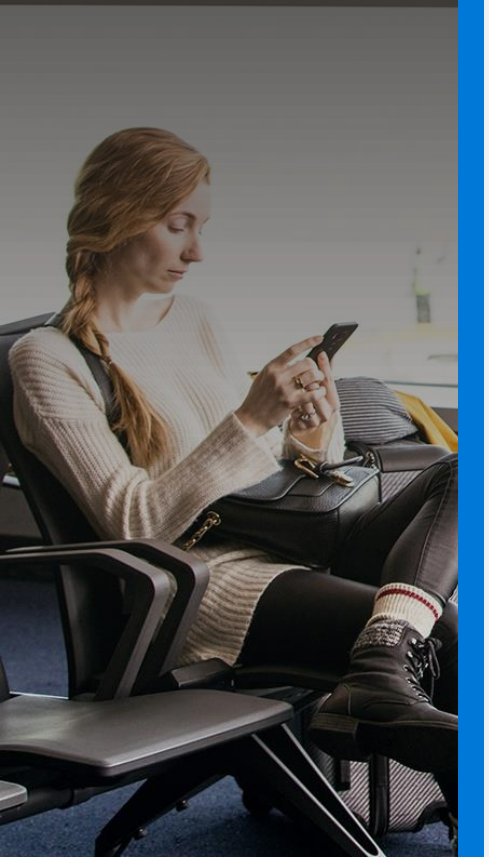
IoT-connected backends



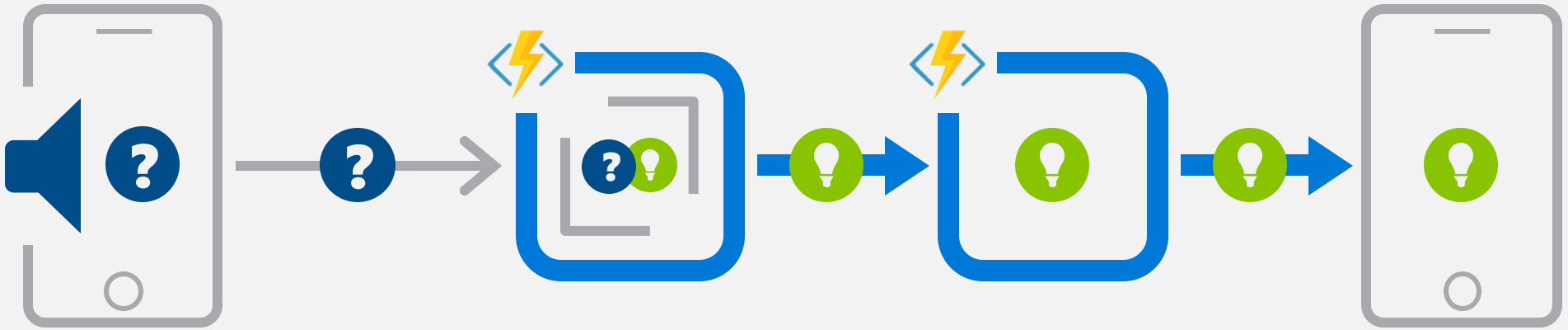
Scenario Example

Hospitality

Customer asks for available vacation accommodations on her smartphone. A serverless bot deciphers the request and returns vacation options.



Conversational bot processing



User request through conversational interface

Bot running in a function deciphers request using language understanding

Another function processes the request

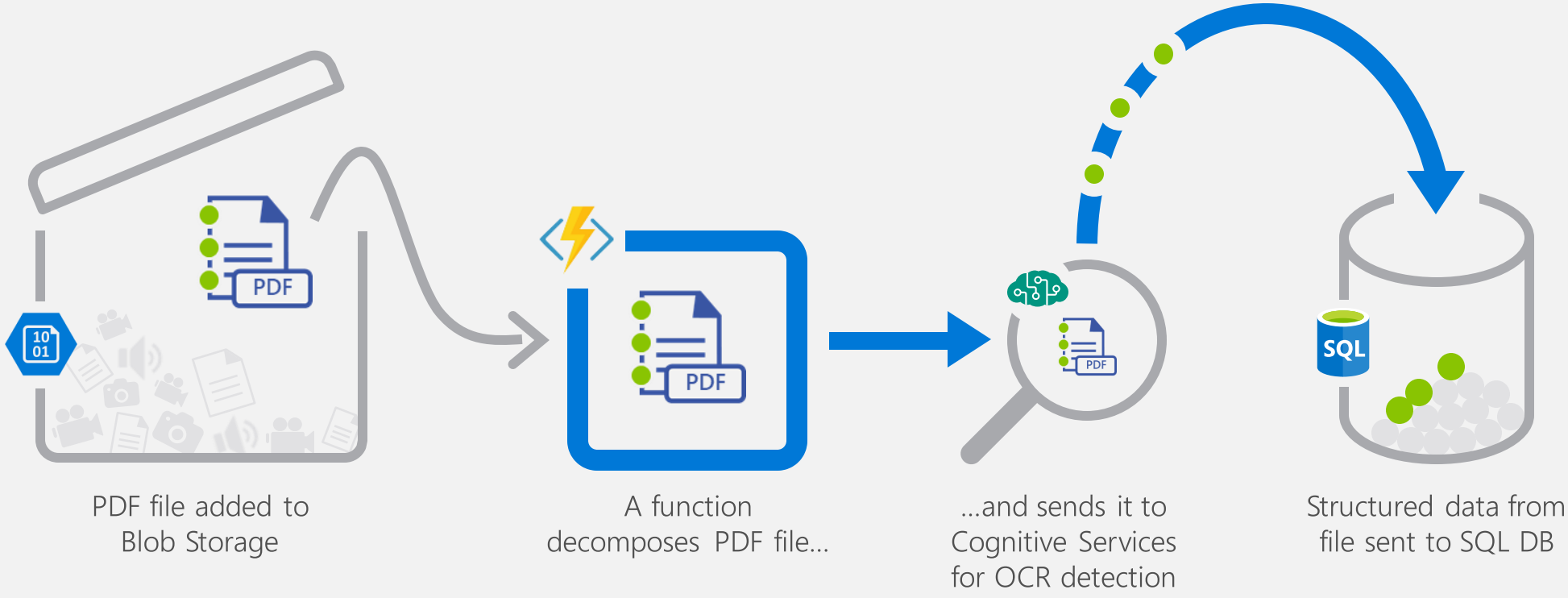
...and sends response to original requester

Scenario Example

Healthcare

Patient records are securely uploaded as PDF files. That data is then decomposed, processed using OCR detection, and added to a database for easy queries.

Real-time file processing

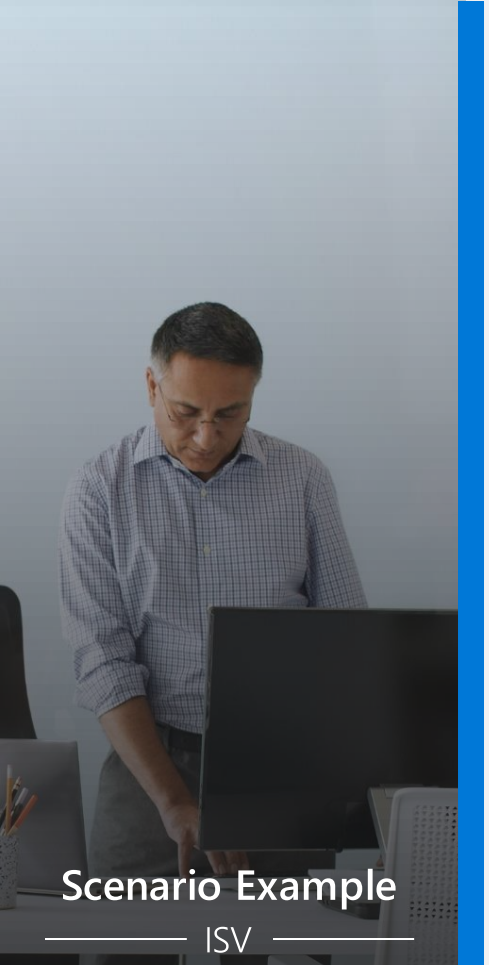


PDF file added to Blob Storage

A function decomposes PDF file...

...and sends it to Cognitive Services for OCR detection

Structured data from file sent to SQL DB

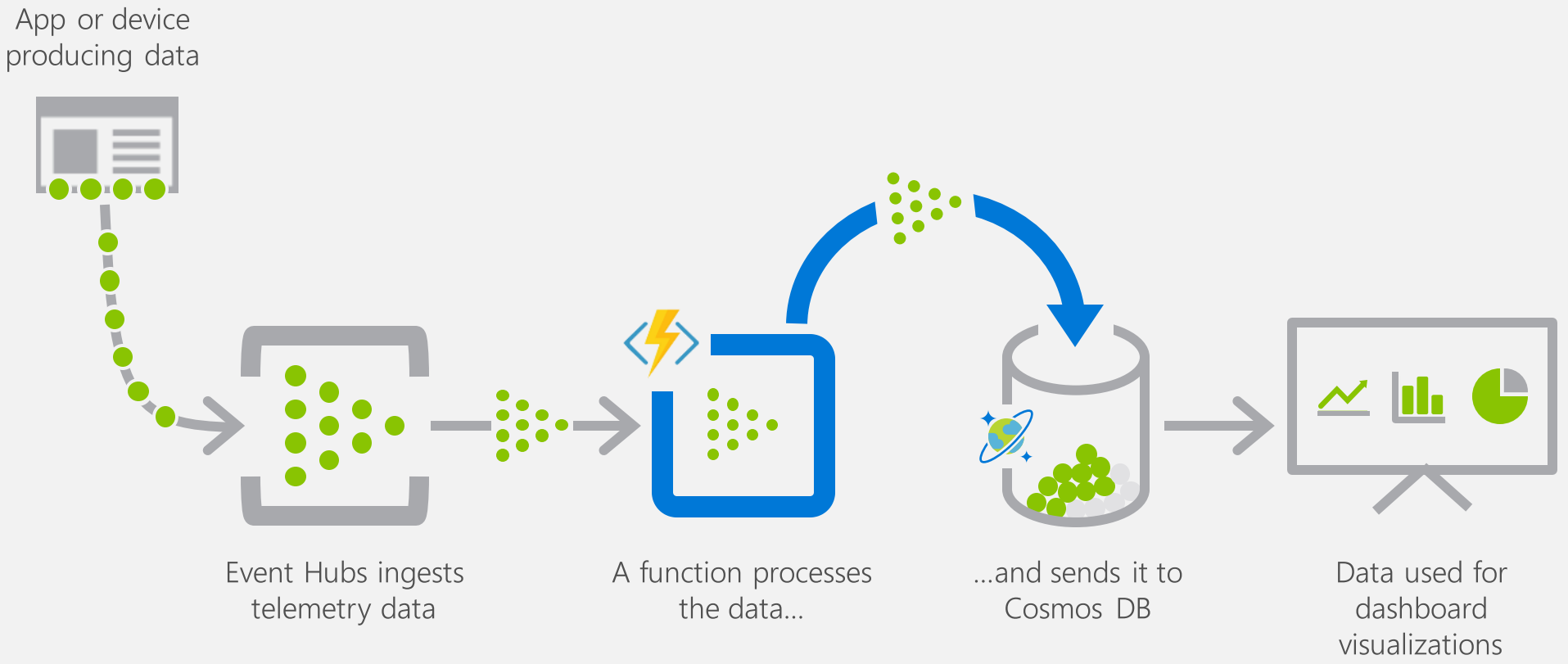


Scenario Example

ISV

Huge amounts of telemetry data is collected from a massive cloud app. That data is processed in near real-time and stored in a DB for use in an analytics dashboard.

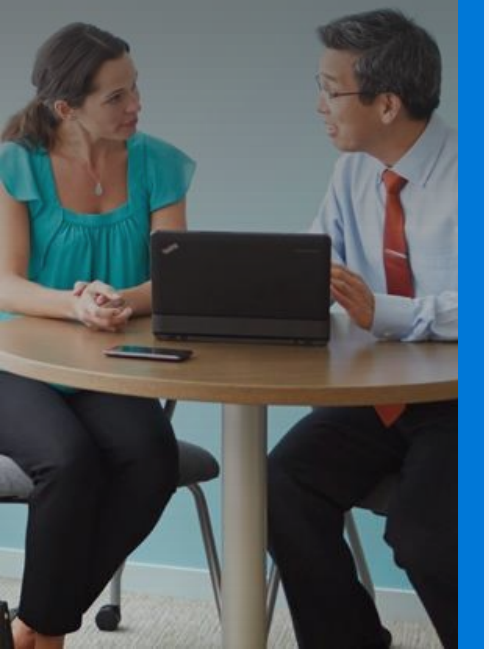
Real-time stream processing



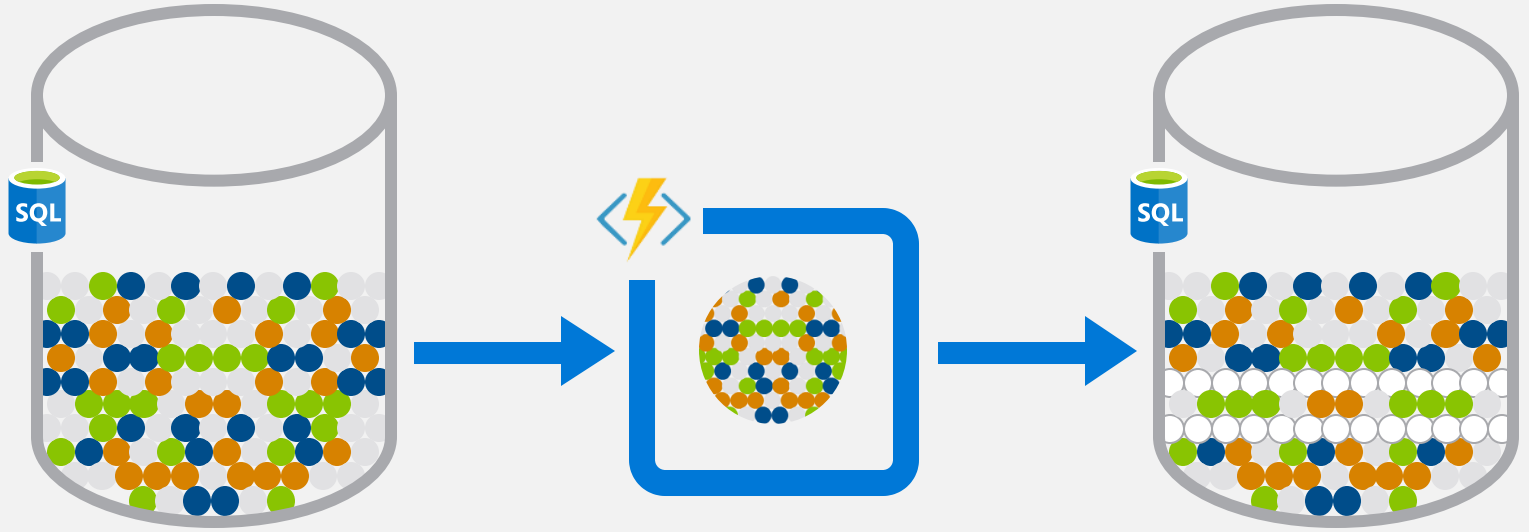
Scenario Example

— Financial Services —

A customer database is analyzed for duplicate entries every 15 minutes, to avoid multiple communications being sent out to same customers.



Automation of scheduled tasks



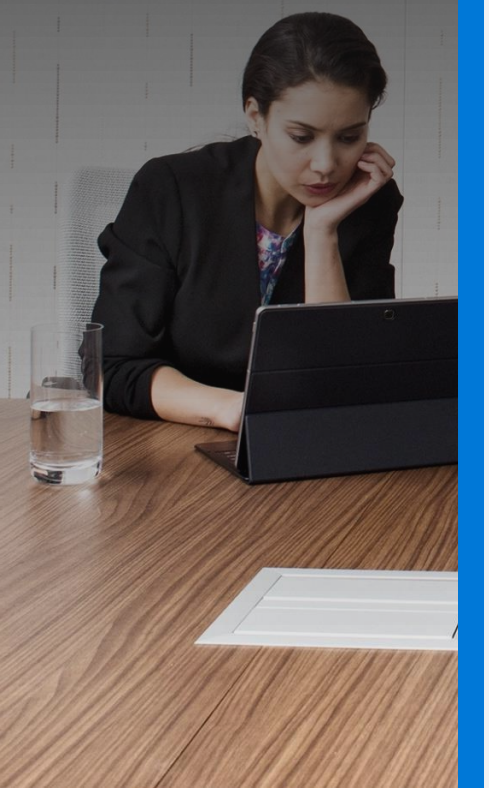
A function cleans a database every 15 minutes…

…deduplicating entries based on business logic

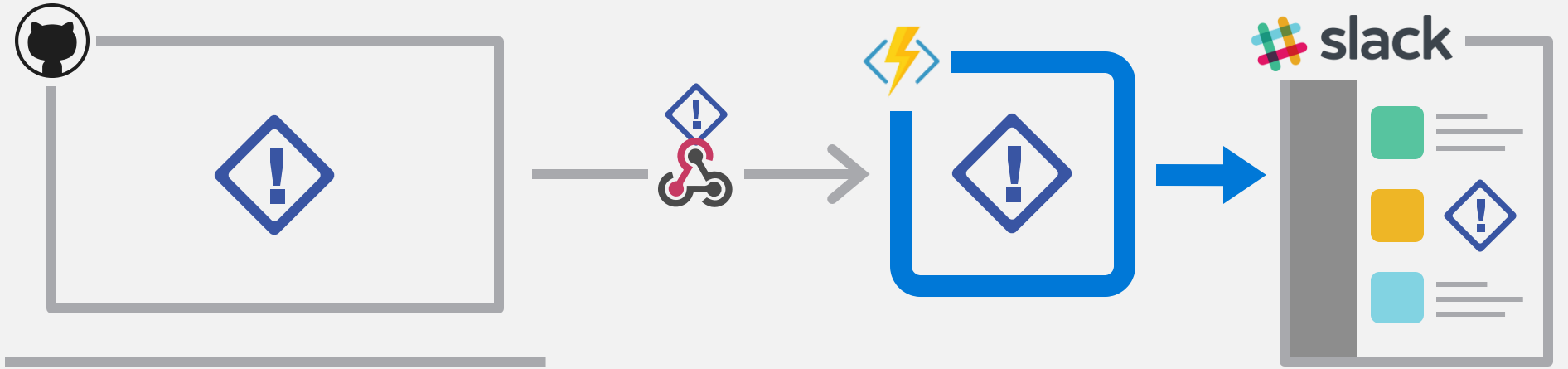
Scenario Example

—Professional Services—

A SaaS solution provides extensibility through webhooks, which can be implemented through Functions, to automate certain workflows.



Extending SaaS applications



Issue created in GitHub...

...which triggers a webhook call

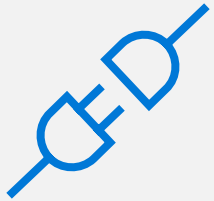
...which is processed by a function...

...by posting the issue details to Slack

Application modernization

Sod Field
Build new functionality on top of existing applications

Offload heavy workloads
Leverage serverless scale

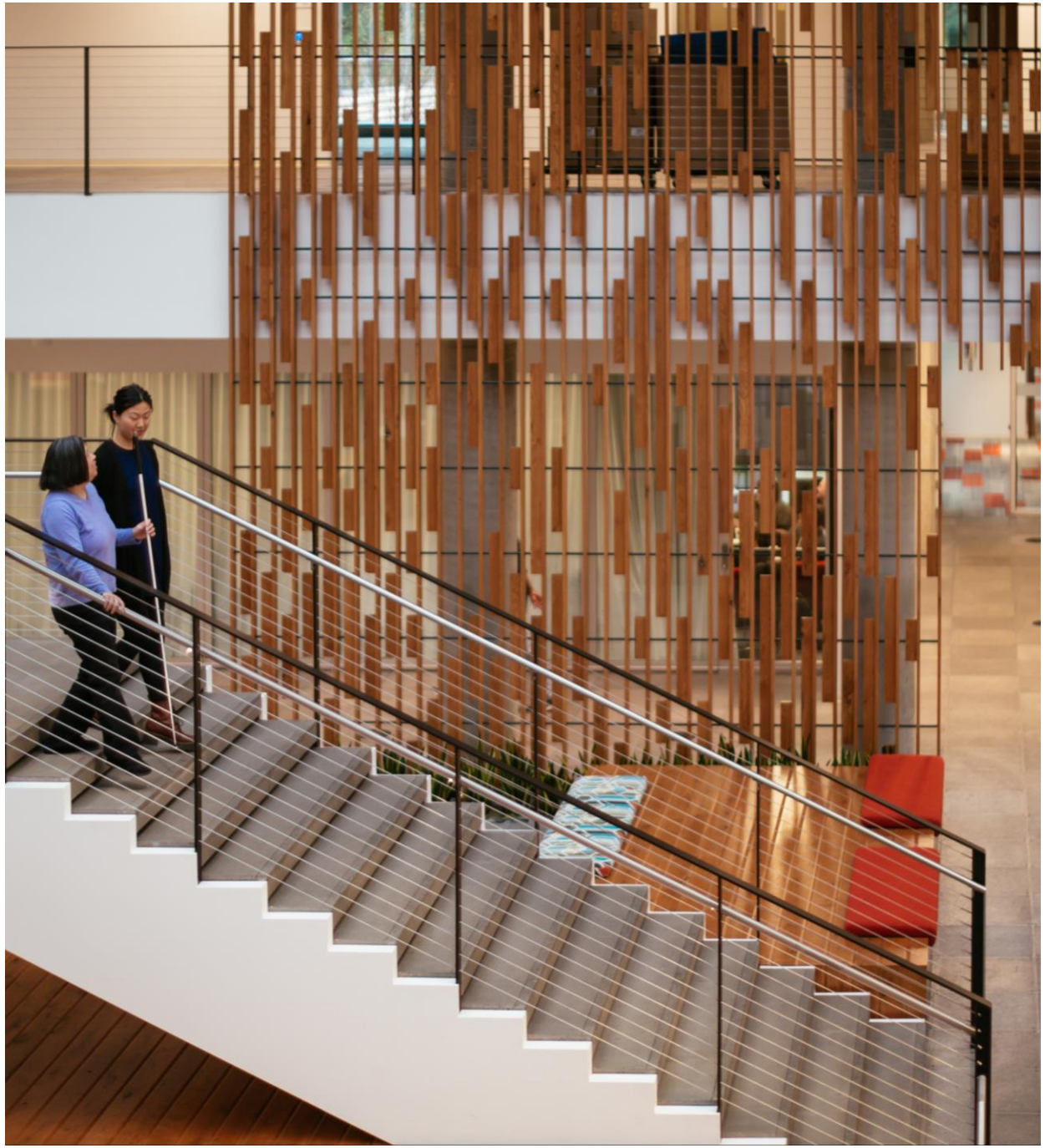


Cloud Glue
Connect services without management overhead

Hosting

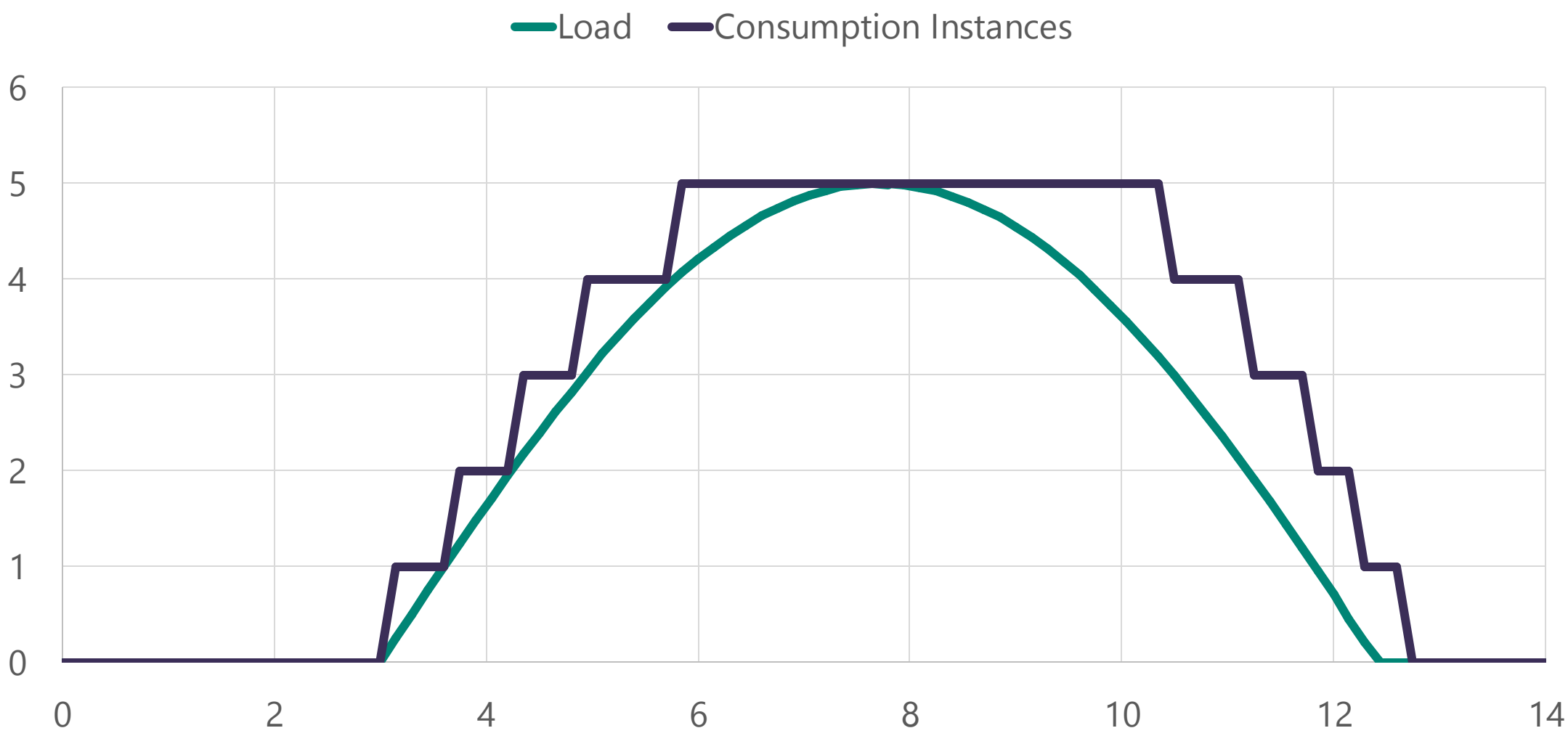
Premium Plan

- Serverless scale with bigger, configurable instances
  - Up to 4 cores 12Gb of memory
- Cold start controls
  - Min plan size
  - Pre-Warmed instances
- VNET connectivity
- Longer run duration
  - ~25 minutes
- Predictable billing
  - Max plan size

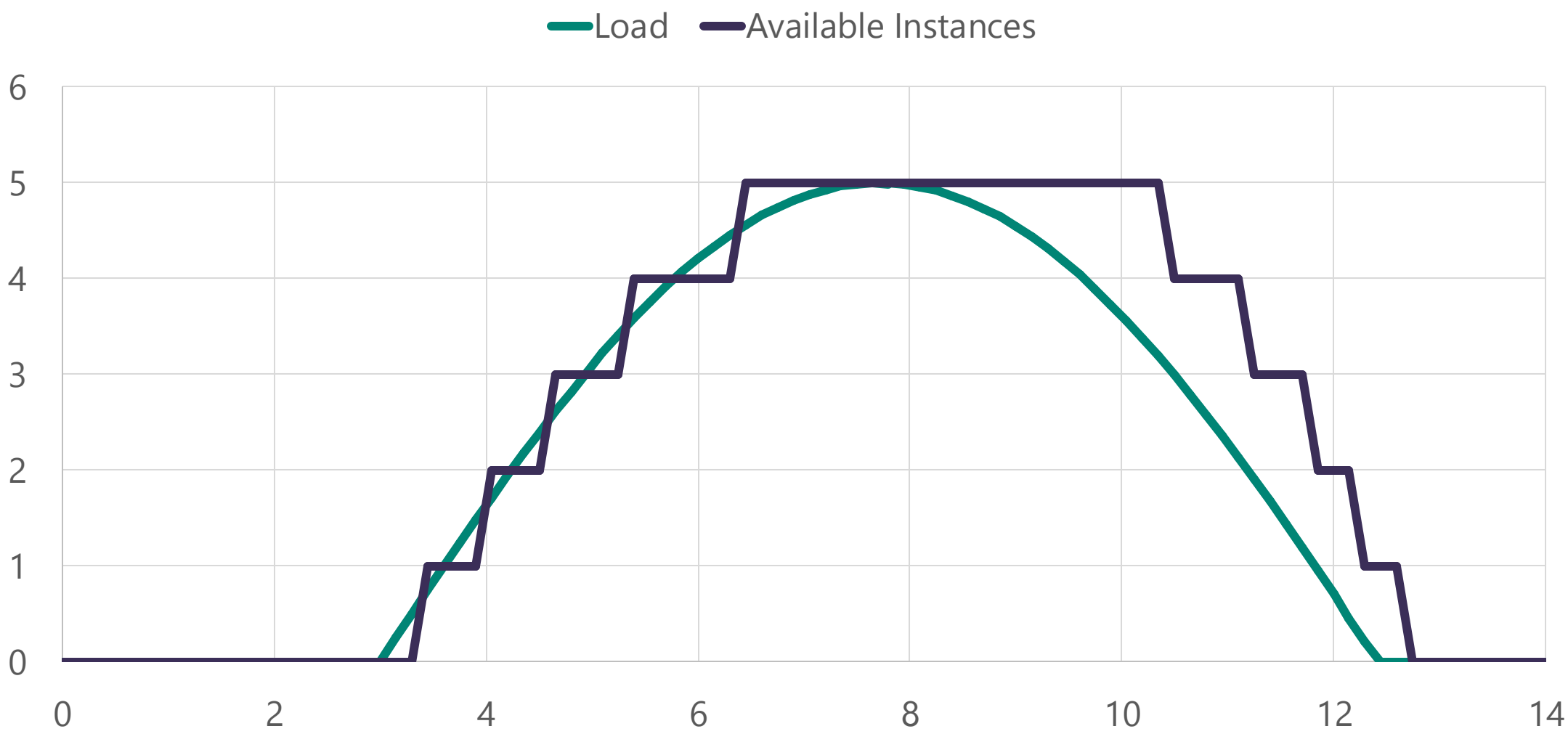


Cold Start Controls

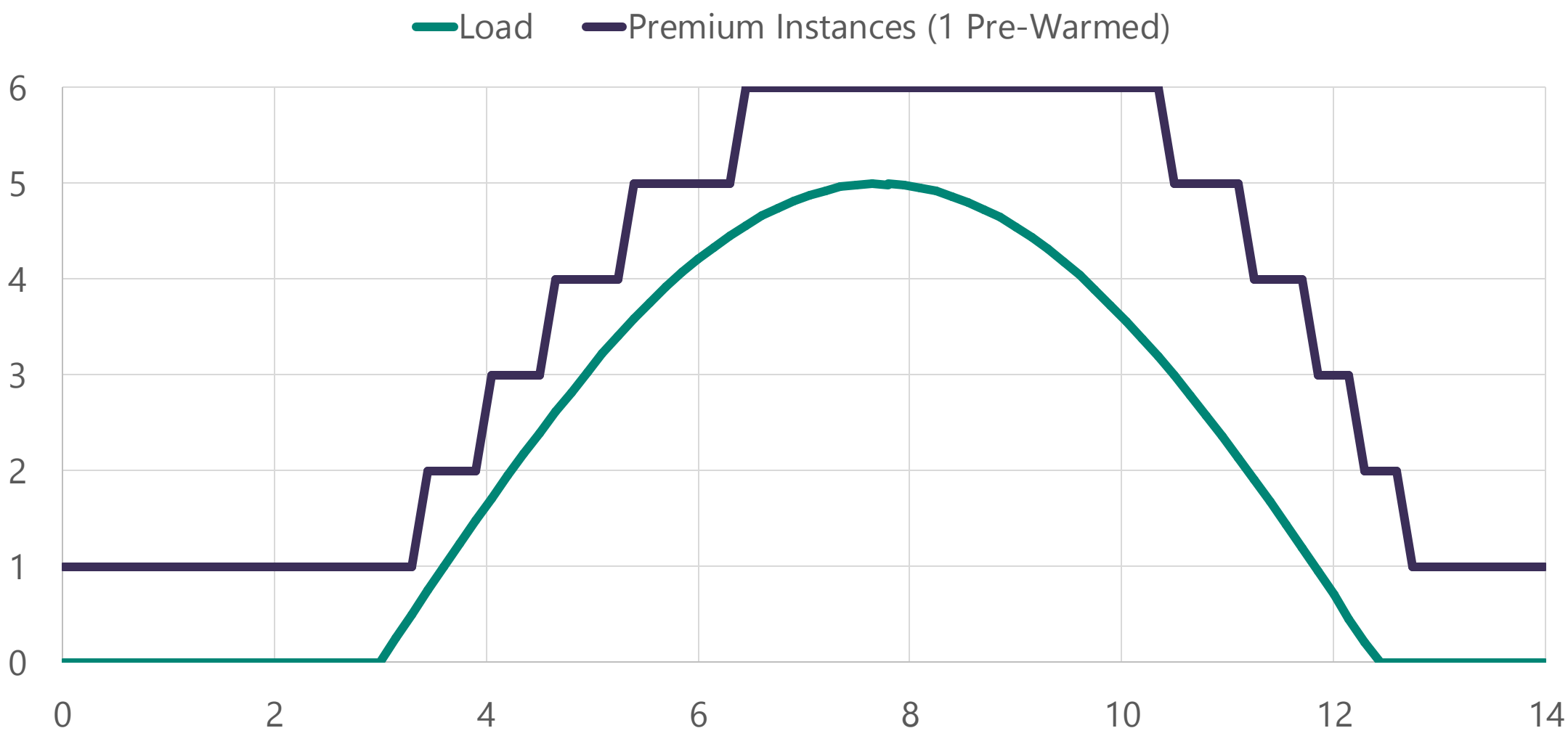
Your App in Concept



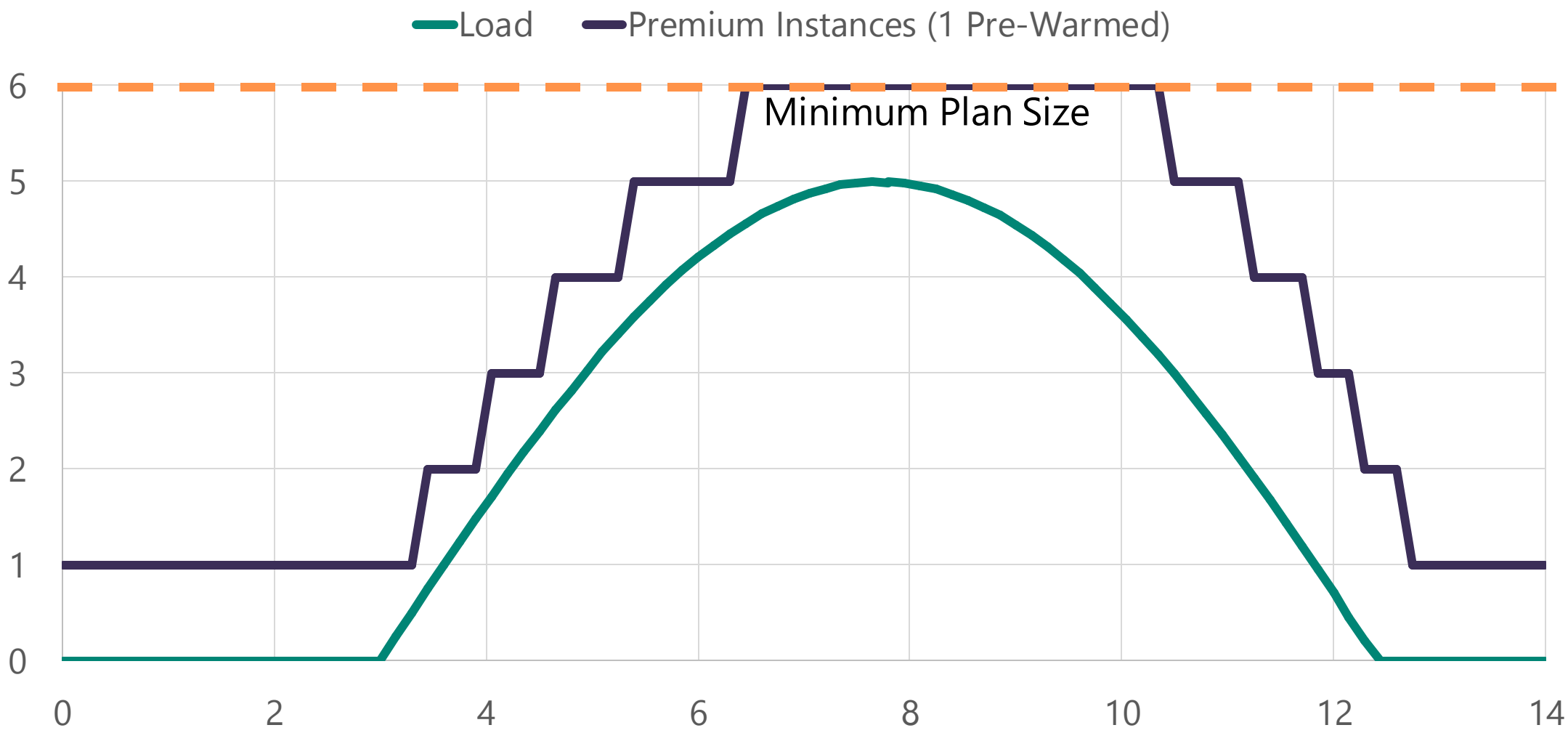
Your app with long cold start



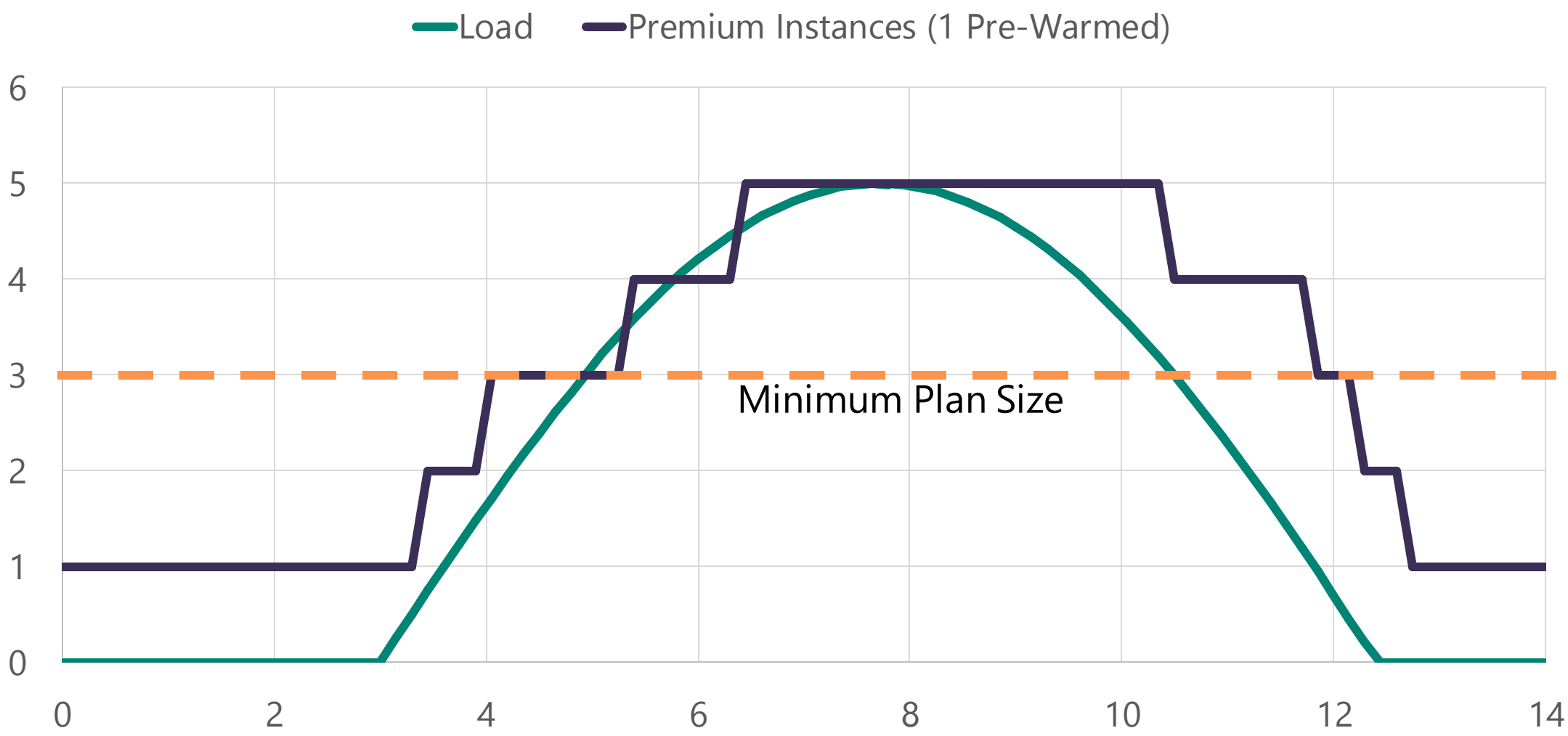
Your app with one pre-warmed instance



Your app with one pre-warmed instance



Your app with a 3 instance min plan size



Scale Demo

Network Isolation

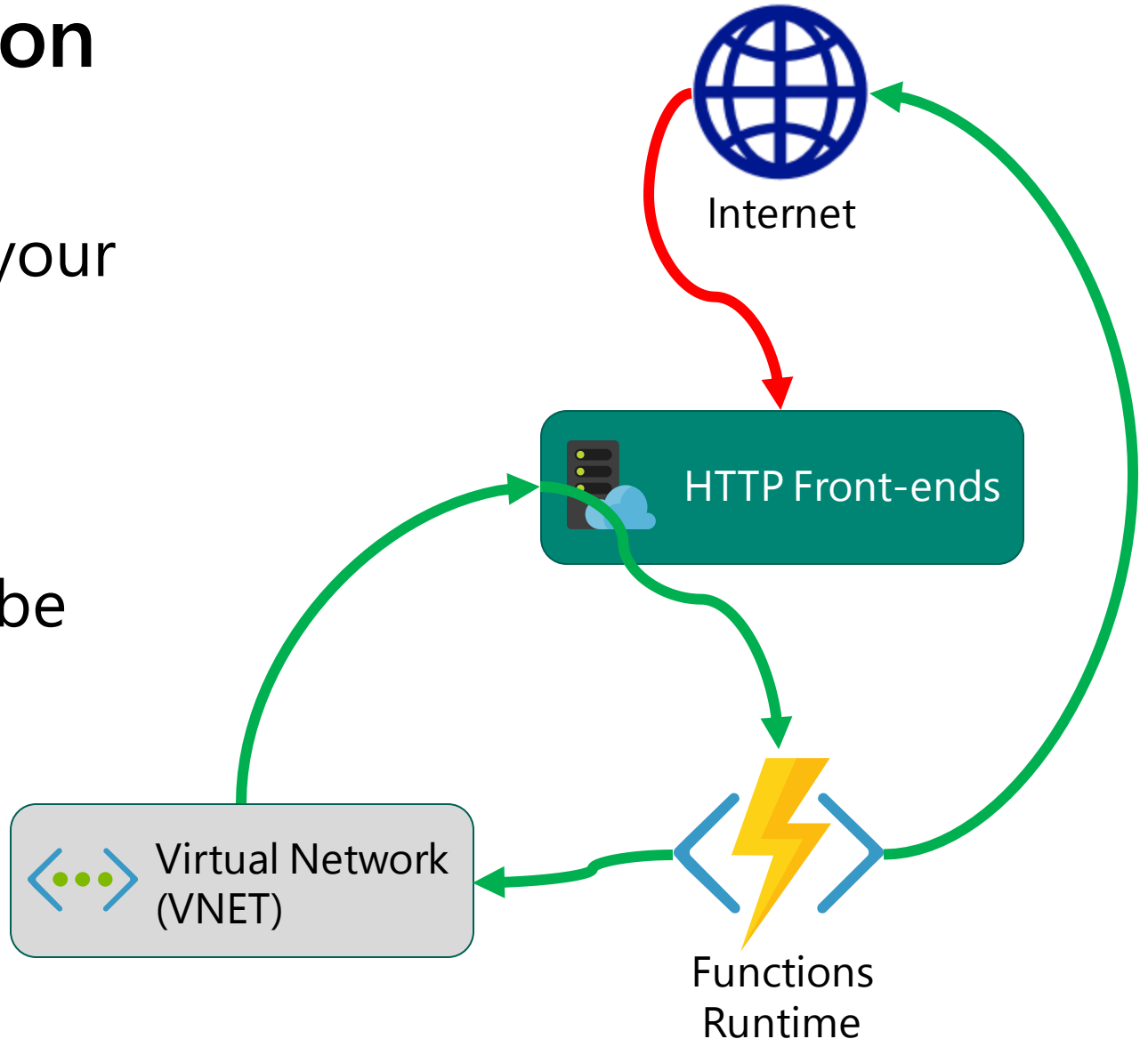
Virtual Networking

Matrix of networking features

	Consumption plan	Premium plan (preview)	App Service plan	App Service Environment
Inbound IP restrictions	✅ Yes	✅ Yes	✅ Yes	✅ Yes
Outbound IP Restrictions	❌ No	❌ No	❌ No	✅ Yes
Virtual network integration	❌ No	❌ No	✅ Yes	✅ Yes
Preview virtual network integration (Azure ExpressRoute and service endpoints outbound)	❌ No	✅ Yes	✅ Yes	✅ Yes
Hybrid Connections	❌ No	❌ No	✅ Yes	✅ Yes
Private site access	❌ No	✅ Yes	✅ Yes	✅ Yes

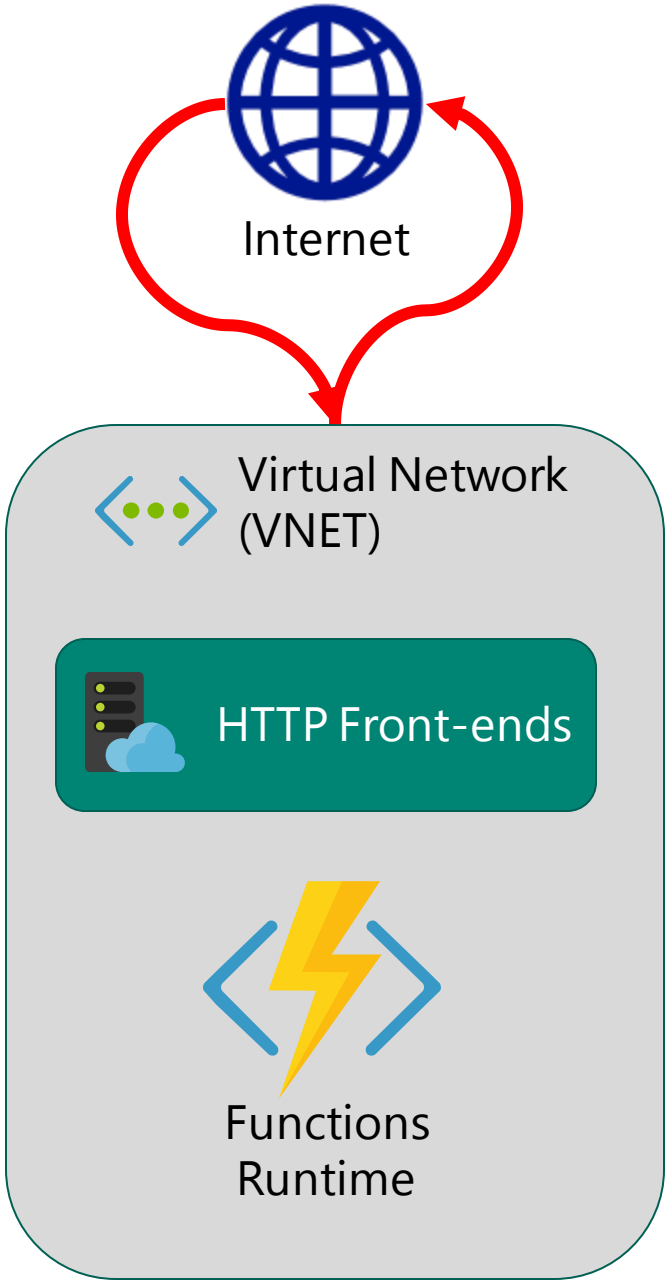
Premium + VNET Integration + Service Endpoints

- Secure inbound HTTP access to your App to one subnet in a VNET
- Allow secure outbound calls to resources in a VNET
- Dependencies that you add can be insecure

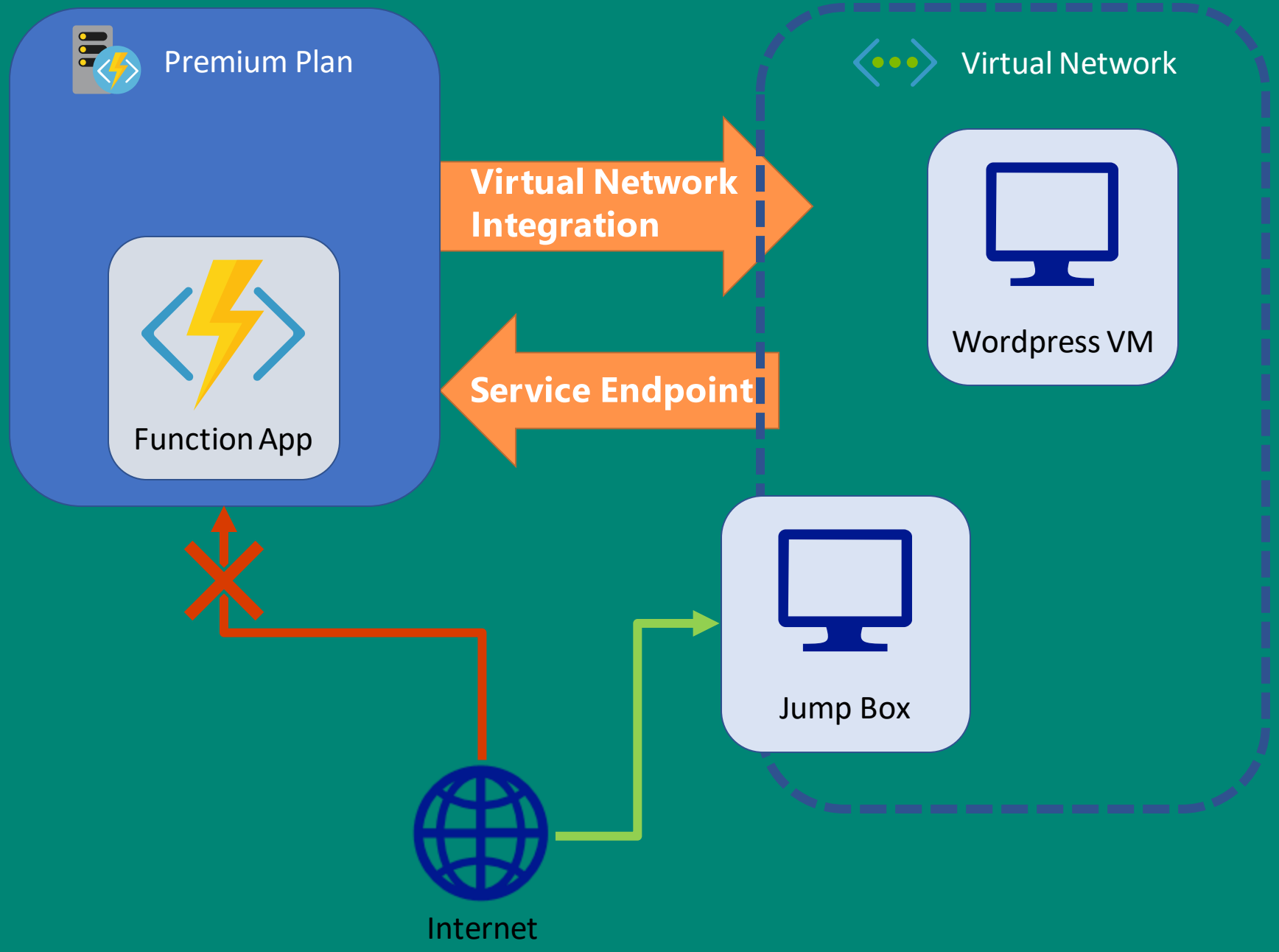


App Service Environment

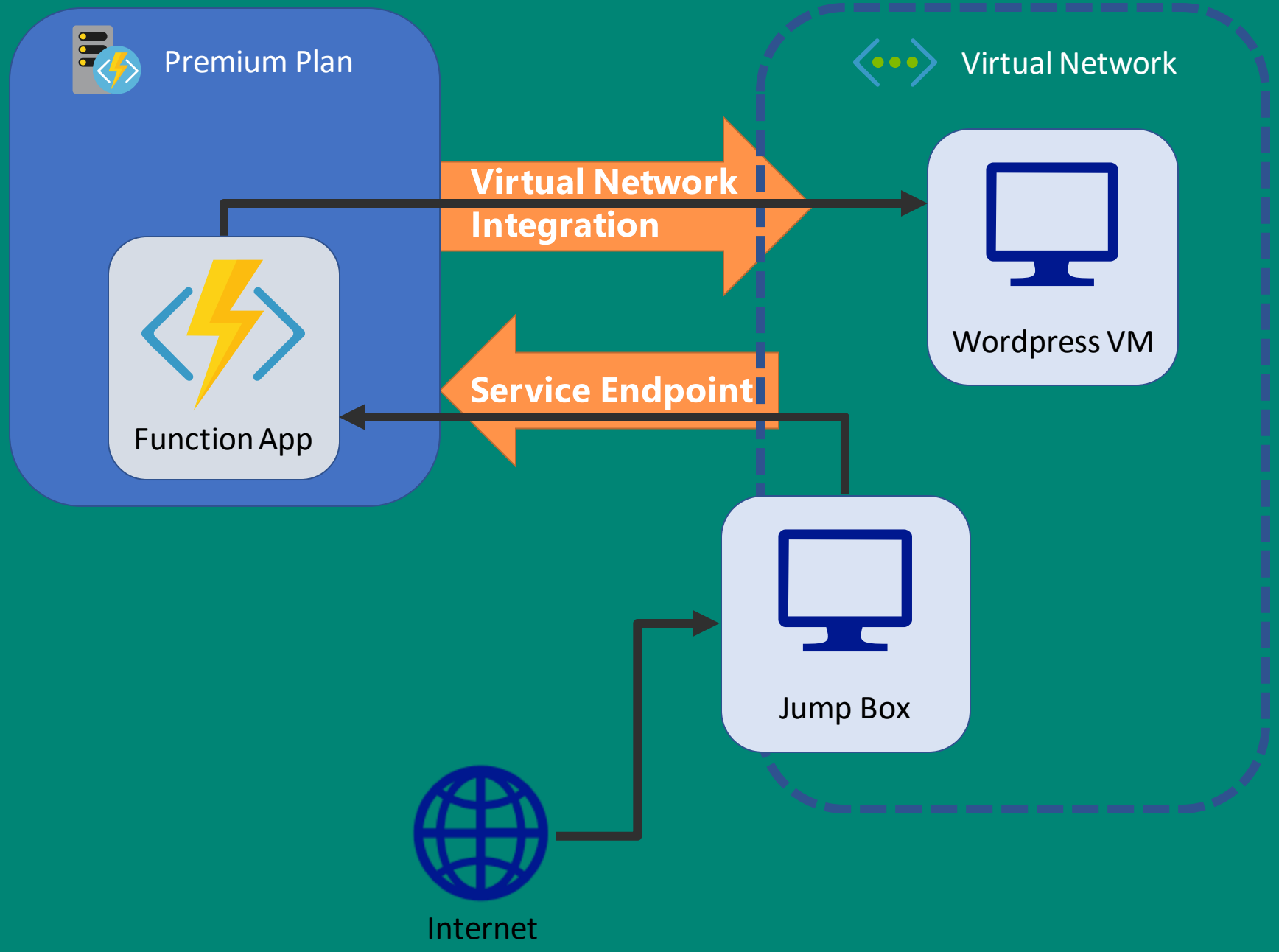
- **Leaving the multi-tenant world**
- Your entire app is contained within a VNET
- Organizational controls over ingress / egress
- Limited scaling speed



Virtual Network Demo



Virtual Network Demo

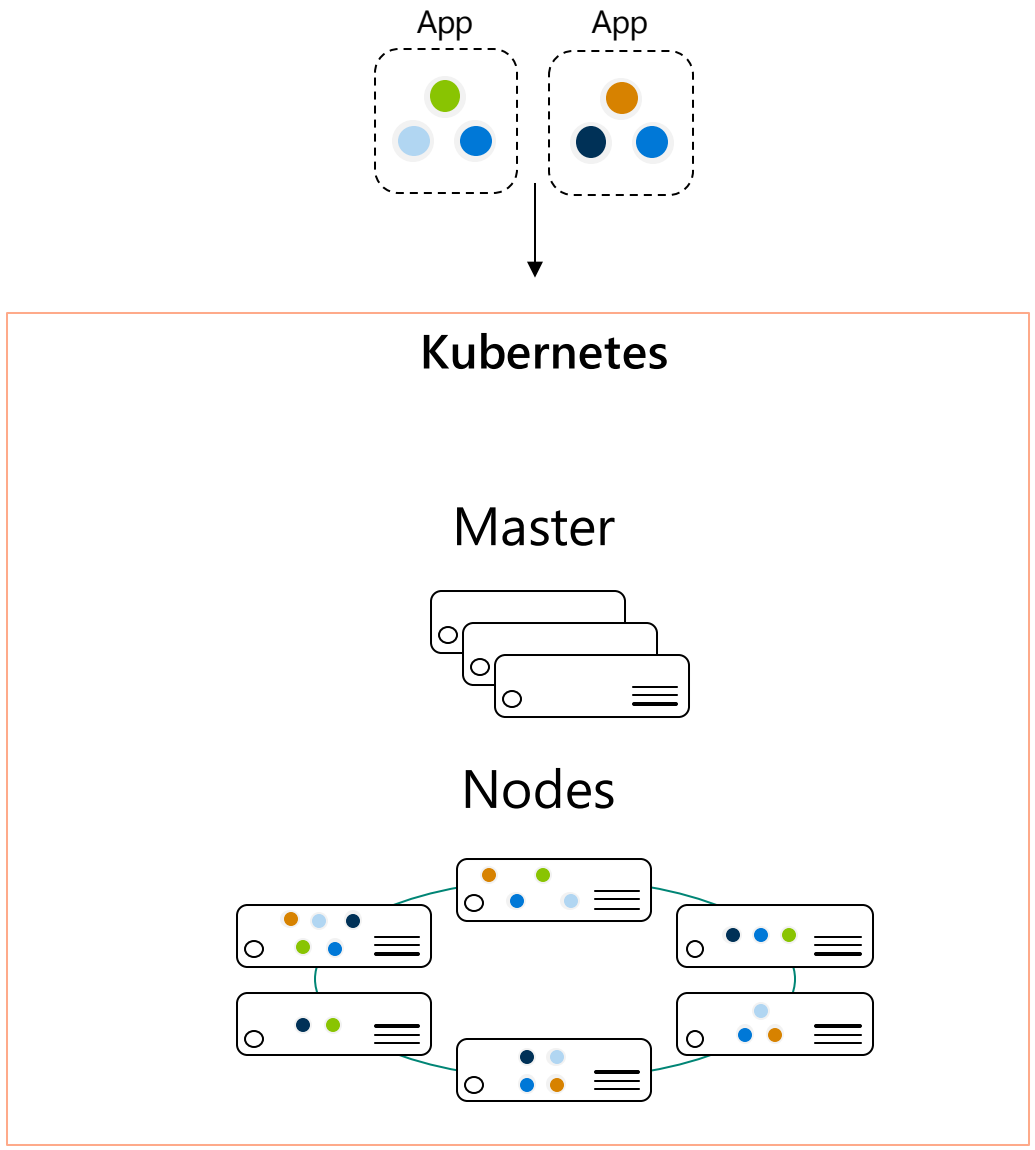


Hosting: Kubernetes

Kubernetes

Orchestrates containerized workloads and services.

Provides a clean interface for managing distributed systems across many nodes, including replication, scaling, and state management.



KEDA

Kubernetes-based event driven autoscaling

Open source component to provide function-like scale in Kubernetes

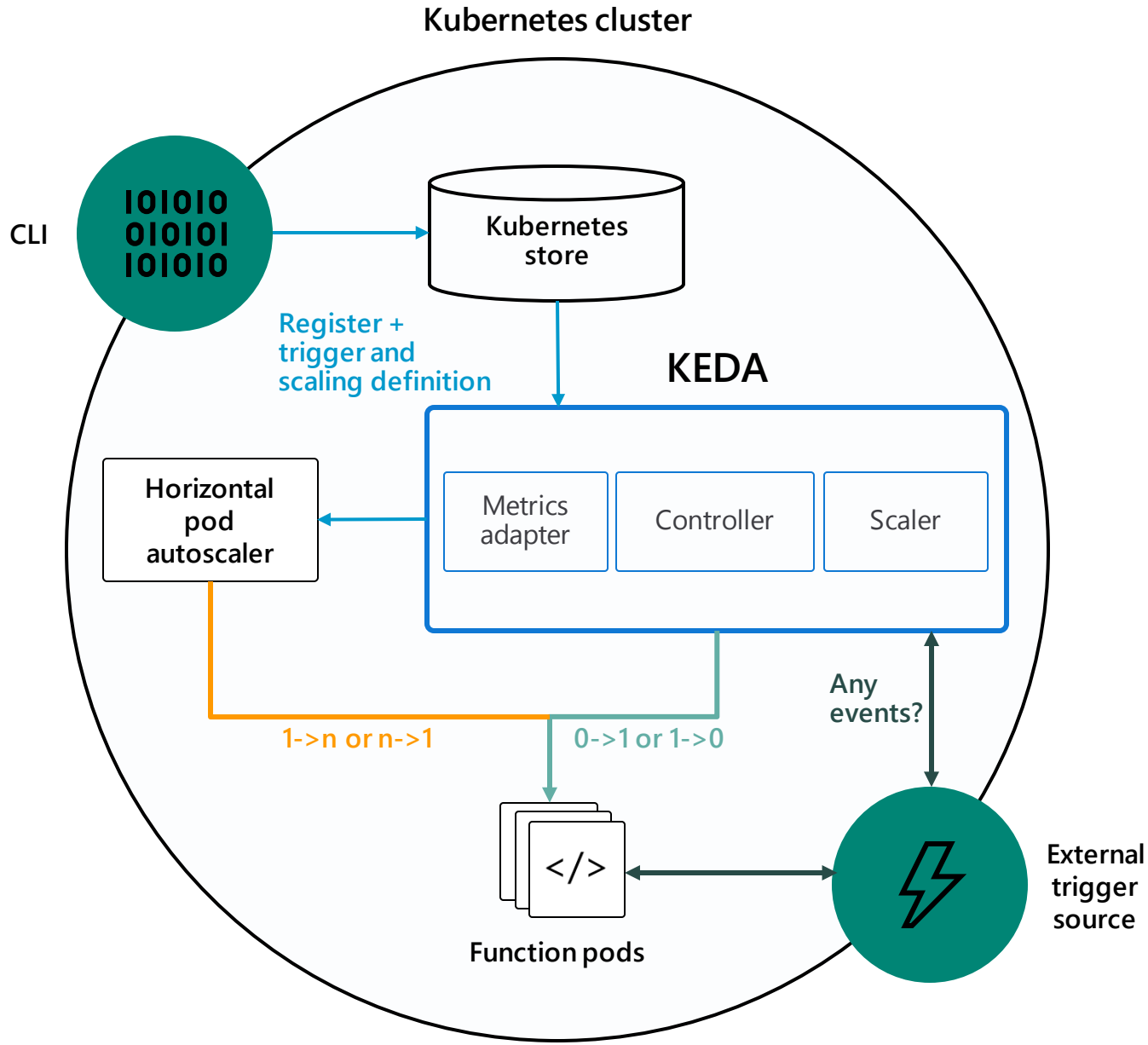
Azure Functions native tooling and trigger support

Scale to zero or scale to thousands

Same app, same tools, flexible hosting

https://github.com/kedacore/keda

How KEDA Works



KEDA Demo

When to consider KEDA

Run functions on-premises / Intelligent edge

Run functions alongside existing Kubernetes investments or requirements

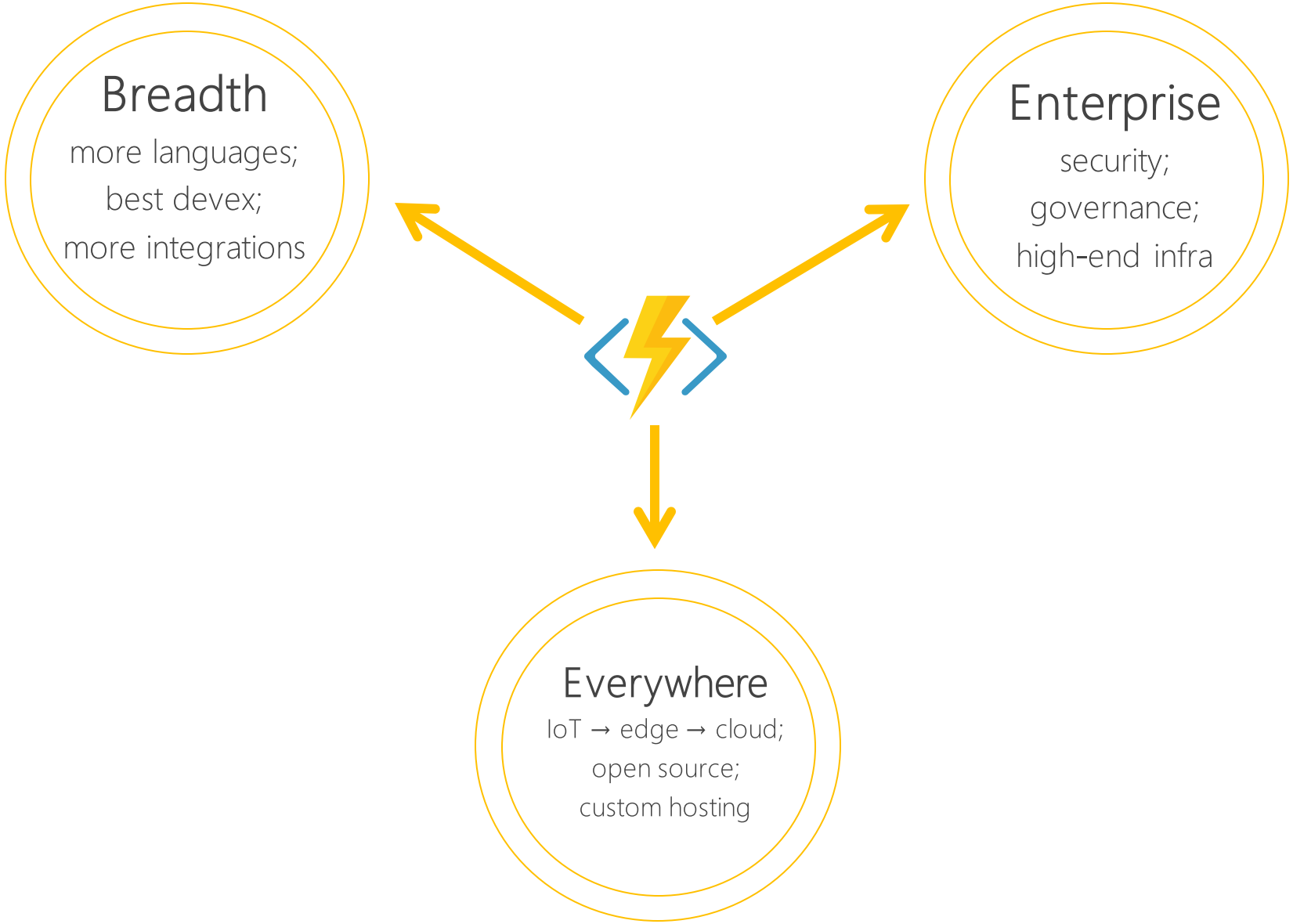
Run functions on a different platform or cloud

Run functions with full control and management of scale and compute

What's New with Azure Functions

- Event-driven programming model with Kubernetes - KEDA
- Premium Functions
- PowerShell Core as a supported language
- Dependency injection support for .NET
- Extension bundles
- Durable Functions stateful patterns
- Streamlined Azure DevOps experience
- New Serverless Community Library experience

Functions Strategy



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File issues: github.com/azure/azure-functions/issues

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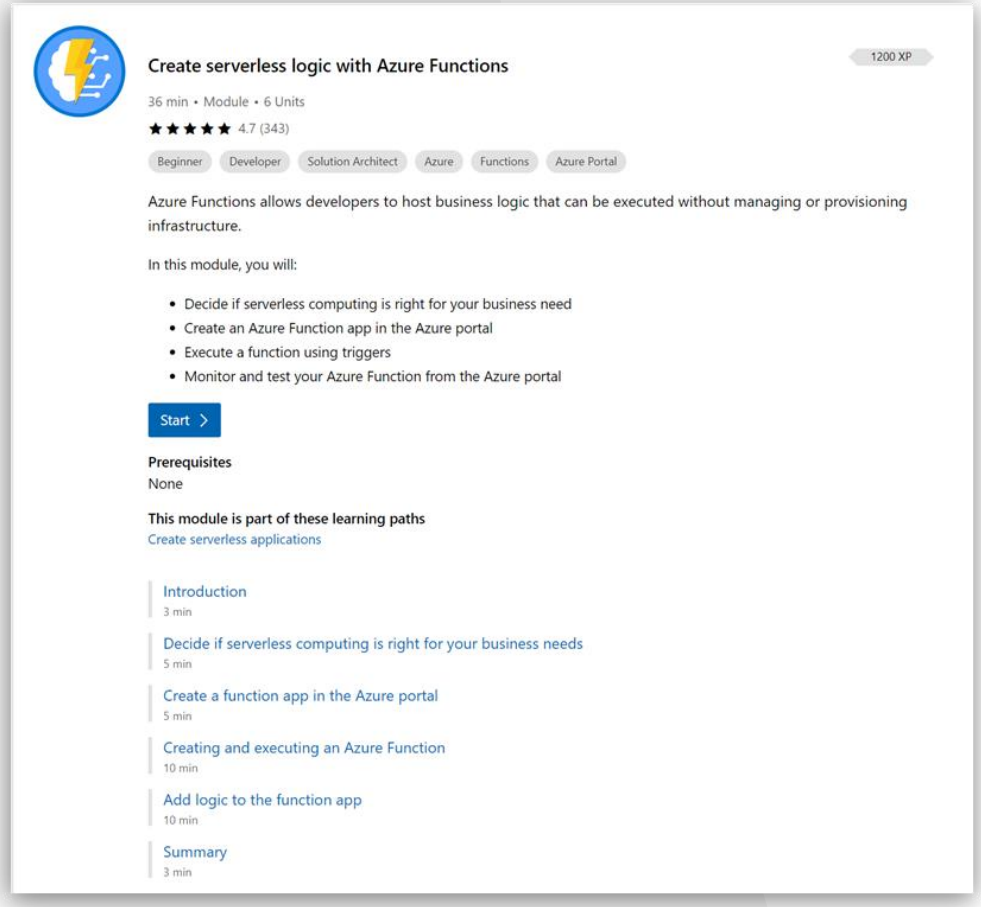
Learn: docs.microsoft.com/learn/modules/create-serverless-logic-with-azure-functions
Github main repo: github.com/Azure/Azure-Functions
Share your solutions: serverlesslibrary.net



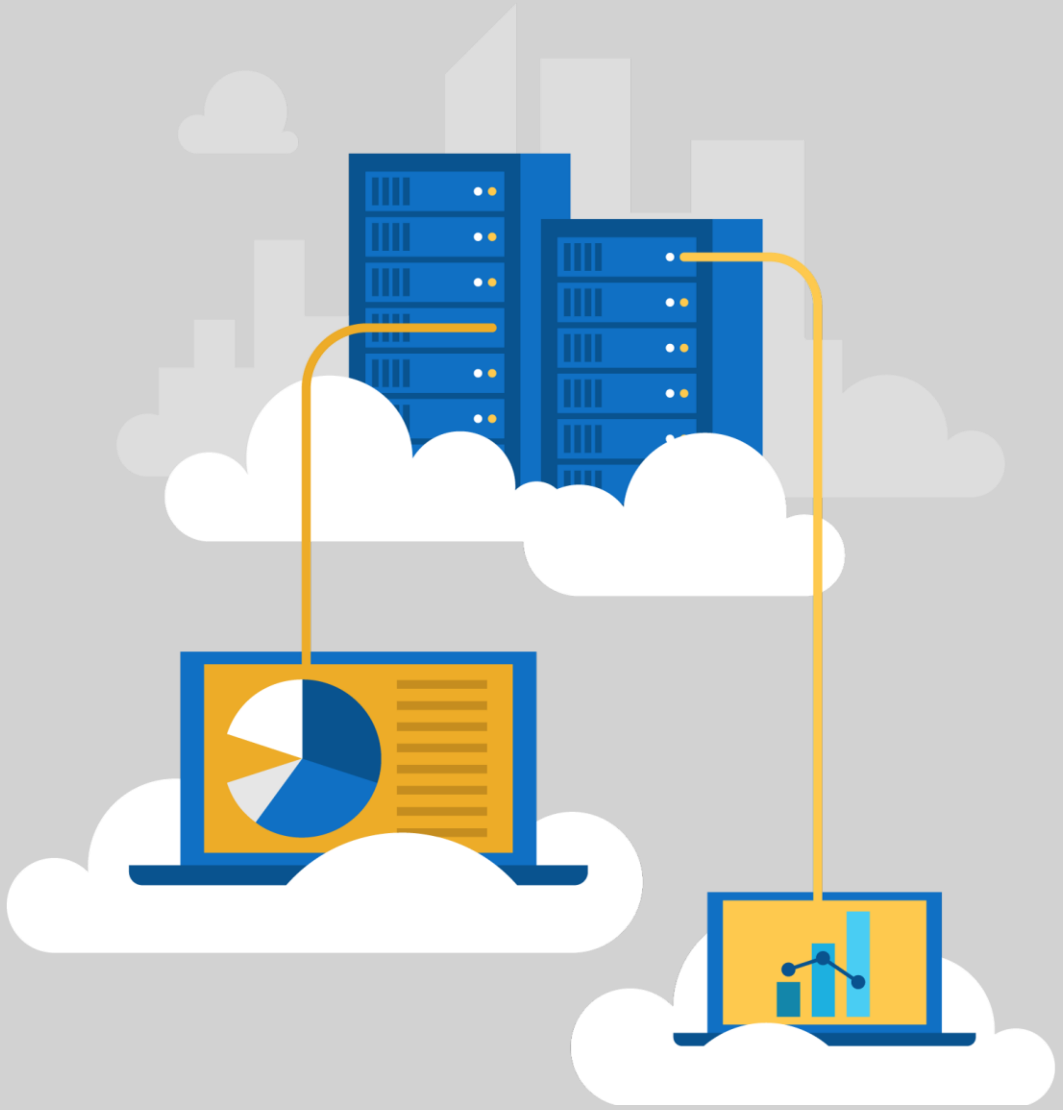
Learning Paths

- Create serverless logic with Azure Functions
- Execute an Azure Function with triggers
- Create a long-running serverless workflow with Durable Functions
- Develop, test, and deploy an Azure Function with Visual Studio

Microsoft

Be an Integration Hero with Logic Apps

Jon Fancey
Principal PM Manager



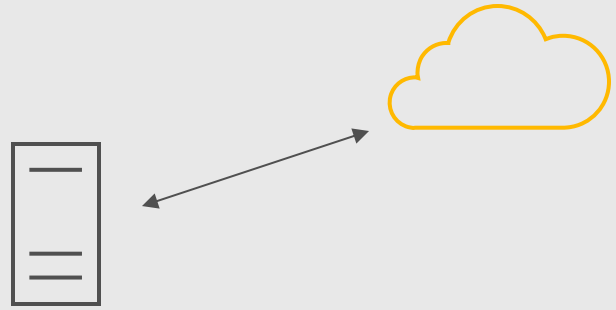
The Integration Hero

noun | ˈthē ˌin-tə-ˈgrā-shən ˈhir-(ˌ)ō

1. A person who is admired or idealized for outstanding achievement.
   - The chief character in IT, who is typically identified with good qualities, and with whom the CTO is expected to sympathize.
   - In IT, a person of superhuman qualities and often semidivine origin, in particular one of those whose exploits and dealings with the (ancient on-prem systems) were in the subject of myths and legends.
2. North American: another term for submarine sandwich

Microsoft

Application integration is the backbone of digital transformation

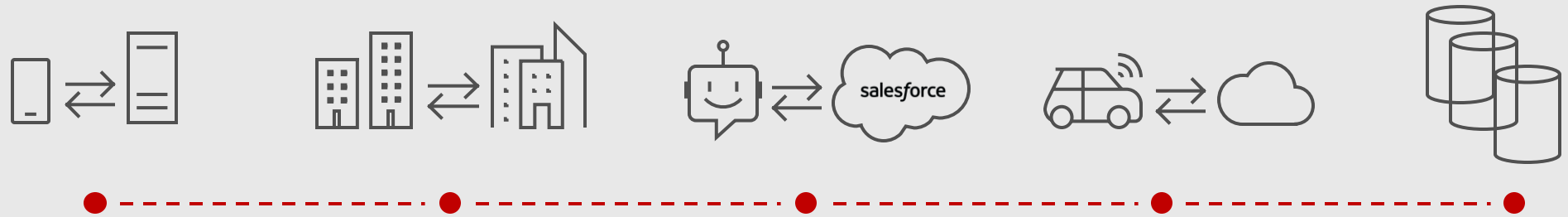


By 2022, **65%** of large enterprises will have implemented a **hybrid integration** platform

Source: Gartner's How to Implement a Truly Hybrid Integration Platform, published February 2018

Microsoft

Integration scenarios



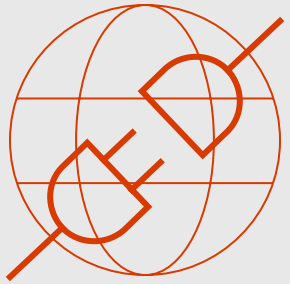
Application to Application	Business to Business	SaaS	IoT	Data & Analytics
EAI, RPA, Intelligent automation	EDI, X12, EDIFACT, AS2, RosettaNet, HL7, FHIR, EBIX	Consumer, Enterprise, niche/broad	Devices, things, edge	Databases, file systems, protocols, warehouses, ETL, MDM

Microsoft

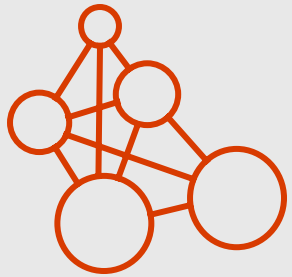
Integration challenges

Microsoft

Integration Platform as a Service

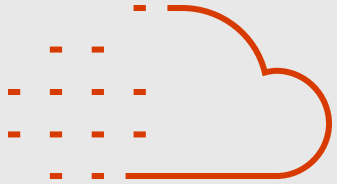


Embrace the
API
Economy



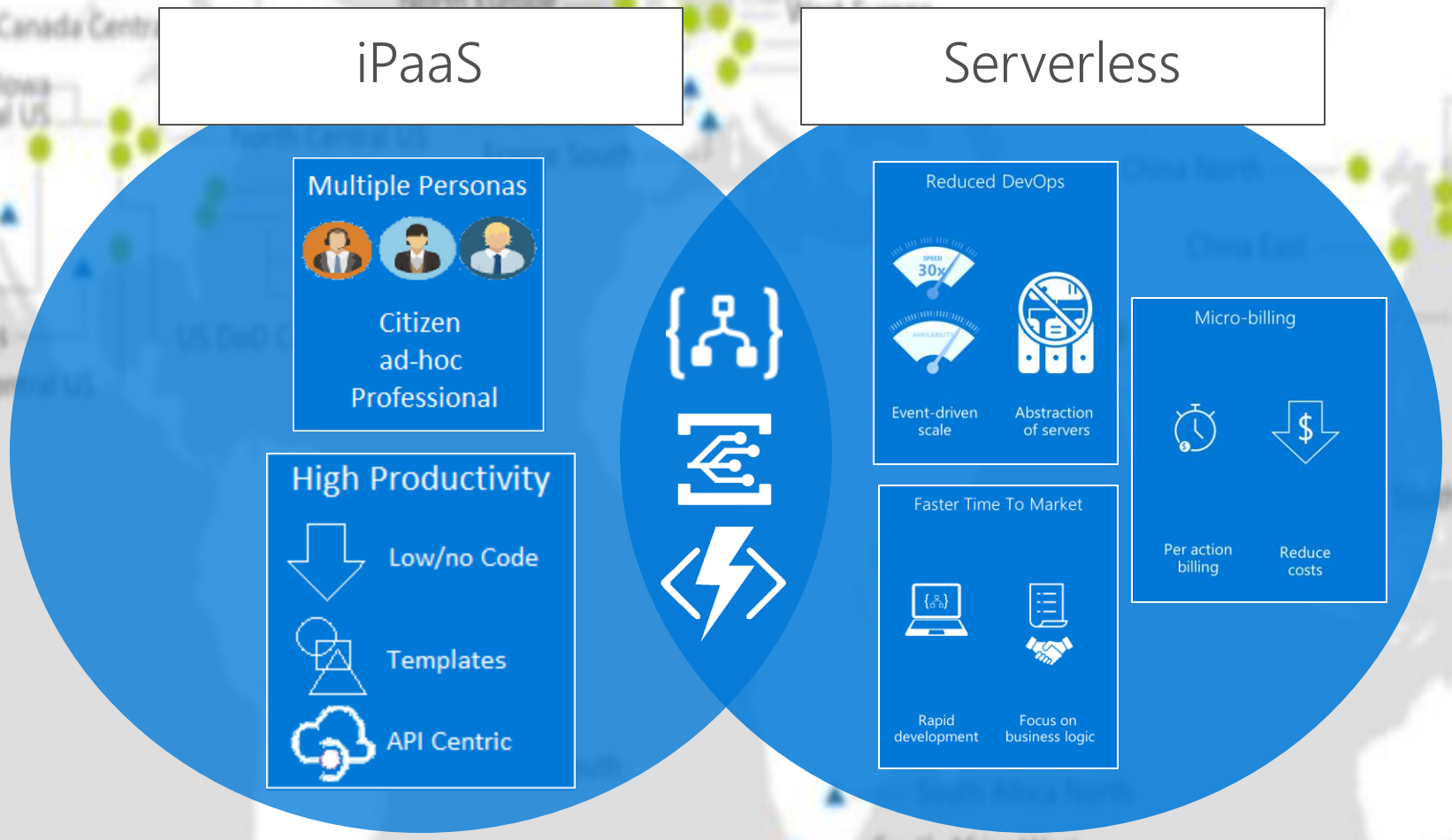
Establish a
Flexible
Platform

Connect
SaaS, On-Prem,
& Cloud



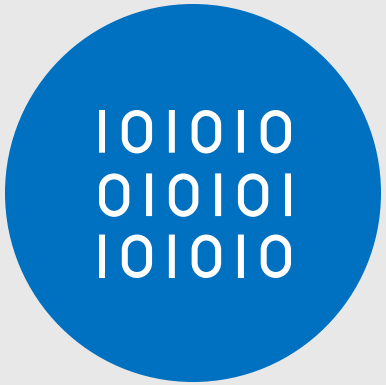
Enable
Digital
Transformation

Modern Integration Architecture

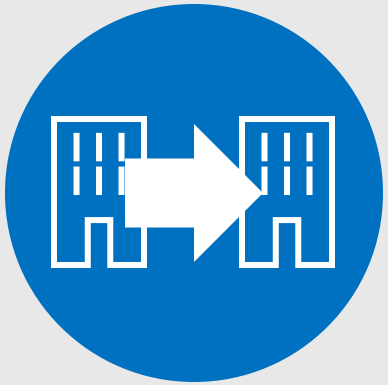


Platform Flexibility

Messaging



Data Wrangling



B2B & EDI

EAI (hybrid) & SaaS

Smart Integration

Azure Logic Apps
Powerful Capabilities

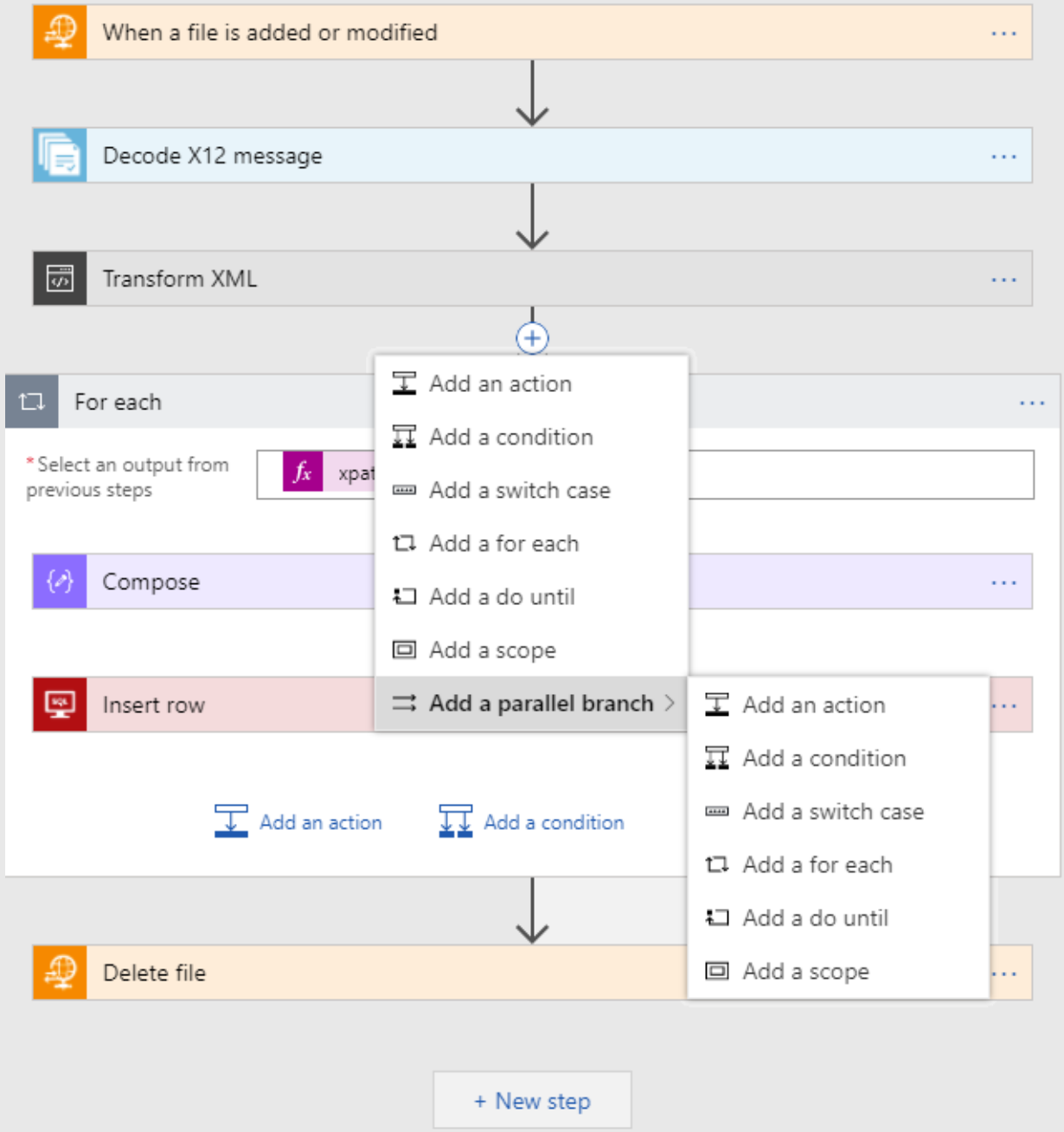
Fast integration using innovative Visual Designer

Easy workflow creation with triggers and actions

More than 200 connectors to mashup applications, data and services

Built for mission critical 24x7 Enterprise Integration

Devops built-in: Create, deploy, manage and monitor



Microsoft

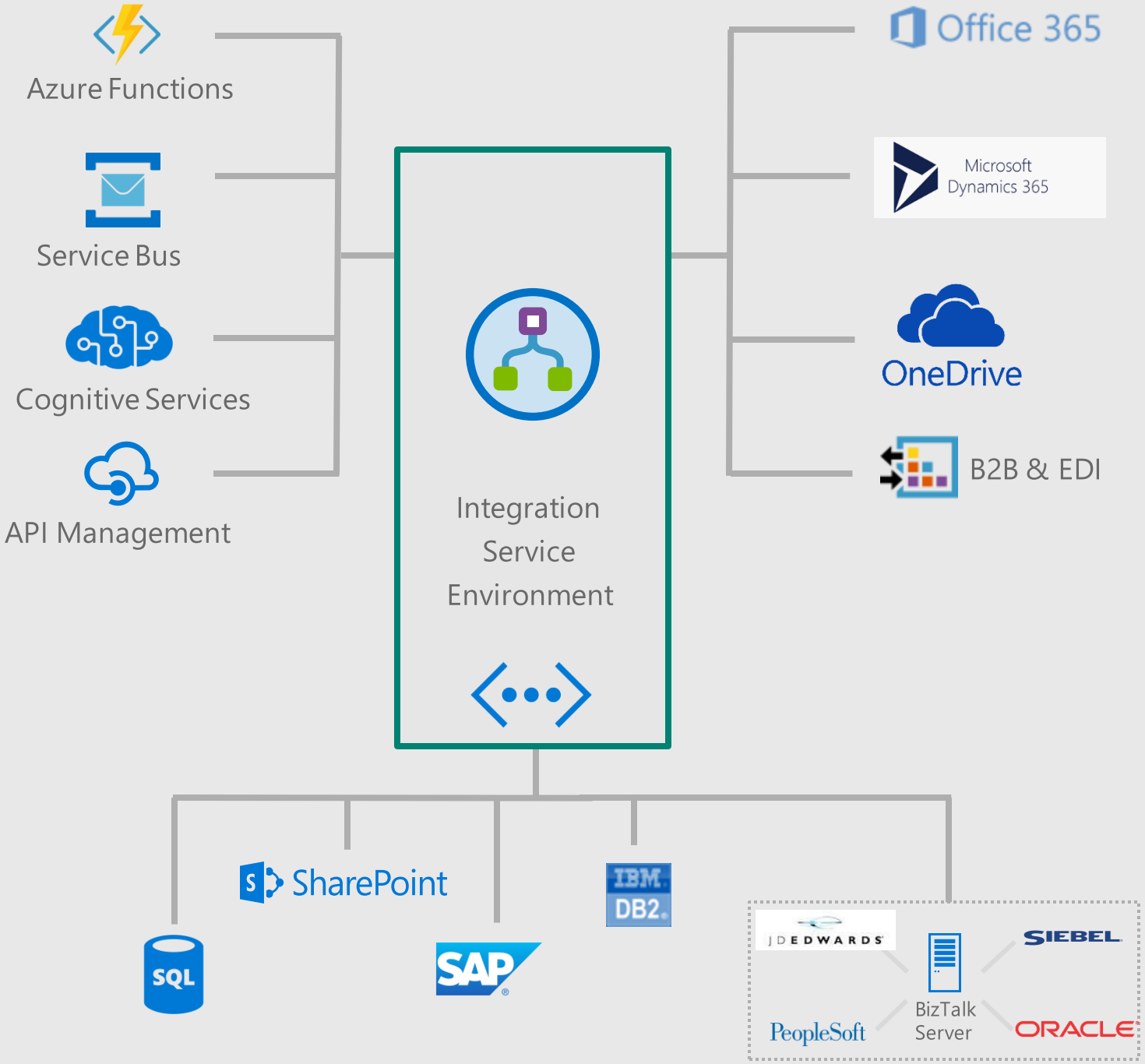
Easy, fast, complete

Connect on-premises data and apps with SaaS, PaaS & cloud

Run mission-critical, complex integration scenarios with ease

Build smart integrations with Azure and beyond with nearly 300 connectors

Connect with B2B business partners



Triggers

Create new instances of Logic Apps

- Recurrence/advanced scheduling
- Polling
- Webhook
- Request

Logic

Flow control

- Scope
- Condition
- Switch-case
- For each
- Do-until
- Variables

Actions

Workflow steps

- Call APIs
- Invoke code
- Batching operations
- Message handling
- Expressions & operators
- Map Data

Demo

Try-Catch-Finally

Try

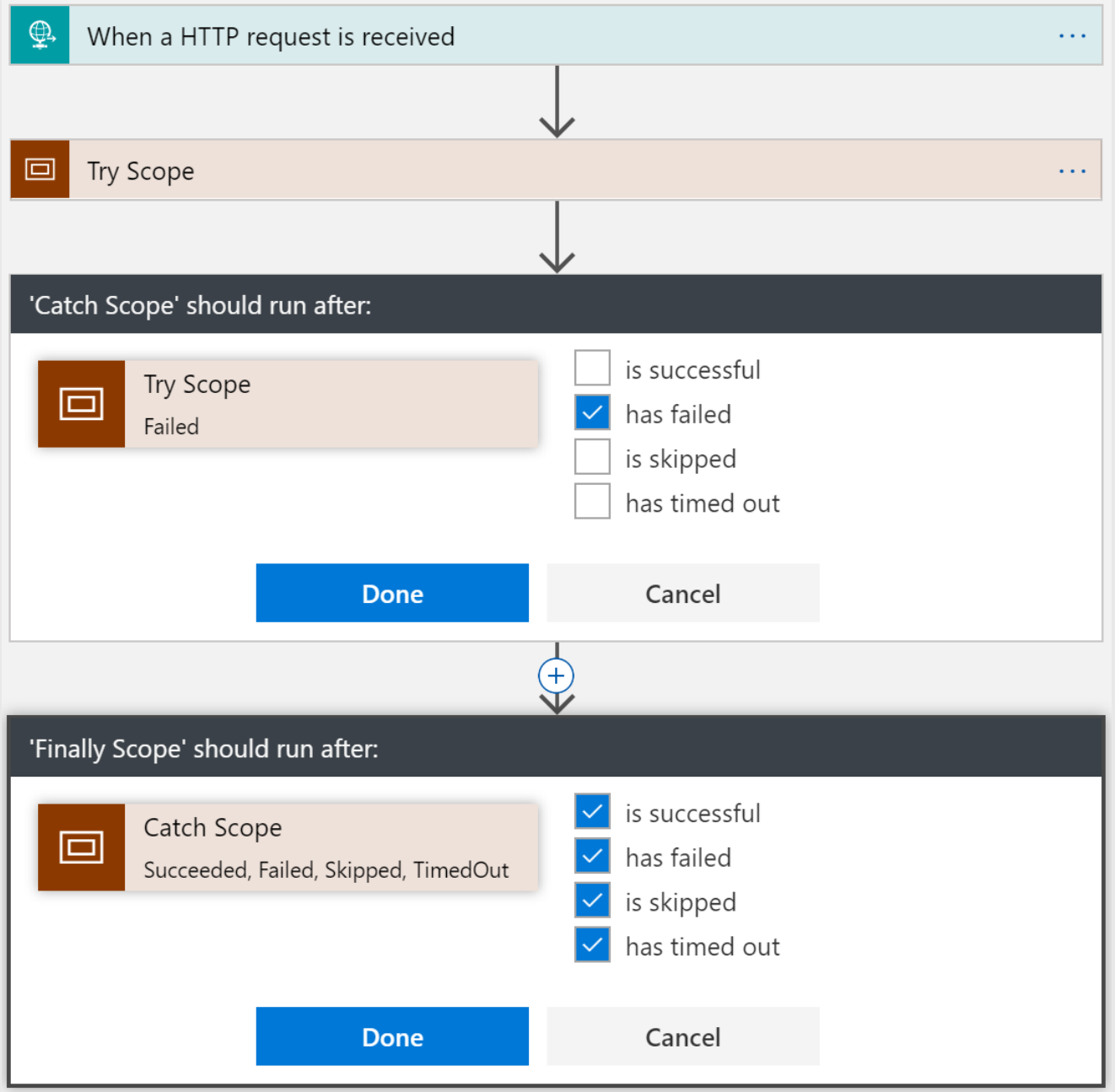
Put actions in a Try scope

Catch

Run after Try scope Failed

Finally

Run after Catch scope Succeeded, Skipped, TimedOut, or Failed



Azure Integration Services

iPaaS

Multiple personas

Approachable

Low/No-code Templates API-centric

Azure Integration Services

Serverless

Time to Market

Rapid development

Focus on business logic

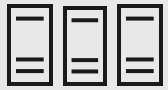
Micro billing

Reduce costs

Pay per action

Reduced DevOps

Event driven scale



Abstraction of servers

Patagonia

- Premium clothier, founded 1973
- Global organization
  - 1000s stocklists globally, 53 own-brand stores
  - Factories in 16 countries
- Driving Digital Transformation
  - Need for global scale in IT
  - Company focus on customer XP
  - Mission of sustainability and customer service
- AIS in action - Logic Apps, Service Bus, APIM
  - Order confirmation time reduced by 90%

Case study: https://enterprise.microsoft.com/en-us/blog/microsoft-in-business/?post_type=articles&product=azure-logic-apps

Microsoft

Recognized As 2018 Leaders by Gartner

Figure 1. Magic Quadrant for Enterprise Integration Platform as a Service

Source: Gartner (April 2018)

Gartner Magic Quadrant for Enterprise Integration Platform as a Service

Keith Guttridge, Massimo Pezzini, Eric Thoo, Bindi Bhullar, Betty J. Zakheim
April 208

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Microsoft

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Gartner Magic Quadrant for Enterprise Integration Platform as a Service

Keith Guttridge, Massimo Pezzini, Eric Thoo, Bindi Bhullar
April 2019

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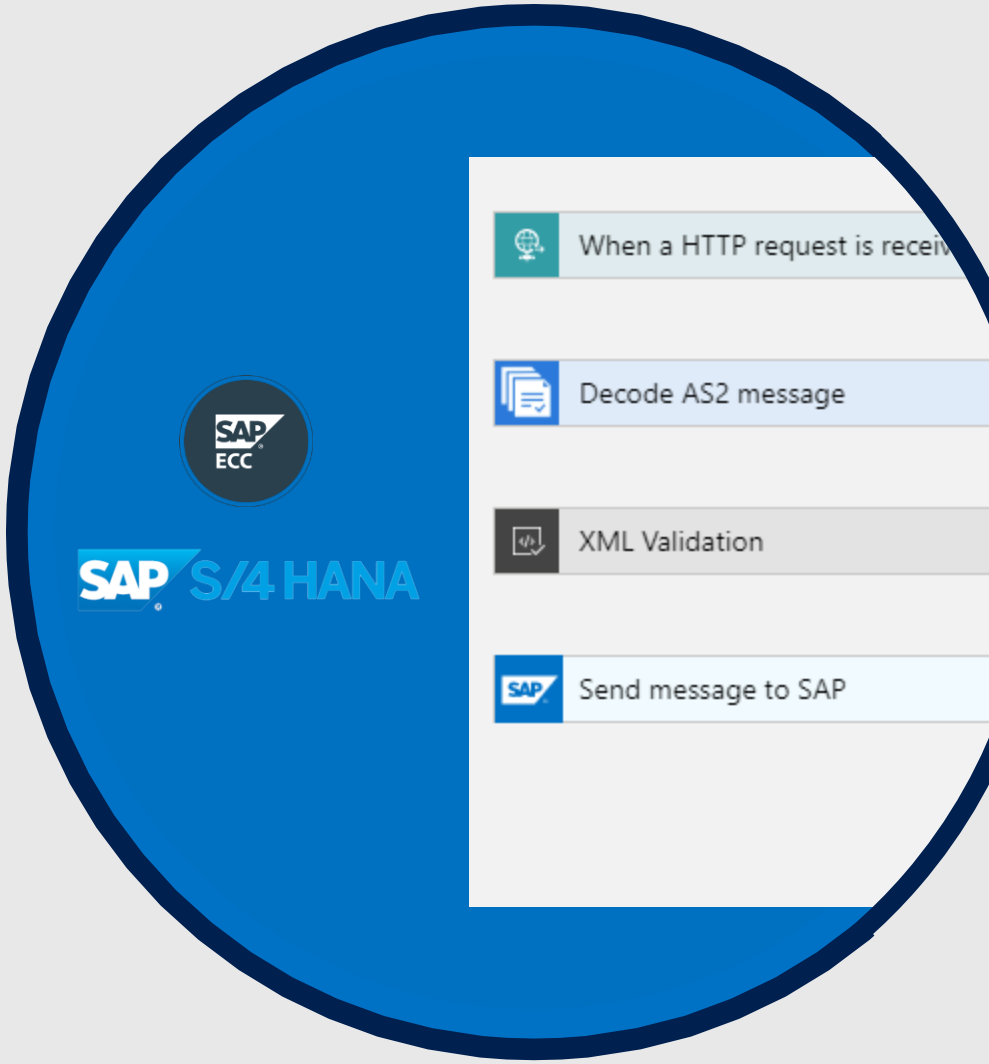
Now **Generally Available**
SAP ECC + S/4 HANA connector

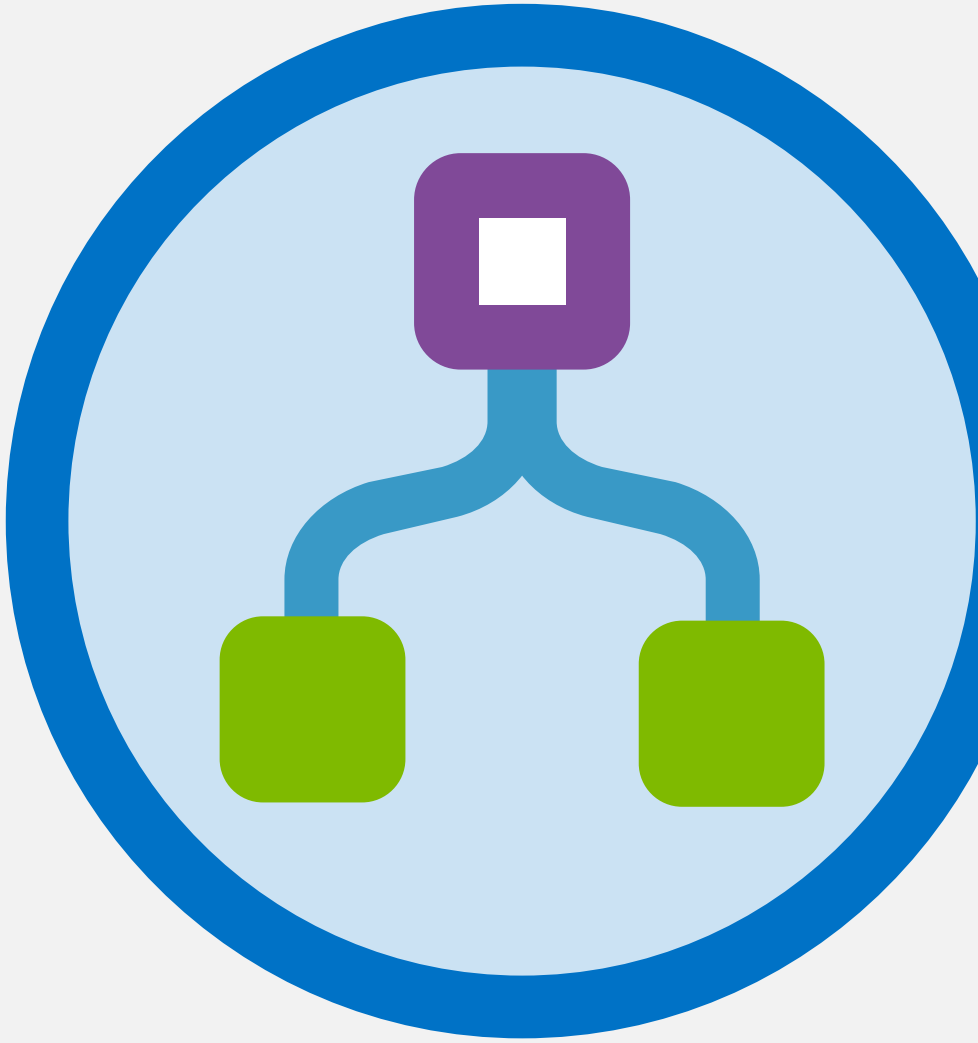
- What are the benefits?
  - Mitigate risk and reduce time-to-success from months to days when implementing new SAP integrations.
  - Make your migration to the cloud smoother by moving at your own speed.
  - Connect best-in-class cloud services to your SAP instance, no matter where SAP is hosted.
- Technical capabilities
  - Easy bi-directional SAP integration with Azure
  - Send and receive data to/from SAP ECC and S/4 HANA systems
  - IDOC, RFC and BAPI support
- Interested in learning more?
  - http://aka.ms/saplogicapps to get started



Now **Generally Available**

Integration Service Environments

- VNET connectivity
- Private static outbound IPs
- Dedicated compute
- Isolated storage
- Flat cost
- Higher Limits
- Faster provisioning
- Better monitoring



What's New

- ✓Integration Service Environment GA
- ✓SAP Connector GA
- ✓Inline Code with JavaScript public preview
- ✓Azure Gov Cloud Virginia
- ✓Managed Identities limit increased
- ✓Sliding window trigger
- ✓Visual Studio 2019 logic apps extension
- ✓Blockchain templates

<u>New Connectors</u>

- ✓Azure Key Vault
- ✓AS2 v2
- ✓Updated Ethereum connector
- ✓Data8 Data Enrichment
- ✓EasyVista Service Manager
- ✓Casper365 for Education
- ✓CommercientCPQ
- ✓Cloud PKI Management

- ✓Connector General Availability

In-Progress

- ISE:
  - Connector manager
  - Internal load balancer
- Inline Code for PowerShell and C#
- Input/Output Secrets hiding
- User-assigned managed identities
- Gateways across subscriptions
- RosettaNet
- VSCode – Logic Apps Project
- SAP connector features
- Visual Studio 2019 cloud explorer
- New public regions
  - France, Korea, South Africa, UAE

Connectors

- IBM CICS, Host File
- SQL Azure AD
- SAP new features
- ISE: SAP
- ISE: File System
- Amazon SQS
- Amazon S3
- SignNow
- RealPad

Microsoft

AIS Whitepaper…

https://aka.ms/integrationpaper

Microsoft

Call to Action

Microsoft Integration Platform as a Service http://aka.ms/ipaas

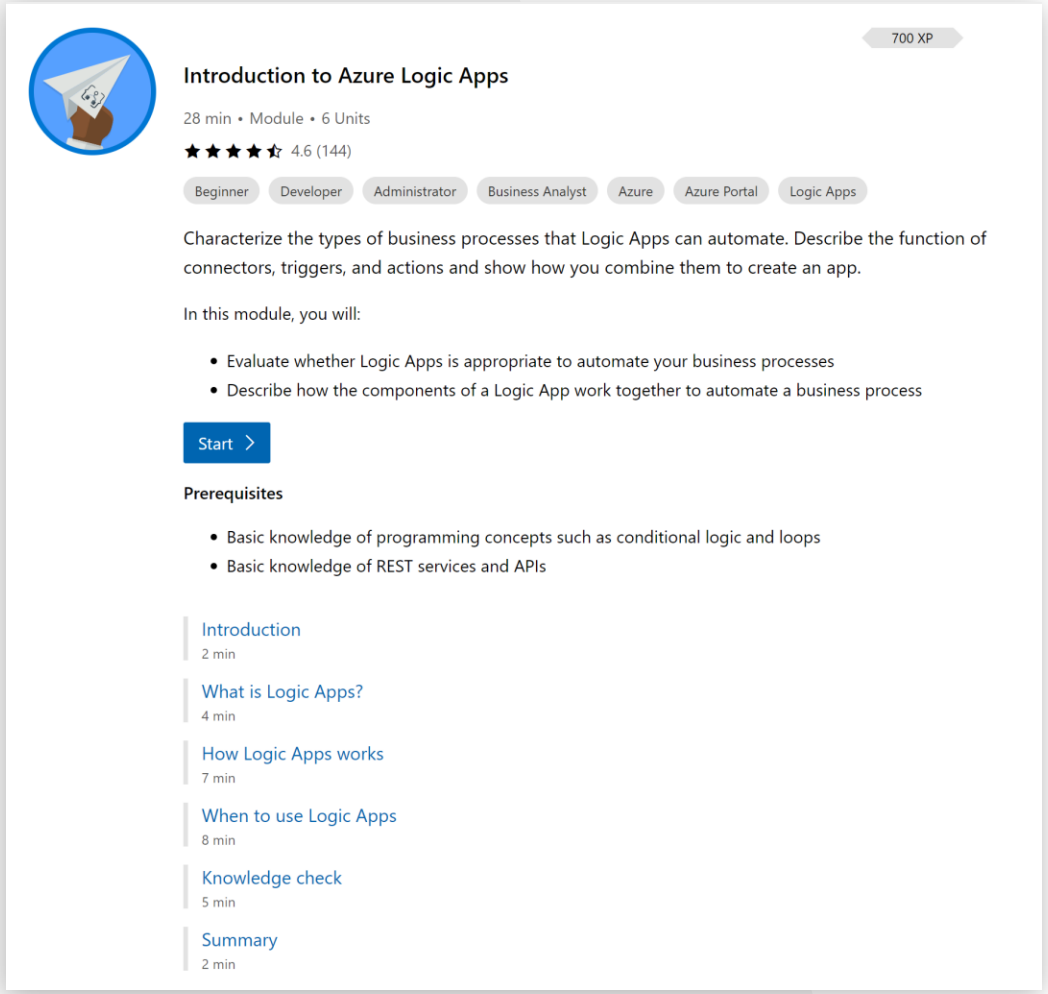
Gartner's Magic Quadrant for Enterprise Integration Platform as a Service http://aka.ms/eipaasmq

Azure Essentials – Integrating your Apps with Azure http://aka.ms/integrationessentials

White paper Introducing Azure Integration Services https://aka.ms/integrationpaper

Try it out – http://aka.ms/azureintegrationservices

Q&A



Learning Paths

- Introduction to Azure Logic Apps
- Call an API from a Logic Apps workflow using a custom connector
- Create and deploy Logic Apps using Azure Resource Manager templates

Containers on Azure Overview

Deep Kapur
Program Manager
Azure Container Compute
@deepkkapur; deep.kapur@microsoft.com

Microservices: a modern approach for agile and focused teams

Business benefits

Faster feature releases to meet customer demands

Greater visibility into cost and resource allocations

Improved partner collaboration

Easier to attract and retain top-notch developers

Cutting-edge technologies keep developer skills fresh

Developer benefits

Greater agility through smaller teams

Flexibility to use preferred technology

Improved app resiliency and scalability

Easier to perform schema updates more frequently

Simplified integration with third-party APIs

Modernization “path” (the 5 Rs)

On-premises

Application

Data

Infrastructure

Migration	**Modernization**		**Cloud-Native**	**SaaS**
Rehost	Refactor	Rearchitect	Rebuild/New	Replace

Virtual Machines

Containers & Executables

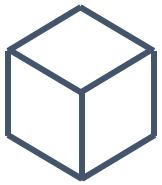
Microservices

App, Data, & AI Services

DevOps

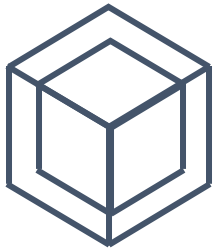
Modernization with containers

Existing application



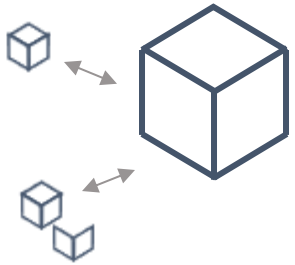
Modernization

Refactor

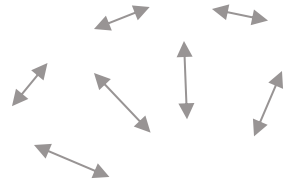


Existing app hosted as container or executable

Rearchitect

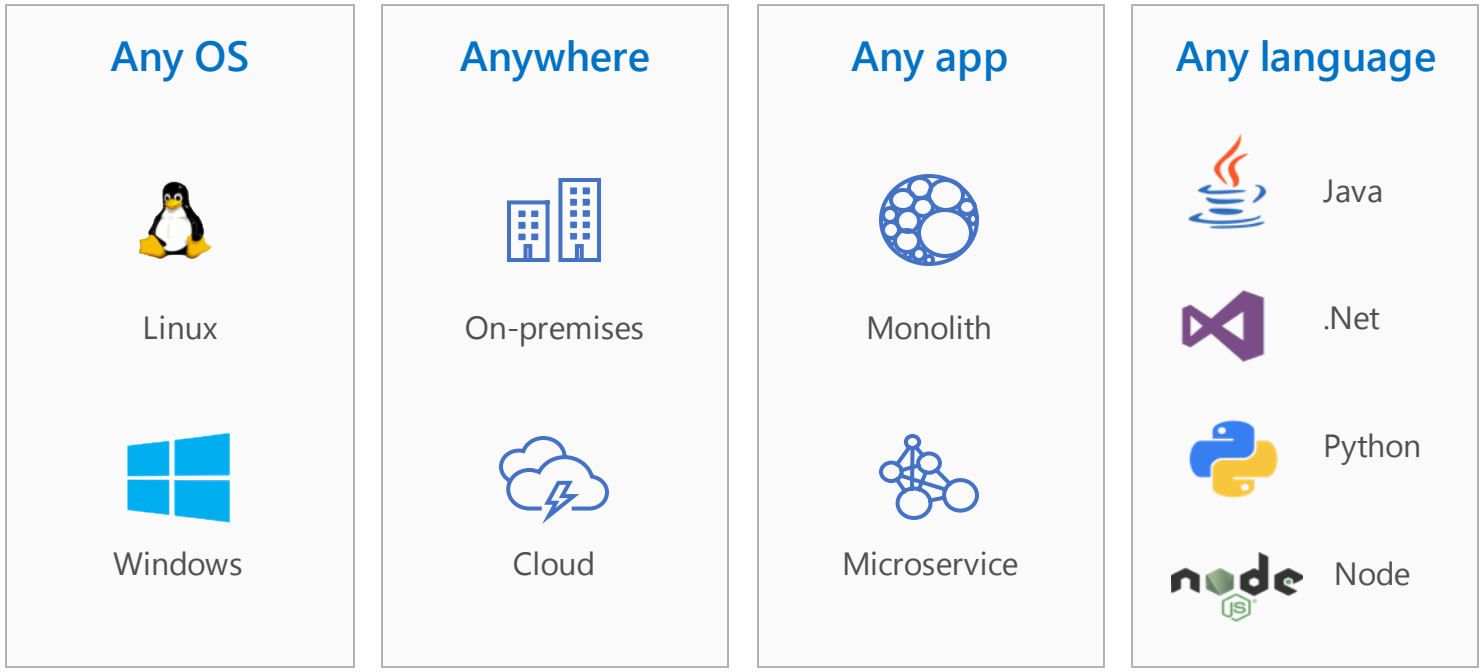


Existing application + new microservices



Parts of existing application rearchitected

Benefits of using containers



Benefits of using containers

Agility

Ship apps faster

Portability

Easily move workloads

Density

Achieve resource efficiency

Rapid scale

Scale easily to meet demand

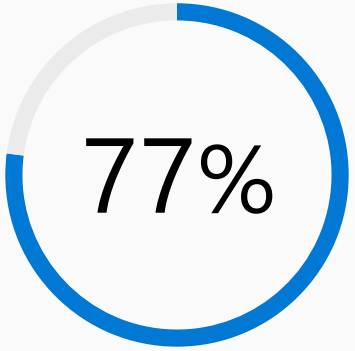
Container momentum

"By 2020, more than **50%** of enterprises will run **mission-critical, containerized cloud-native applications** in production."

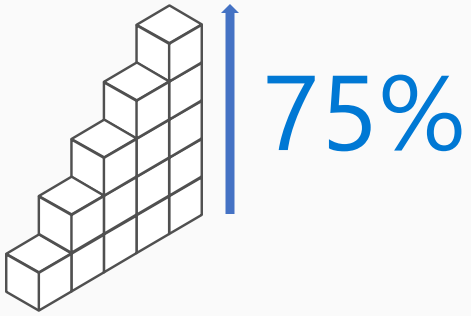
Gartner

Half of container environment is orchestrated.[1]

77% of companies[2] who use container orchestrators choose Kubernetes.

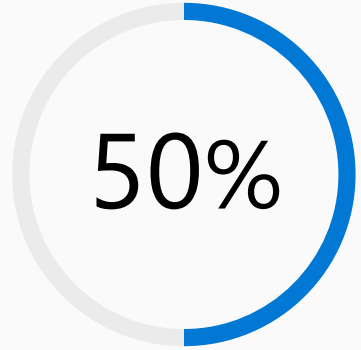


The average size of a container deployment has grown 75% in one year. [1]



Larger companies are leading the adoption.[1]

Nearly **50%** of organizations[1] running 1000 or more hosts have adopted containers.



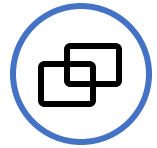
[1] Datadog report: 8 Surprising Facts About Real Docker Adoption
[2] CNCF survey: cloud-native-technologies-scaling-production-applications

Using containers (orchestration?)

Scheduling

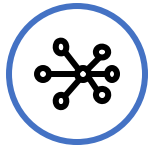
Affinity/anti-affinity

Health monitoring



Failover

Scaling

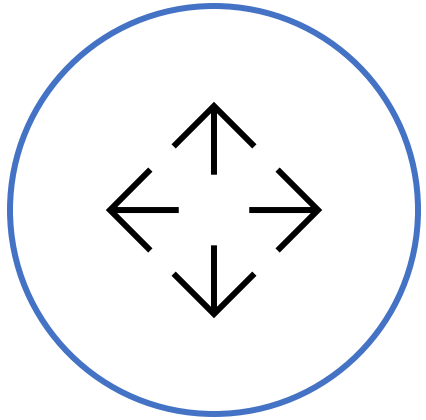


Networking

Service discovery

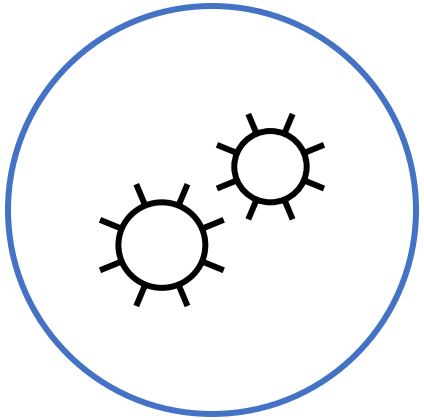
Coordinated app upgrades

Containers on Azure



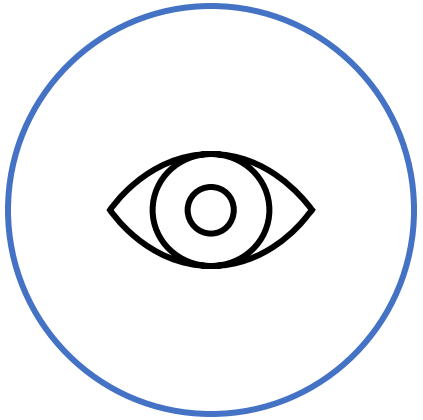
Flexibility

Deploy containerized applications in your preferred environment



Productivity

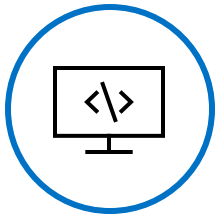
Accelerate containerized application development



Trust

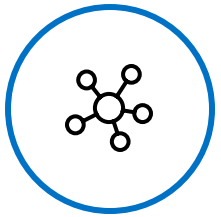
Manage, monitor, and help secure your containers

Azure accelerates containerized app development

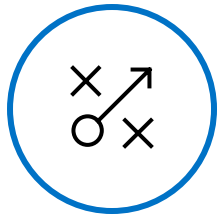


Automatically containerize and scaffold any applications directly from IDE

Auto-build to a secure container registry



Rapidly iterate, test and debug microservices



A few clicks to receive a full CI/CD pipeline

Built-in monitoring and logging to get full visibility of container health and app telemetry

Containers in Azure

App Service

Deploy web apps or APIs using containers in a PaaS environment

Container Instance

Serveless Containers on Demand (CaaS)

Kubernetes Service

Scale and orchestrate Linux containers using Kubernetes

Service Fabric

Modernize .NET applications to microservices using Windows Server containers

Ecosystem

Bring your Partner solutions that run great on Azure

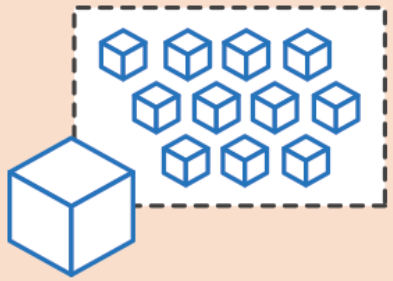
Azure Container Registry

Docker Hub

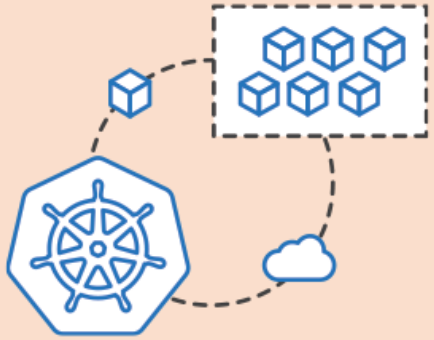
Choice of developer tools and clients

Azure Container Instances (ACI)

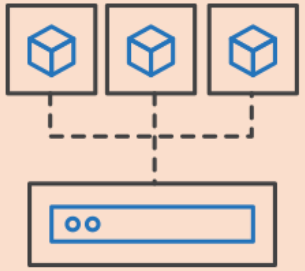
Serverless containers on demand



Run containers without managing servers



Increase agility with containers on demand



Secure applications with hypervisor isolation

Core scenarios

- Learning to use containers!
- Stateless workers for
  - Test agents and simulation
  - Build agents and devops
  - ML / data ingestion pipelines
- Scalable “back-end” for cloud native solutions
  - Use ACI with a brain elsewhere (Fn, AKS, SF, another ACI)
- Virtual nodes

Rapidly growing software company attracts customers with seamless cloud demo experience

Challenge: Jedox needed a more lightweight compute unit than virtual machines to power its website demos and provide a good customer experience.

Solution: The company used Microsoft Azure Container Instances to support the Jedox Marketplace and power its demos.

Outcome: With ACI, Jedox is able to spin up customer demos on demand, improve provisioning speed, build confidence in the cloud, and lower IT costs.

> We are far more responsive to customer needs since adding Azure Container Instances. Our Marketplace demos are powerful marketing tools for Jedox, and we've used Azure to improve the customer experience significantly.
>
> Vladislav Malicevic , Vice President Development and Support, Jedox

PUBLIC PREVIEW

Support for latest Windows Server base images

Deploy much more performant container with Windows Server 2019 or 1809

GENERALLY AVAILABLE

More availability

Lots of capacity added to existing regions,
new regions introduced,
new combinations of CPU/mem introduced

Roadmap

- Stabilize and provide GA support for various integrations
- Deploy to a custom VNet (GA Linux, preview Windows)
- Supporting ML/Data ingestion workloads with GPUs
- More availability and better performance

Demo:
Event-driven ACI

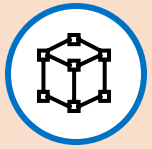
Azure Kubernetes Service (AKS)

Simplified deployment, management, and operations for k8s

Deploy and manage Kubernetes with ease

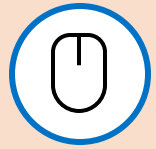
Scale and run applications with confidence

Secure your Kubernetes environment



Accelerate containerized application development

Work how you want with open-source tools & APIs



Set up CI/CD in a few clicks

Core scenarios

- Kubernetes! (Managed)
- Linux based container applications
- When you actually need an orchestrator…
  - Scaling (including autoscaling)
  - Managing app lifecycle
  - Managing infra
  - Communication scenarios like service discovery, DNS resolution, etc.

SIEMENS

Siemens Health leverages technology to connect medical devices to the cloud through AKS

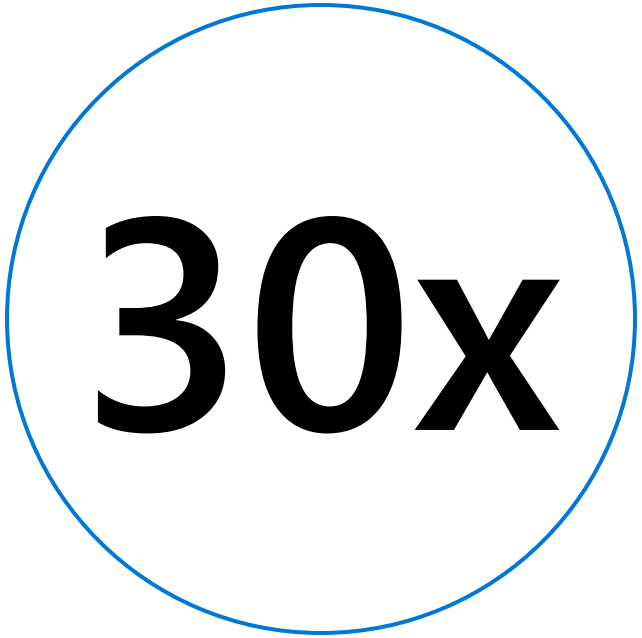
Challenge: Siemens needed to speed up their development process to make the transition from value-added services provider to platform provider.

Solution: Siemens adopted Azure Kubernetes Service (AKS) to speed up application development and run their microservices-based apps.

Outcome: With AKS, Siemens has driven newfound product development agility. AKS enables them to use an applicant gateway and API management to manage exposure, control, and to meter the access continuously.

> The managed Azure Kubernetes Service puts us really into a position to not only deploy our business logic in Docker containers, including the orchestration, but it's also really easy through application gateway and API management to manage that exposure and control and meter the access continuously.
>
> Thomas Gossler, Lead Architect - Digital Ecosystem Platform, Siemens

Azure Kubernetes momentum



Azure Kubernetes Service
usage grew 30x since it was made
generally available in June 2018

Trusted by thousands of customers

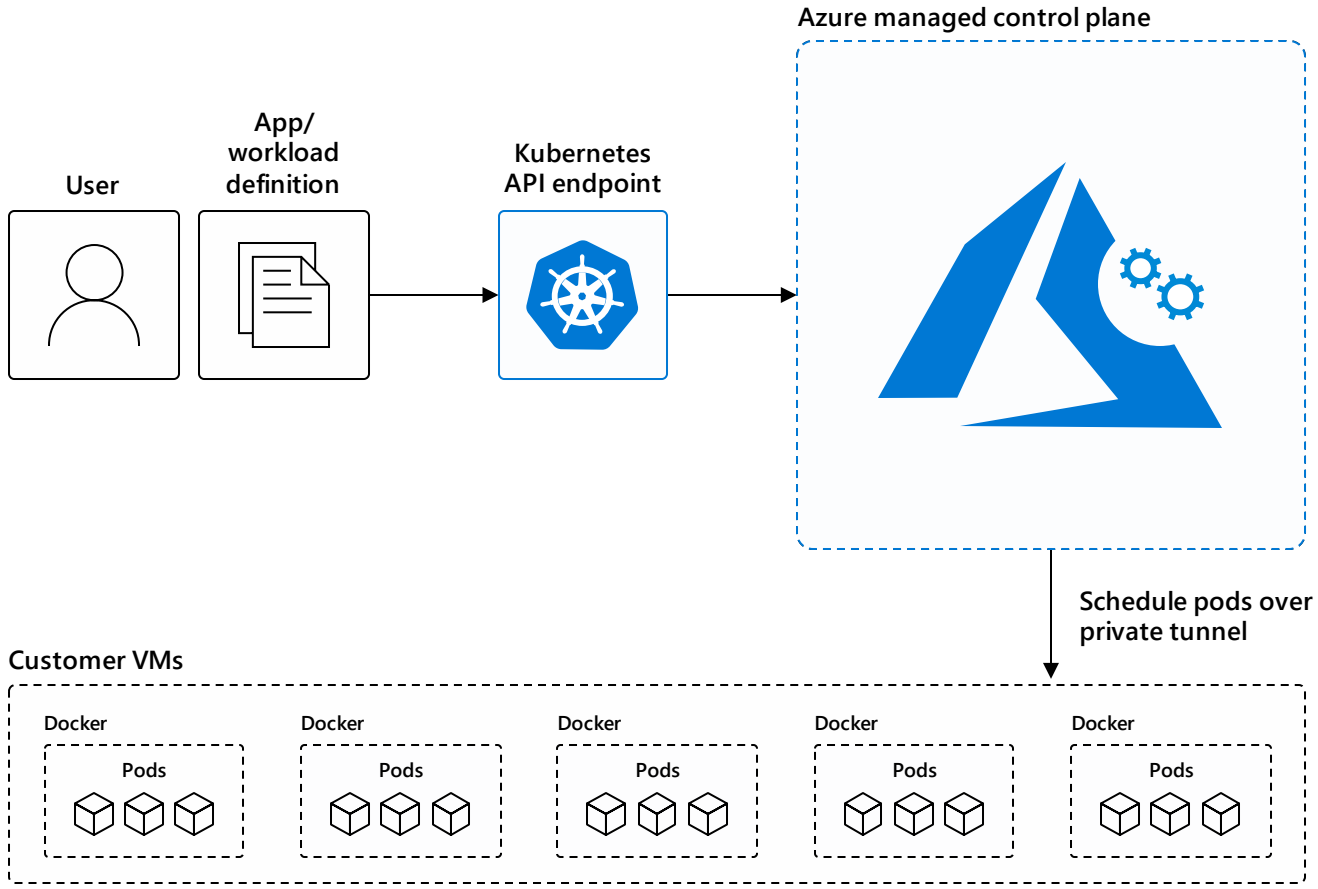
J.B. HUNT
Hafslund
MAERSK
AMBITENERGY
webjet.com.au
WhiteSource
falkonry
Aporeto
Altair
SOTETSU
xerox
SIEMENS Healthineers
varian
NAMOGOO
きりんカルテシステム株式会社
Tryg
BOSCH
ELASTACLOUD
Munich RE
welt hunger hilfe
FINASTRA
equinor
nyris

Dated November 2018

Manage Kubernetes with ease

Infrastructure automation

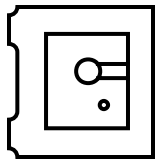
- Automated provisioning, upgrades, patches
- High reliability, availability
- Easy, secure cluster scaling
- Self-healing
- API server monitoring
- At no charge



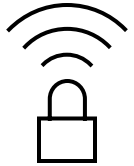
Manage Kubernetes with ease

Responsibilities	DIY with Kubernetes	Managed Kubernetes on Azure
Containerization		
Application iteration, debugging		
CI/CD		
Cluster hosting		
Cluster upgrade		
Patching		
Scaling		
Monitoring and logging		

Build on a secure, enterprise-grade platform



Control access through AAD and RBAC

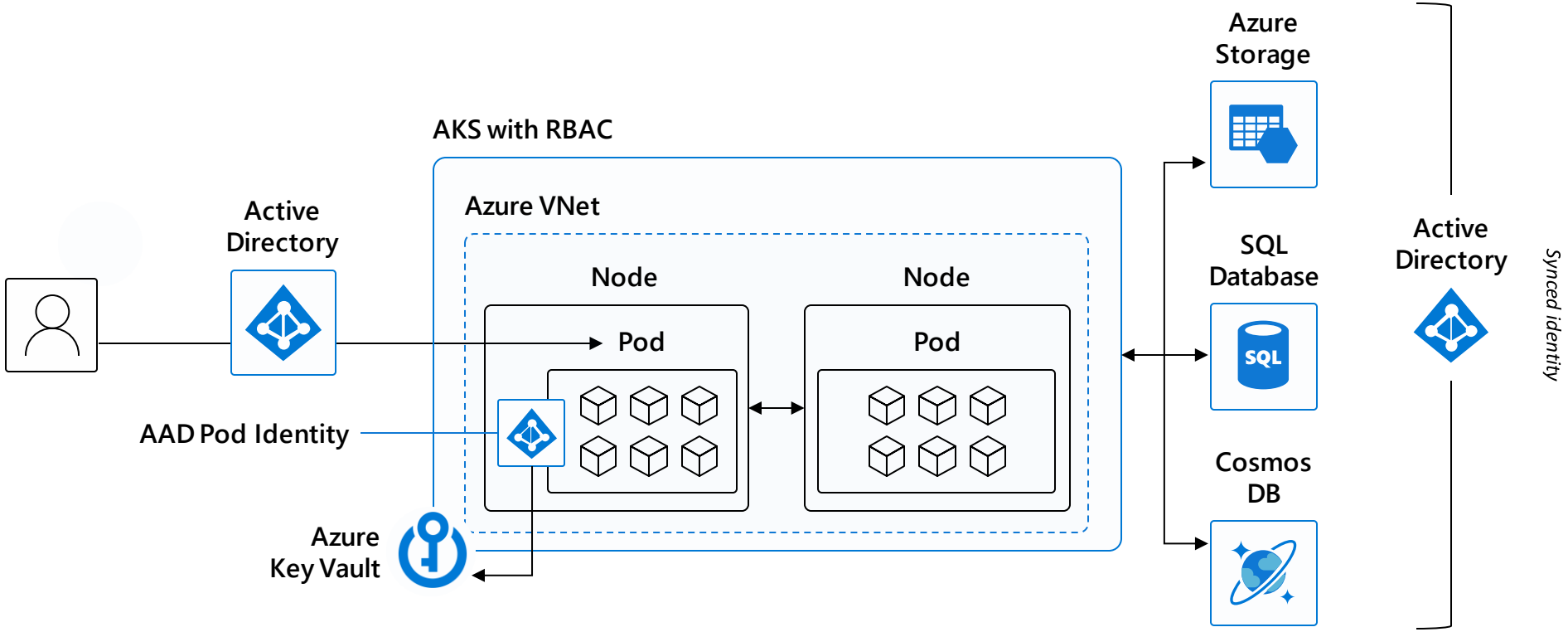


Secure network communications with VNET and network policy

Put guardrails in your development process with Azure Policy

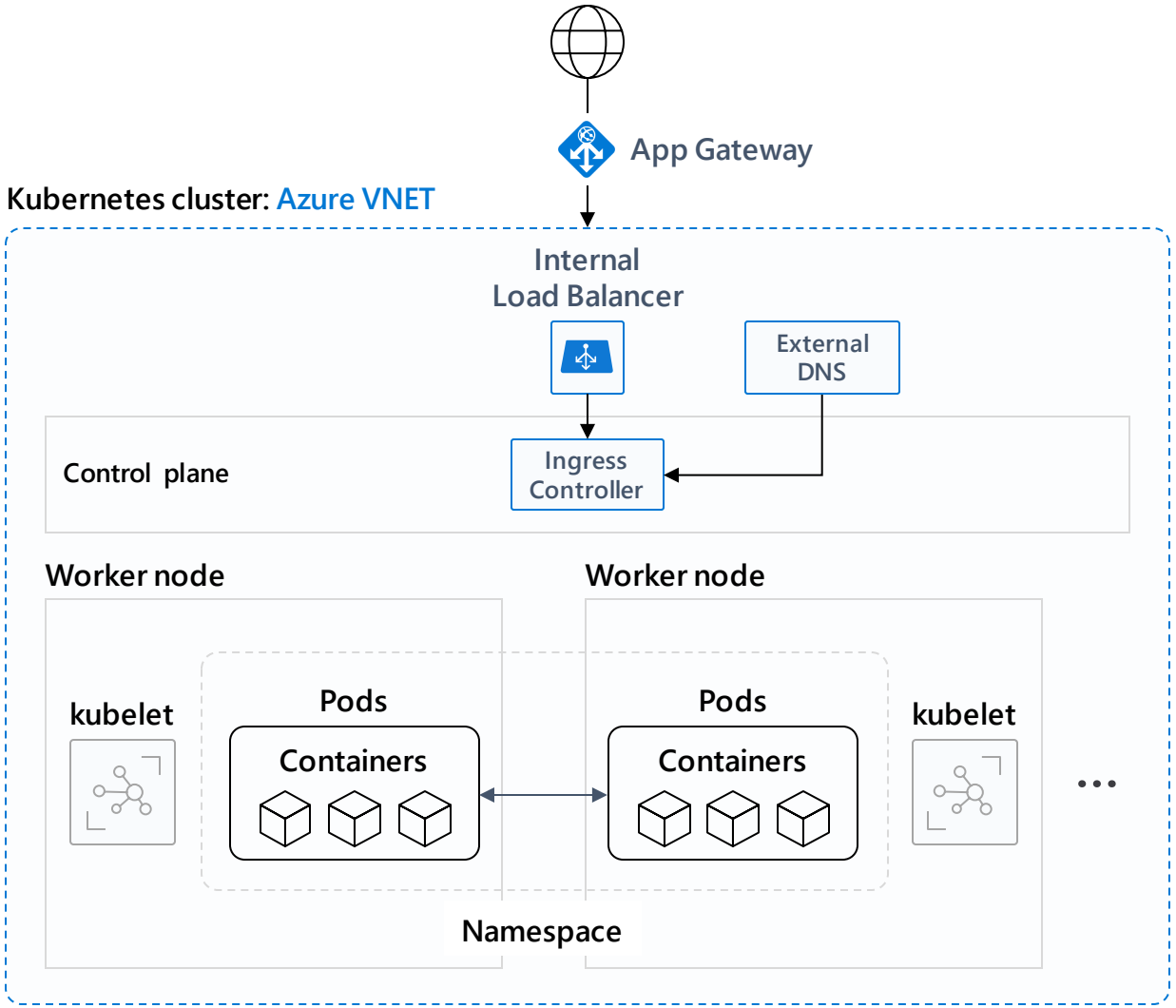
Identity

Use familiar tools like AAD for fine-grained identity and access control to Kubernetes resources from cluster to containers



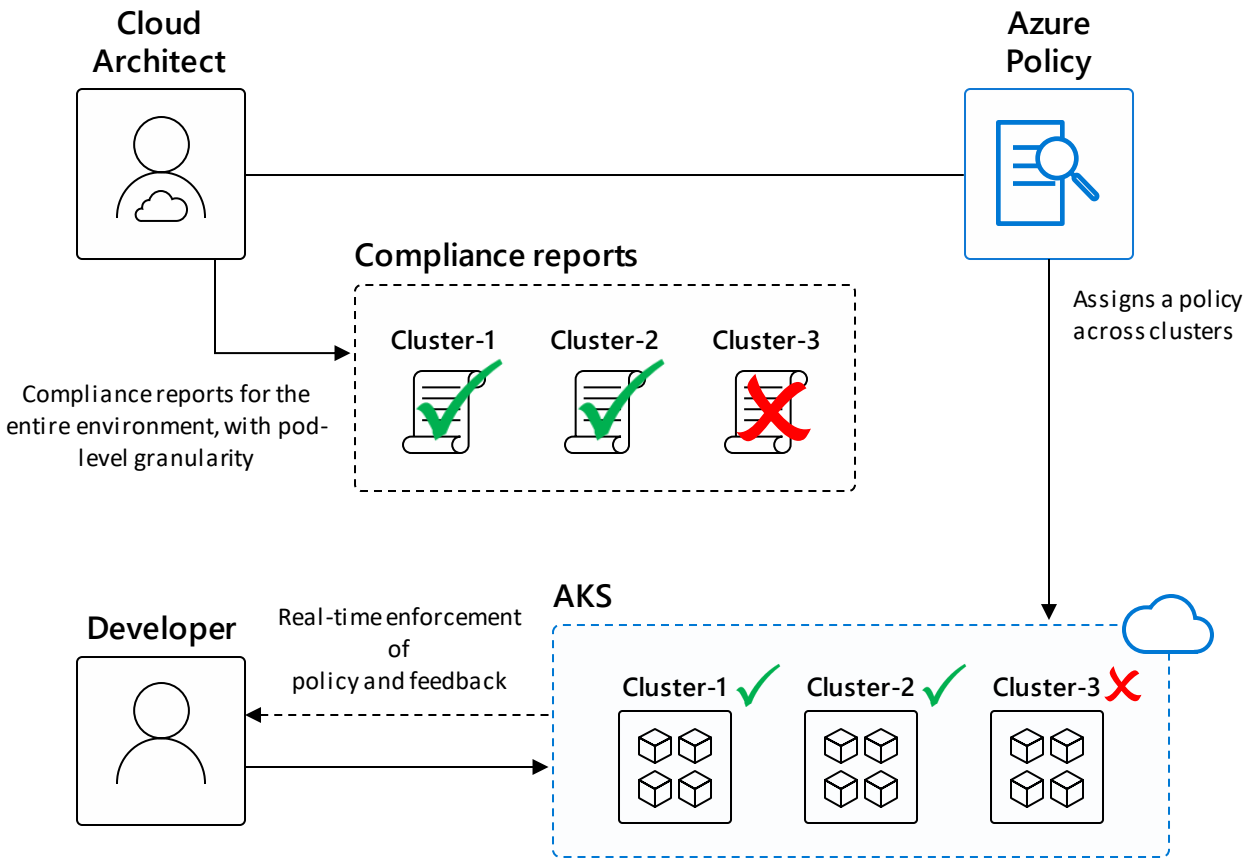
Networking

Secure your Kubernetes workloads with virtual network and policy-driven communication paths between resources



Governance

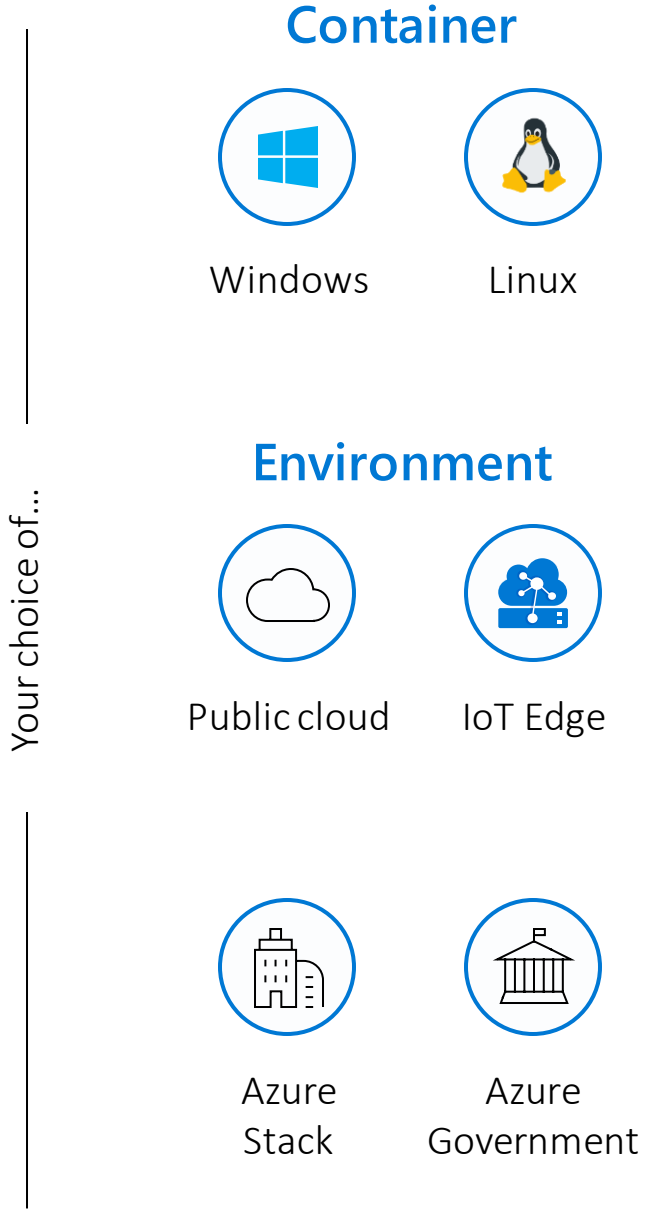
Dynamically enforce guardrails defined in Azure Policy across multiple clusters—nodes, pods, and even container images can be tracked and validated at the time of deployment or as part of CI/CD workflows



Run anything, anywhere

From Windows to Linux containers, from public cloud to IoT edge, use Kubernetes on Azure to orchestrate any type of workloads running in the environment of your choice, including Azure Stack and Azure Government.

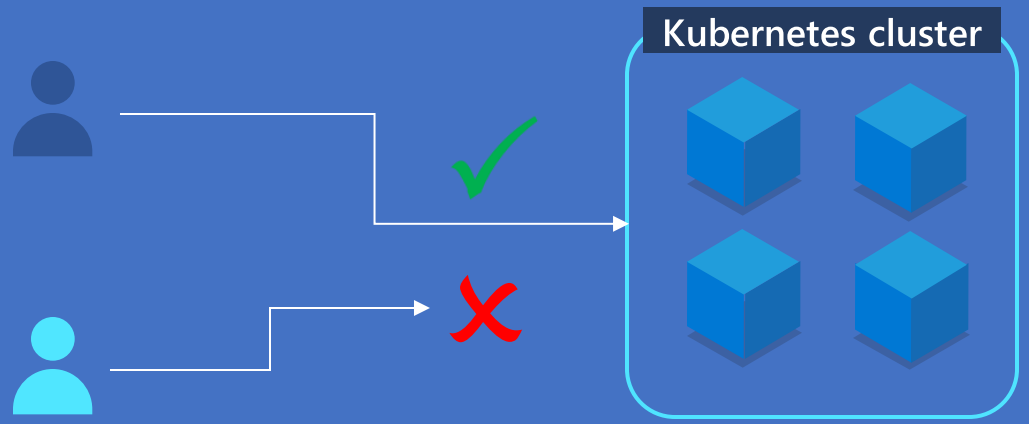
Azure works with your app modernization goals, helps dial up your Kubernetes skills, and apply best practices in production.



PUBLIC PREVIEW

API Server Authorized IP Ranges

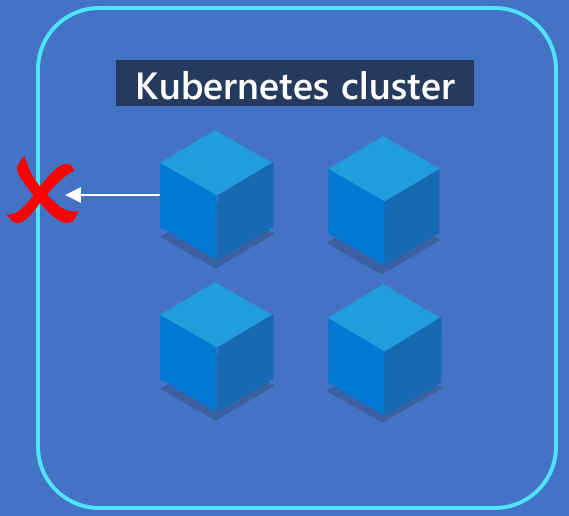
Lock down the Kubernetes API server to a set of trusted endpoints



PUBLIC PREVIEW

Limiting egress traffic

Limit agent node egress to a small set of trusted Azure endpoints

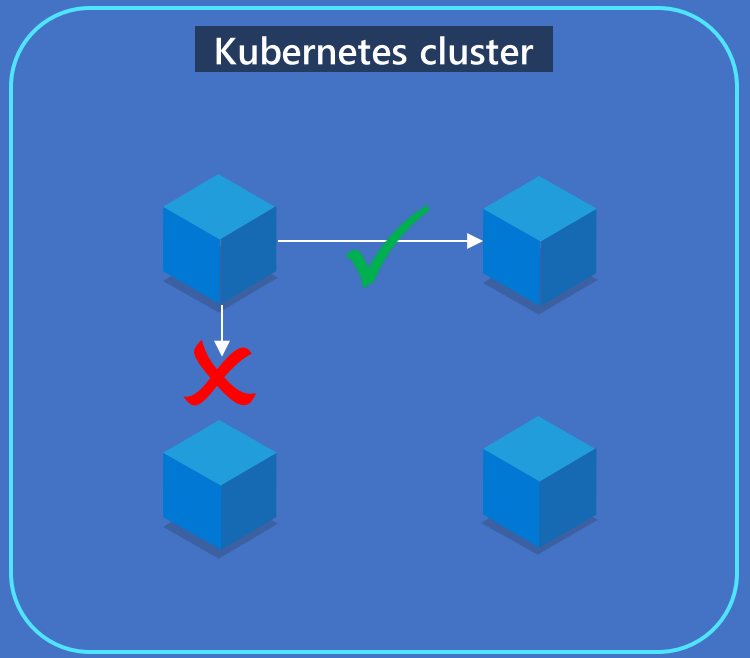


GENERALLY AVAILABLE

Kubernetes Network Policy

Control network traffic within the cluster

Choice of plugins: Azure-native or OSS Calico project



PRIVATE PREVIEW

Azure Policy for AKS

Automate policy enforcement for Kubernetes

Capture policies in a declarative format

KEDA

Kubernetes-based event driven autoscaling

Open source **component to provide function-like scale in Kubernetes**

Azure Functions **native tooling and trigger support**

Scale to zero **or scale to thousands**

Same app, same tools, flexible hosting

https://github.com/kedacore/keda

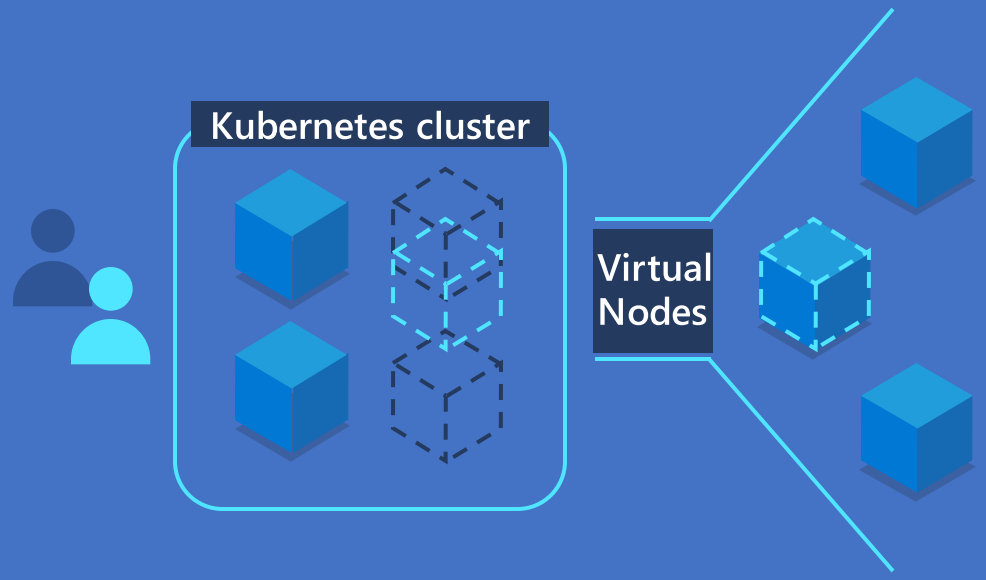
GENERALLY AVAILABLE

AKS Virtual Nodes

Elastically provision compute capacity with Virtual Nodes

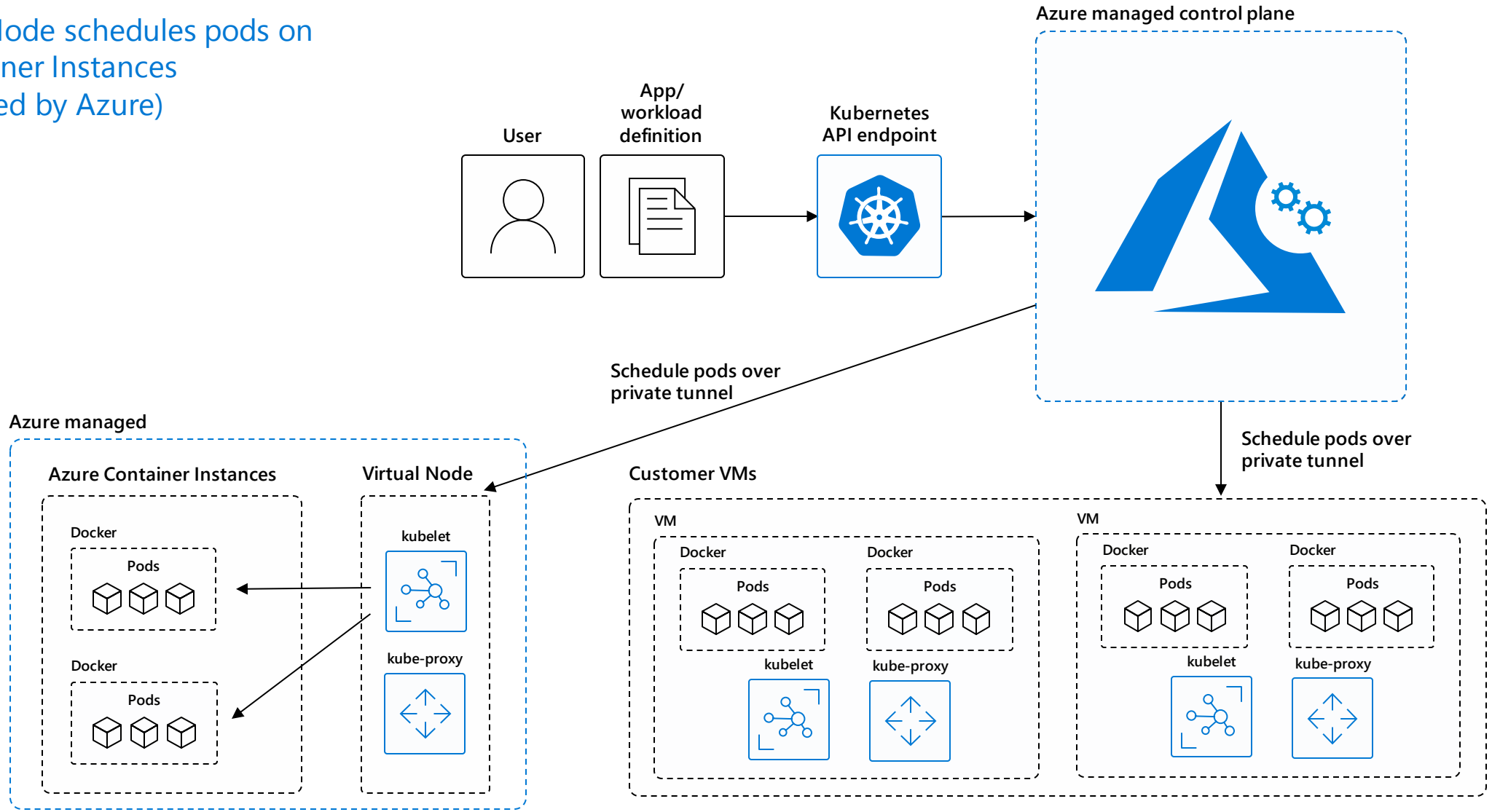
No infrastructure to manage

Built on open sourced Virtual Kubelet technology, donated to the Cloud Native Computing Foundation (CNCF)



Serverless k8s with VN

The Virtual Node schedules pods on Azure Container Instances (fully managed by Azure)



Demo:
Serverless K8s with Virtual Nodes

Roadmap

Node auto-repair
Achieve always-on state with self-healing clusters. AKS will initiate a repair process automatically if a health check fails

Cluster auto-upgrade
Stay up to date with the latest and greatest of Kubernetes and get patching and security updates automatically

Low priority node pools
Realize huge cost savings with pre-emptible VMs

Private clusters
Limit access to the Kubernetes API server to your Azure virtual network

Pod identity
Securely communicate with Azure services like Key Vault and Storage by giving Kubernetes pods their own first-class identity in Azure Active Directory

Availability Zones
Achieve higher availability and resiliency

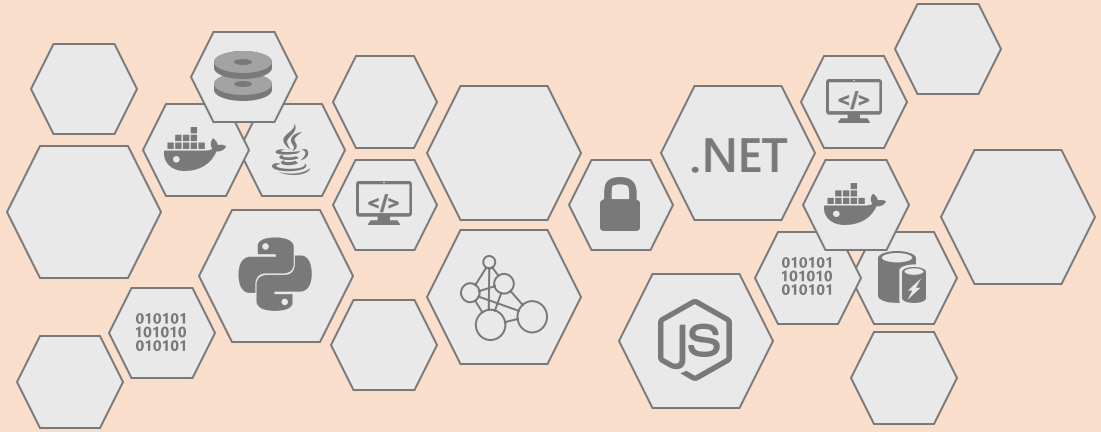
KeyVault FlexVolume for Kubernetes
Centrally store secrets outside of clusters

Azure Service Fabric

Microservices platform for mission critical applications

Build Deploy Operate

always-on, highly scalable microservice apps



Flexible infrastructure

Lifecycle management

24/7 availability & performance

Elastic scalability

Microservice and container orchestration

Security & compliance

Health & monitoring

Core scenarios

- .NET stack and developer expertise
- Windows containers in production in the next year
- Service Fabric programming models
  - Highly performant stateful compute
  - Orchestrate .exe processes
  - Combine container and non-containerized workloads
- Azure supported hybrid deployments

Zeiss creates smart devices by connecting field devices with back-end systems

Benefits:

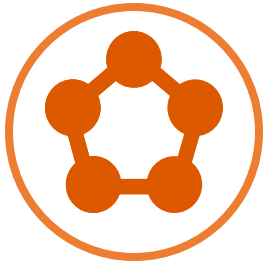
- Run Windows containers with existing code & new microservices together
- Securely expose business applications using REST APIs
- Improved agility makes it easier for developers to update container applications and services
- Scalable microservices-based platform for stateless/stateful workloads

> With Service Fabric we rely on a robust and scalable platform which host our digital integration scenarios – stateful integrations in Reliable Services and stateless integrations in containers can be hosted side by side on one platform.

Kai Walter, Lead IT Solution Architect ZEISS Group

Service Fabric product offerings

Service Fabric Standalone



Azure Service Fabric clusters

Azure Service Fabric Mesh

Responsibility

	Service Fabric Standalone	Azure Service Fabric clusters	Azure Service Fabric Mesh
You	Hardware OS patching Runtime upgrades Billing Cluster capacity planning Network and storage Application deployment	Cluster capacity planning Network and storage Application deployment	Application deployment
Azure		Hardware OS patching Runtime upgrades Billing	Hardware OS patching Runtime upgrades Micro-billing Cluster capacity planning Network and storage

GENERALLY AVAILABLE

Applications and services as Azure resources (ARM)

RBAC and auditing of control plane actions on applications and services
Use Azure Deployment Manager for compliant, safe rollouts

GENERALLY AVAILABLE

Applications and services as Azure resources (ARM)

RBAC and auditing of control plane actions on applications and services
Use Azure Deployment Manager for compliant, safe rollouts

GENERALLY AVAILABLE

Azure Files Storage volume driver

Mount Azure File Storage as a volume to containers for stateful operations

GENERALLY AVAILABLE

Cross Availability Zone clusters

Highly available clusters across AZs in Azure regions

Other improvements

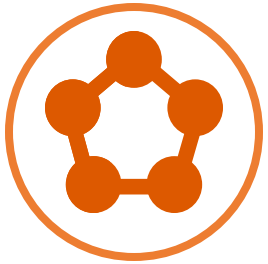
- Cluster reliability
  - New & improved safety checks to prevent accidental actions impacting cluster health/stability
  - Set custom upgrade rollout process to enable granular upgrades (node by node)
- Security
  - Auto cert rotation for cluster certificates
  - Enforce certificate validations, so that only valid cluster certificates are used
- Auditing & diagnostics
  - Increased set of container events and made container management more transparent
  - Control Plane Audit log
  - Sys-Log integration for Linux

Roadmap

- Managed Identity support
  - MI (Managed Identities) for applications and services deployed as Azure resources
  - AAD-based authentication to other Azure services, for security and ease of use
- Container support
  - Windows Server 2019 / 1809 containers
  - Hyper-V isolated container support
  - Volumes – GA support for Service Fabric volume disk
- Improved diagnostics experience for clusters (yes, even more)
- Low priority VMs for stateless (volatile) workloads

Service Fabric product offerings

Service Fabric Standalone



Azure Service Fabric clusters

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Azure		Hardware OS patching Runtime upgrades Billing	Hardware OS patching Runtime upgrades Micro-billing Cluster capacity planning Network and storage

Managing infrastructure is hard and unnecessary

To solve - Application and infrastructure challenges

"How do I build an application gateway to route all my requests to a specific service?"

"How many VMSS node types should I have?"

"How do a update a single microservice with no downtime in production with a CI/CD pipeline?"

"What size VMs should I use?"

"How do I handle the complexity of network failures and retries between microservices?"

"How do I manage my VM and application certificates? How do I get automated rollover?"

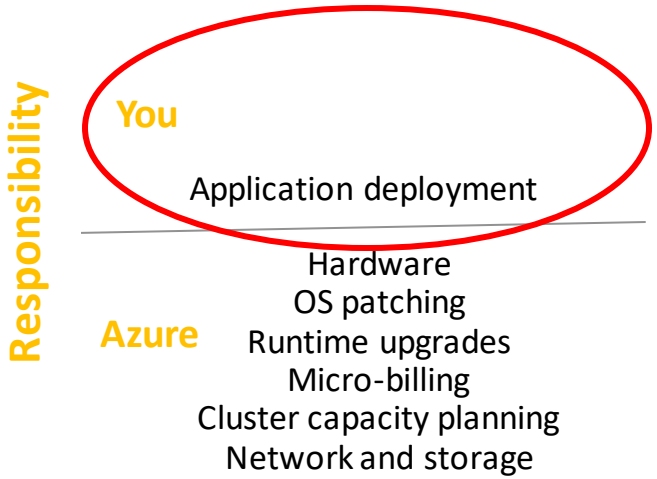
"How can I be billed on a more granular level based on usage?"

"How do I easily scale-in and scale-out my cluster?"

"How do I set up automatic scaling of my cluster for peak times?"

"How do I have easy, informative diagnostics configured for my applications by default?"

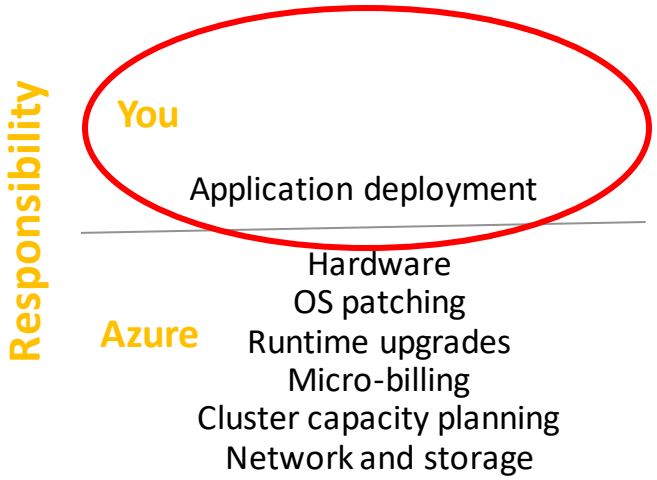
Azure Service Fabric Mesh



Fully managed serverless platform for microservices

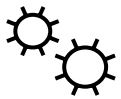
- Abstracted infrastructure – no VMs, Operating System in the picture
- Seamless integration with Azure
- Deploy, scale and delete applications within seconds
- Guarantee high availability of applications irrespective of application scale
- Per second billing

Azure Service Fabric Mesh

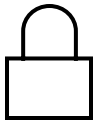


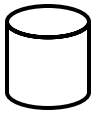
Service Fabric Mesh Preview

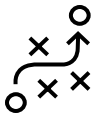
Service Fabric Resource Model

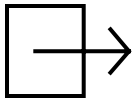

Applications and Services


Networks


Secrets


Volumes


Gateways / routing rules

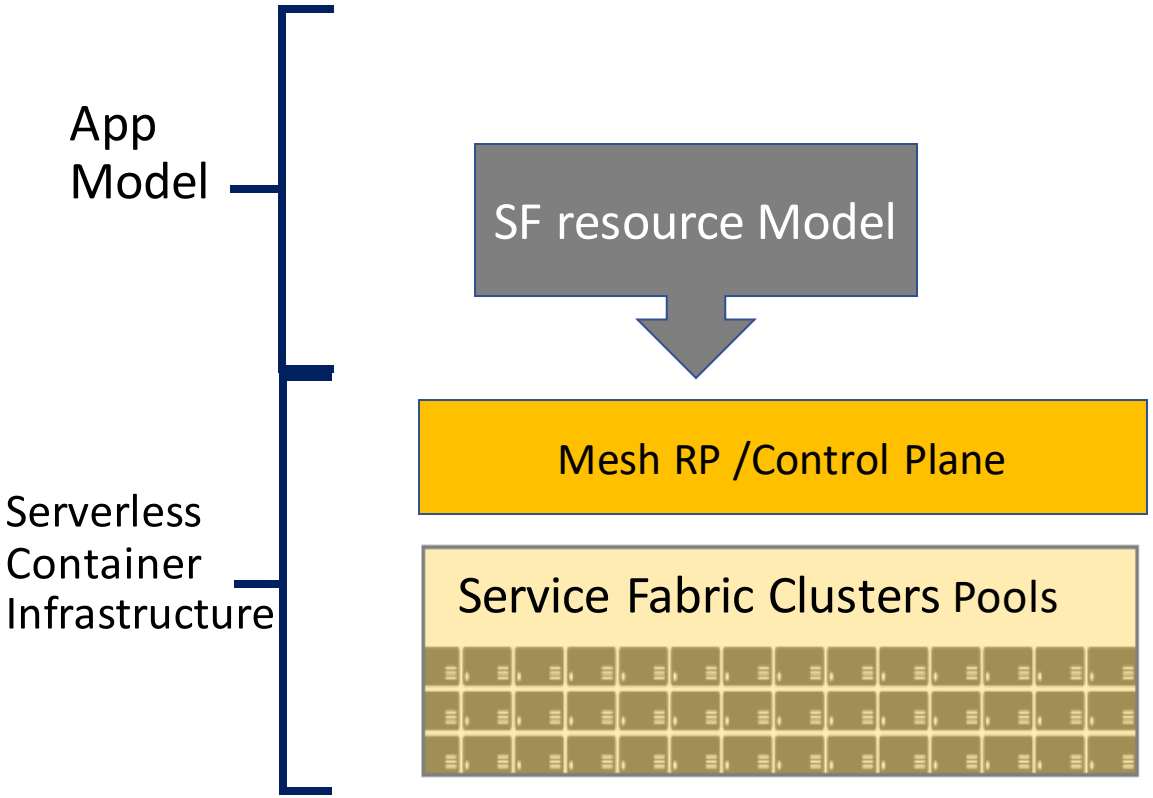

Auto-scale rules

Spring 2019 Refresh release

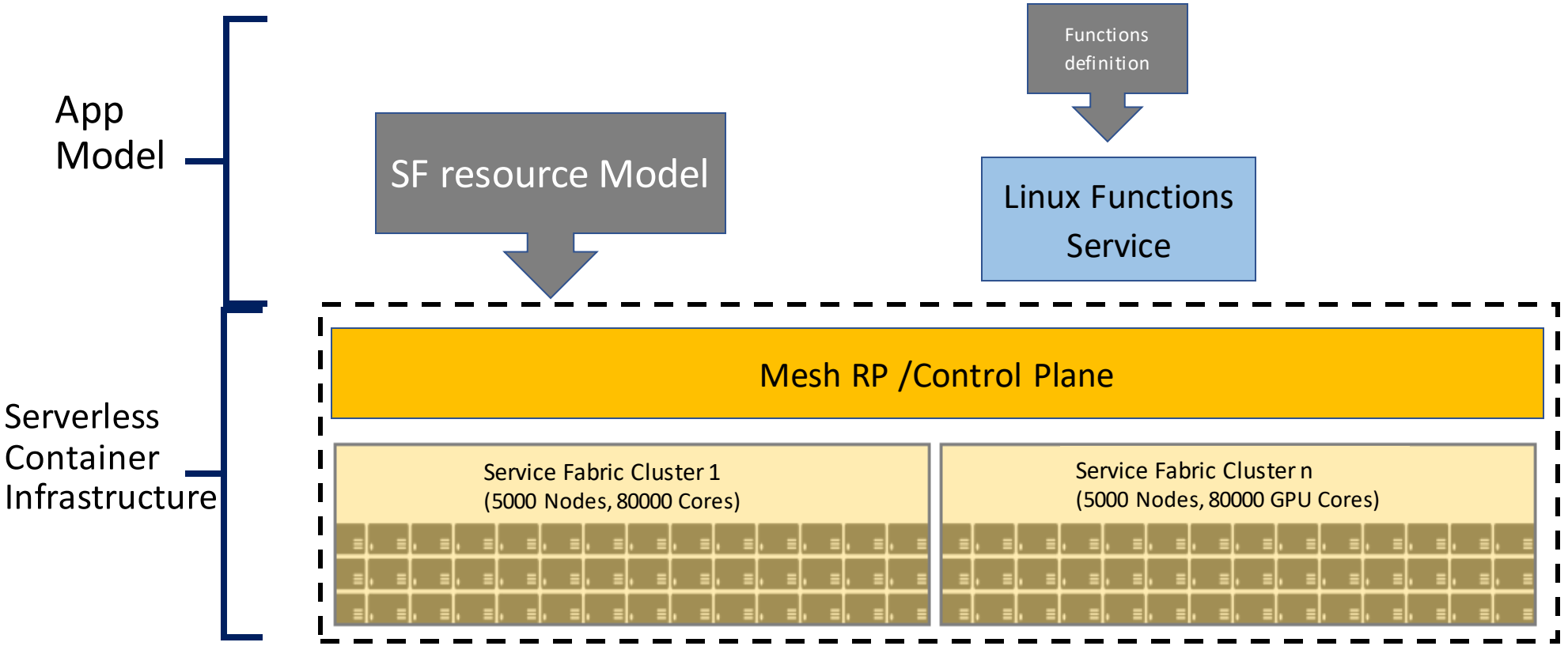
- Support for Windows Server 2019, 1809 containers
- Integration with Managed Identities
- Improvements to container diagnostics via Azure Monitor
- Billing starts (50%)

- Coming later
  - Availability in more regions
  - BYO Vnet
  - Performance enhancements
  - Evolved application model

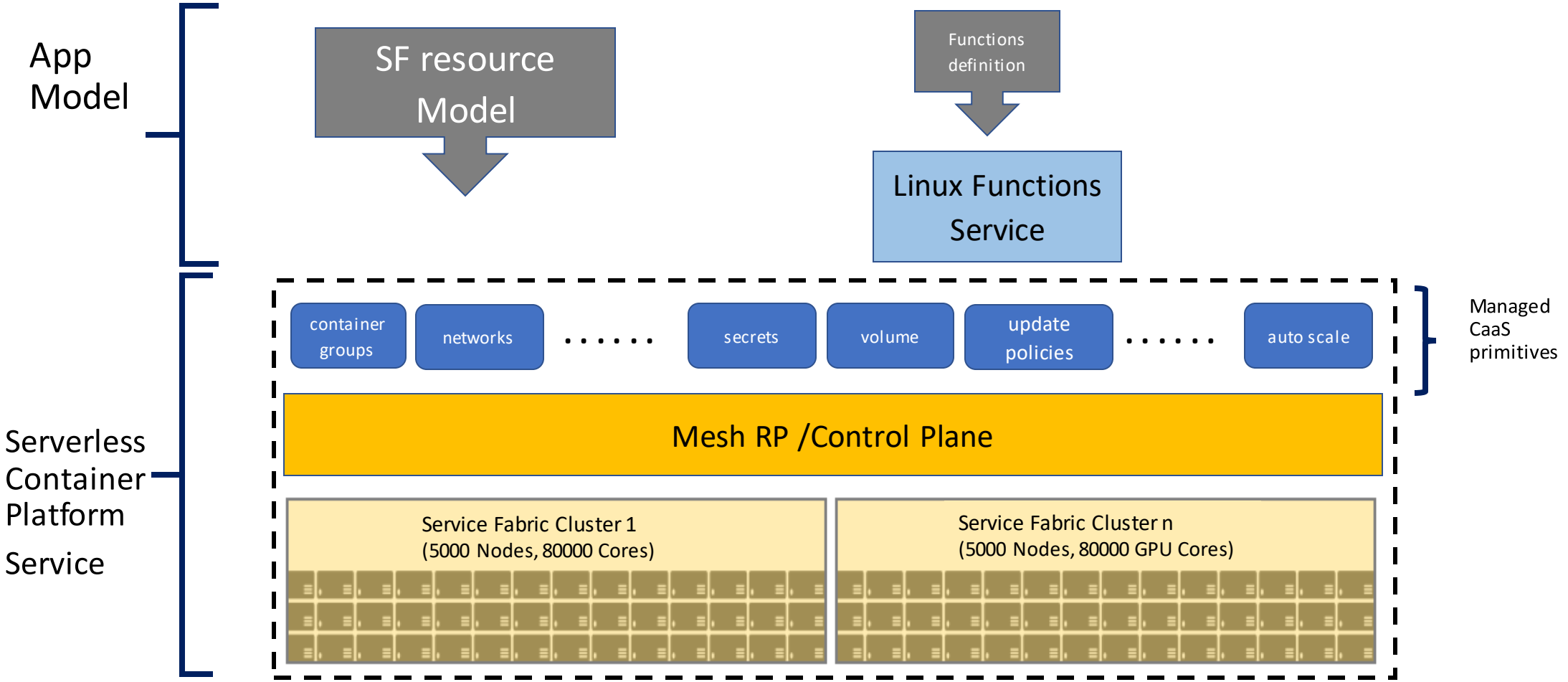
SF Mesh preview – Early Last year.



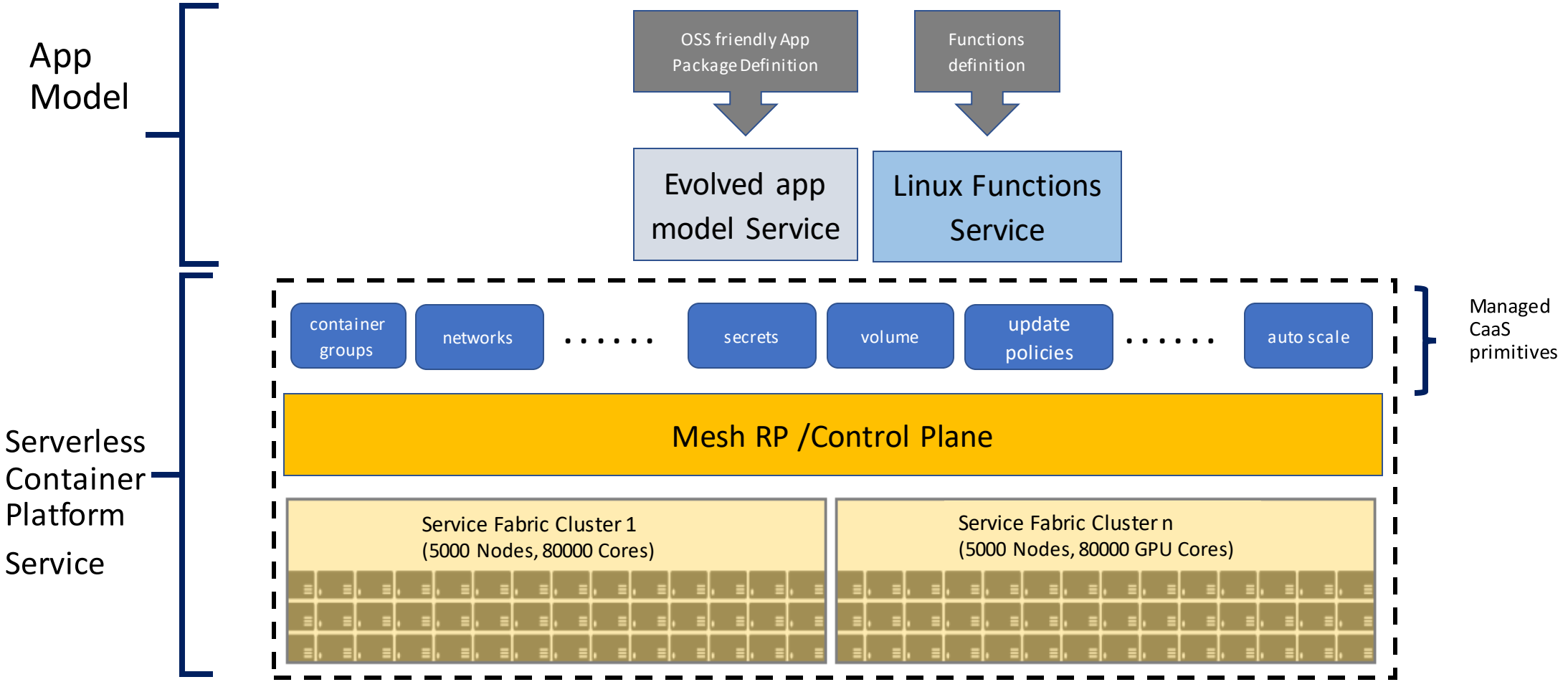
SF Mesh preview – Second half of Last year.



SF Mesh preview – End of the year

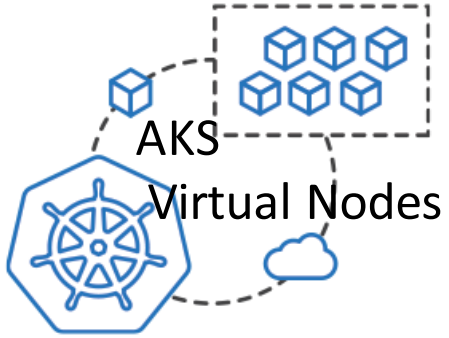


SF Mesh preview – Evolution



SF Mesh preview – Evolution

App Model



OSS friendly App Package Definition

Functions definition

Evolved app model Service

Linux Functions Service

Future Serverless Multitenant Services

Atlas Serverless Container Platform Service

container groups | networks | ..... | secrets | volume | update policies | ..... | auto scale

Managed CaaS primitives

Atlas RP /Control Plane

Service Fabric Cluster 1
(5000 Nodes, 80000 Cores)

Service Fabric Cluster n
(5000 Nodes, 80000 GPU Cores)

Azure Kubernetes Service (AKS)

App Service

Azure Container Instances (ACI)

Service Fabric

Azure Batch

Azure Container Registry (ACR)

App Service

Easily deploy and run container-based web apps at scale

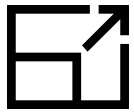
Accelerated outer loop

Tight integration w/ Docker Hub, Azure Container Registry

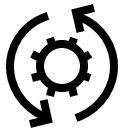
Built-in CI/CD w/ Deployment Slots

Intelligent diagnostics & troubleshooting, remote debugging

Fully managed platform



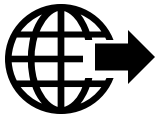
Automatic scaling and load balancing



High availability w/ auto-patching

Backup & recovery

Flexibility & choices



From CLI, portal, or ARM template

Single Docker image, multi container w/ Docker Compose

IntelliJ, , Jenkin, Maven Visual Studio family

Azure Kubernetes Service (AKS)

App Service

Azure Container Instances (ACI)

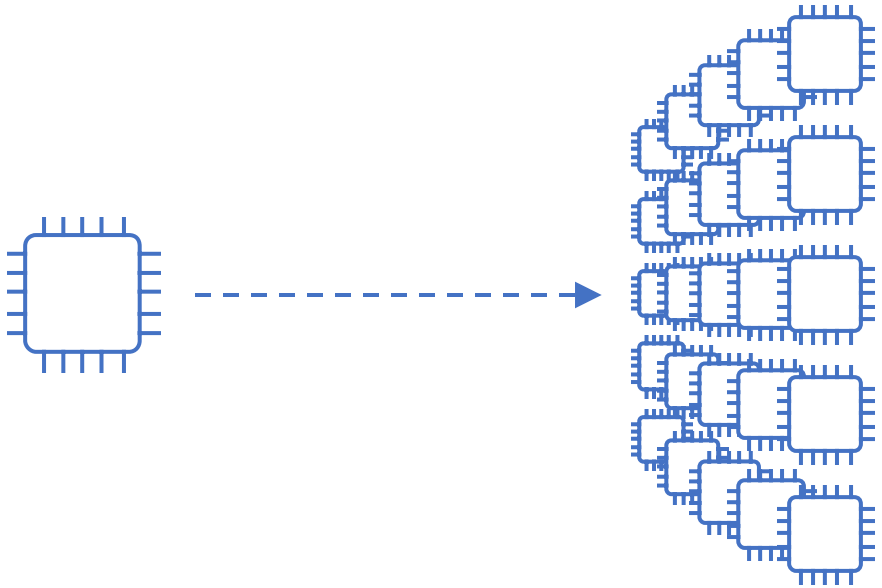
Service Fabric

Azure Batch

Azure Container Registry (ACR)

Azure Batch

Run repetitive compute jobs using containers



Enable applications and algorithms to easily and efficiently run in parallel at scale.

Run Batch tasks without having to manage an environment and dependencies.

Package, execute, and scale your High Performance Computing applications and batch workloads in a consistent, reproducible manner.

Azure Kubernetes Service (AKS)

App Service

Azure Container Instances (ACI)

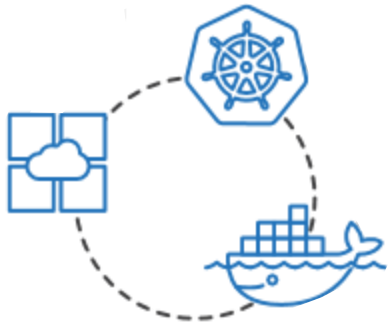
Service Fabric

Azure Batch

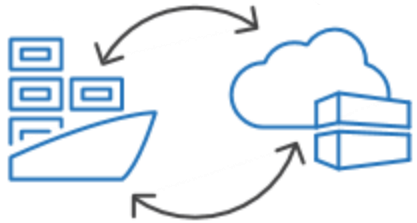
Azure Container Registry (ACR)

Azure Container Registry (ACR)

Manage a Docker private registry as a first-class Azure resource



Manage images for all types of containers



Use familiar, open-source Docker CLI tools

Azure Container Registry geo-replication

Containers in Azure

App Service

Deploy web apps or APIs using containers in a PaaS environment

Container Instance

Serveless Containers on Demand (CaaS)

Kubernetes Service

Scale and orchestrate Linux containers using Kubernetes

Service Fabric

Modernize .NET applications to microservices using Windows Server containers

Ecosystem

Bring your Partner solutions that run great on Azure

Azure Container Registry

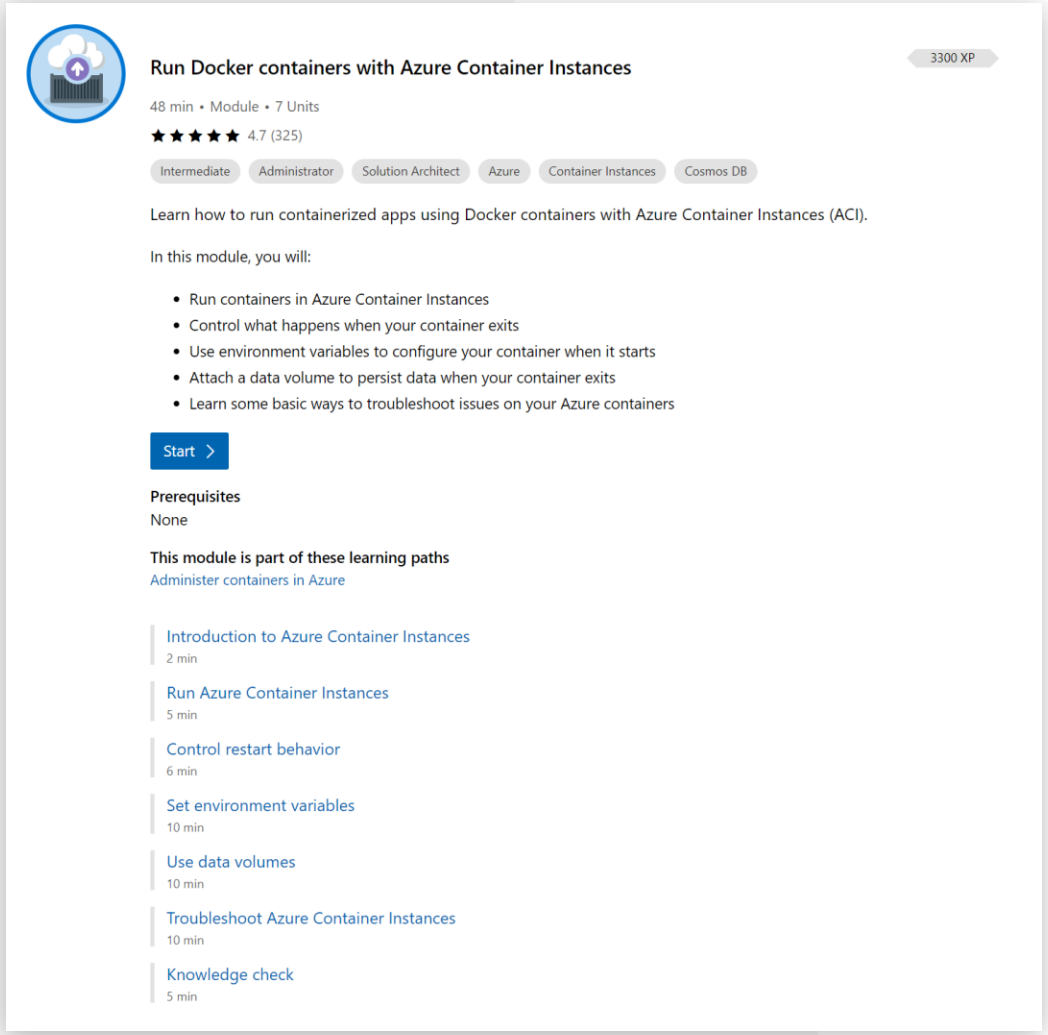
Docker Hub

Choice of developer tools and clients

Use the right tool for the job

- ACI
  - First steps into containers
  - Burst workloads that run for a long time
- AKS
  - Orchestrating containers (market's preferred platform)
- Service Fabric
  - Windows containers
  - Not-only-containers
- App Services
  - Hosting ('simpler') web applications in containers
- Functions
  - Burst workloads that run for a short time
  - Functions runtime / programming model for event-driven compute
- Batch
  - Scheduled repeatable tasks that run at scale

Q&A



Learning Paths

- Run Docker containers with Azure Container Instances
- Build a containerized web application with Docker
- Build and store container images with Azure Container Registry

Microsoft

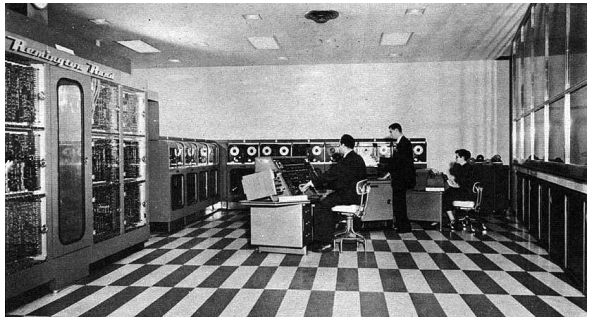
Azure API Management overview

Jon Fancey, Principal PM Manager

Last updated on Mar 12, 2019

Digital transformation

1950 1960 1970 1980 1990 2000 2010 2020



Mainframes and minis

Analog work and life

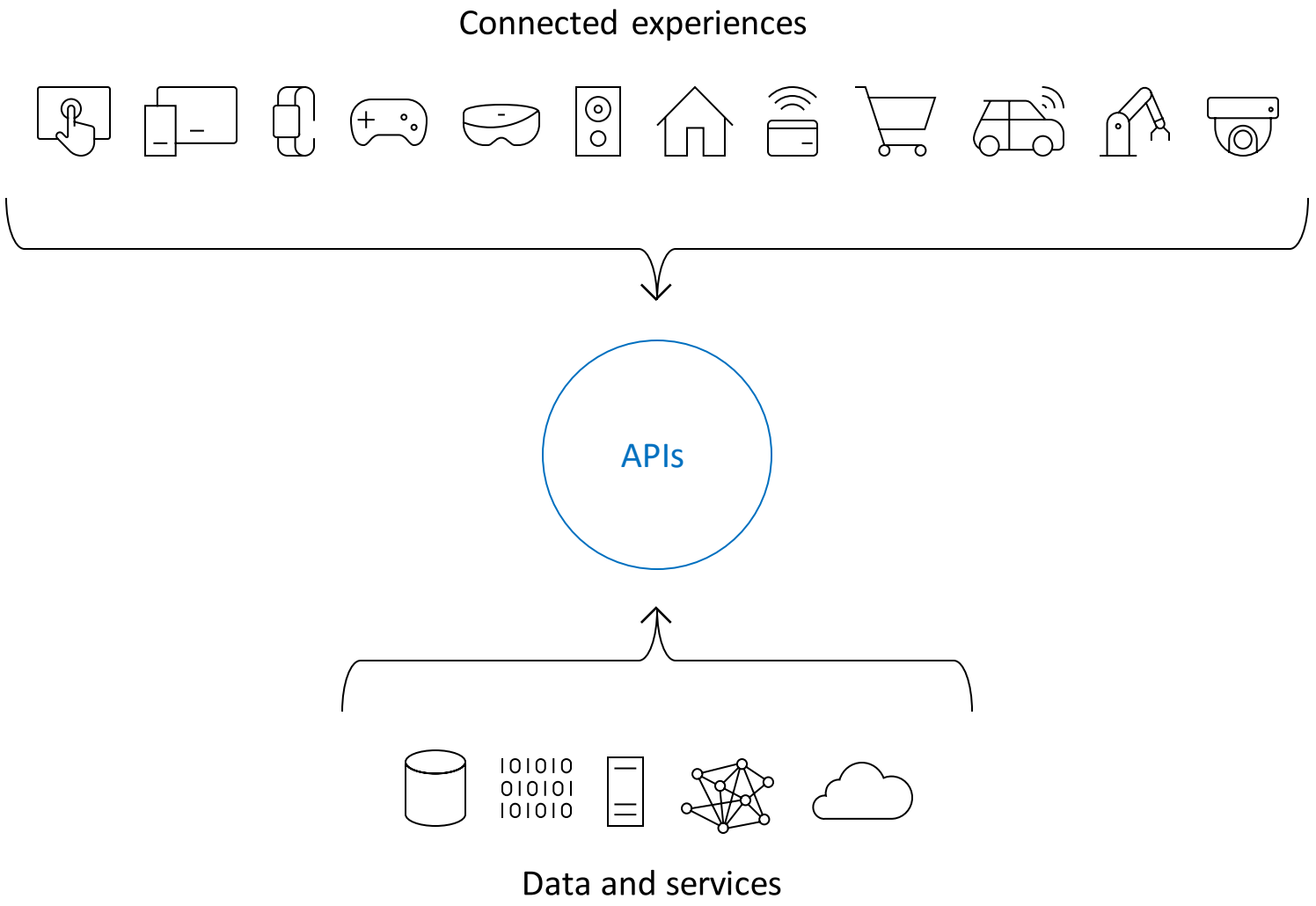
Personal computers

Digital work, analog life

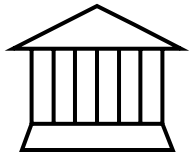
Mobile and wearable computing

Digital work and life

Digital transformation is built on APIs

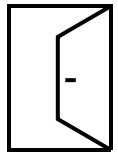


Essence of API management



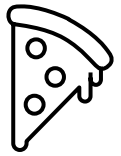
Façade

Hide backends from clients



Front door

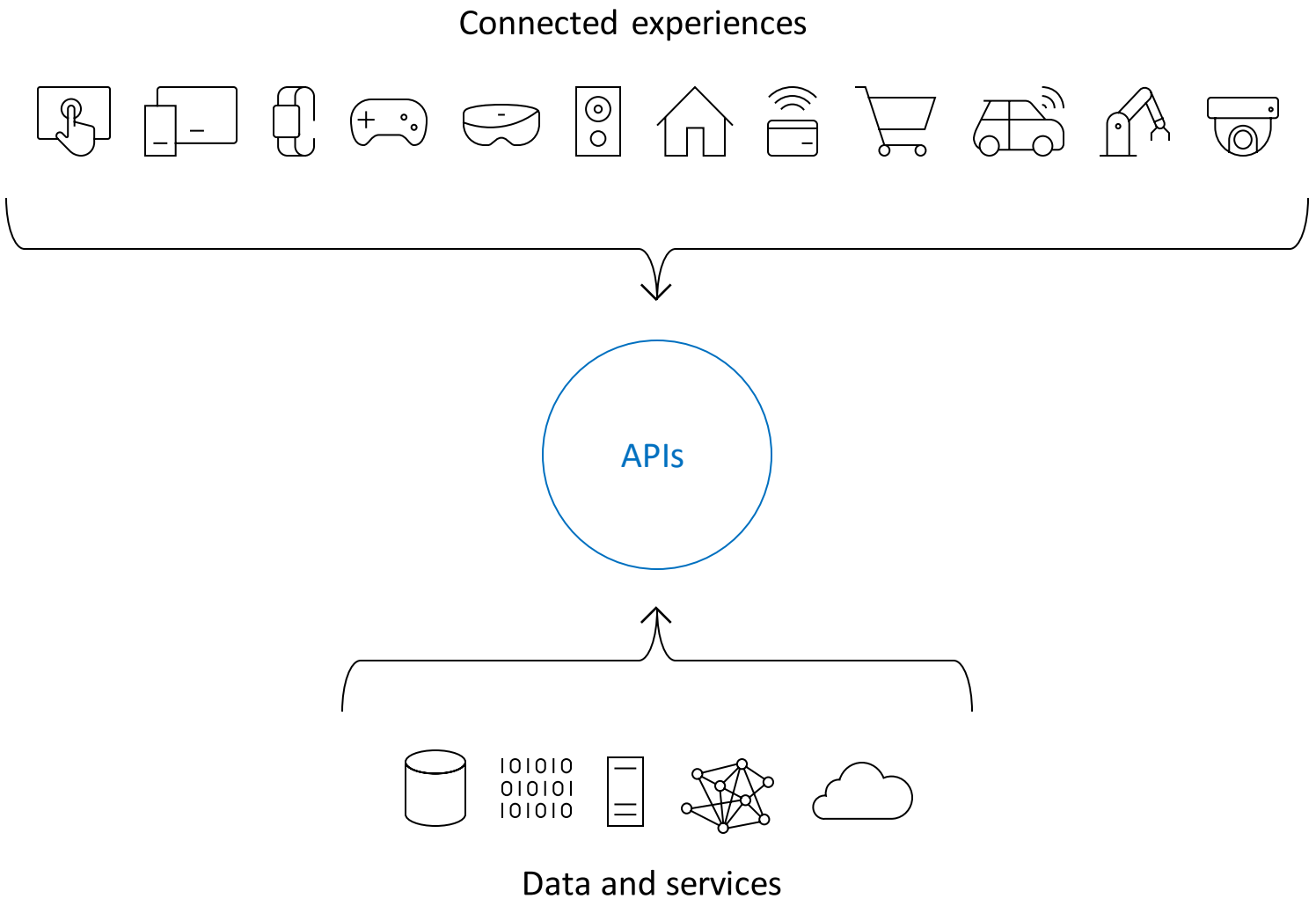
Single point of ingress



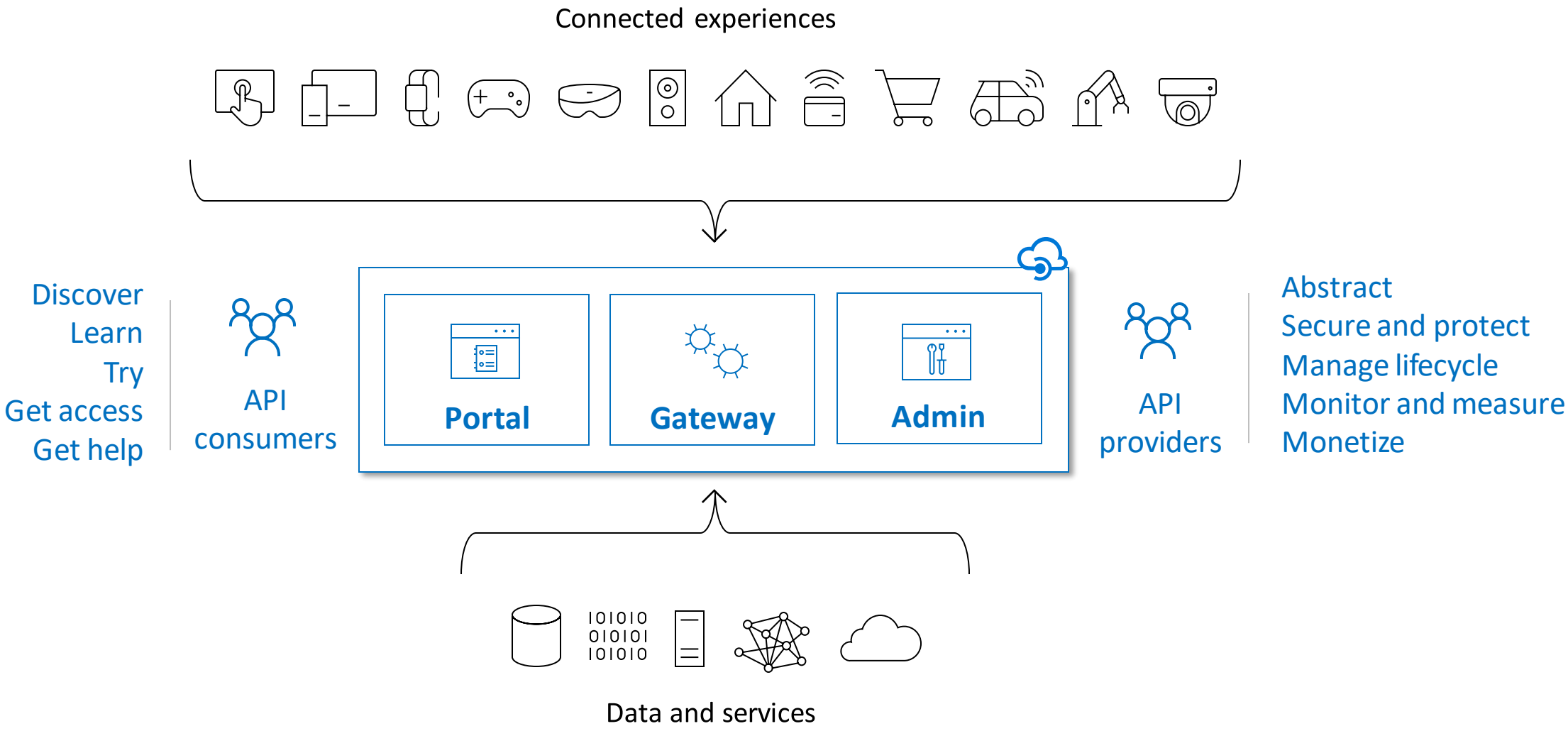
Frictionless consumption

Self-service user onboarding

Digital transformation is built on APIs



API management solves API-related challenges



Top scenarios for API Management

Cloud migrations	Replacement for API management solution used on-premises Reach-back to on-premises APIs
Cloud-born apps	App modernization and cloud-native apps API gateway for PaaS, container and serverless-based microservices
IoT solutions	Management of control plane APIs
Big Data platform	Management of reporting and insights APIs
Two-speed IT	Digital transformation Enterprise-wide API catalog and governance

Customer use cases

Enterprise API catalog

Customer and partner integration

Mobile enablement and IoT

APIs as a business

Gateway for microservices

There is a policy for that

Security

Caching

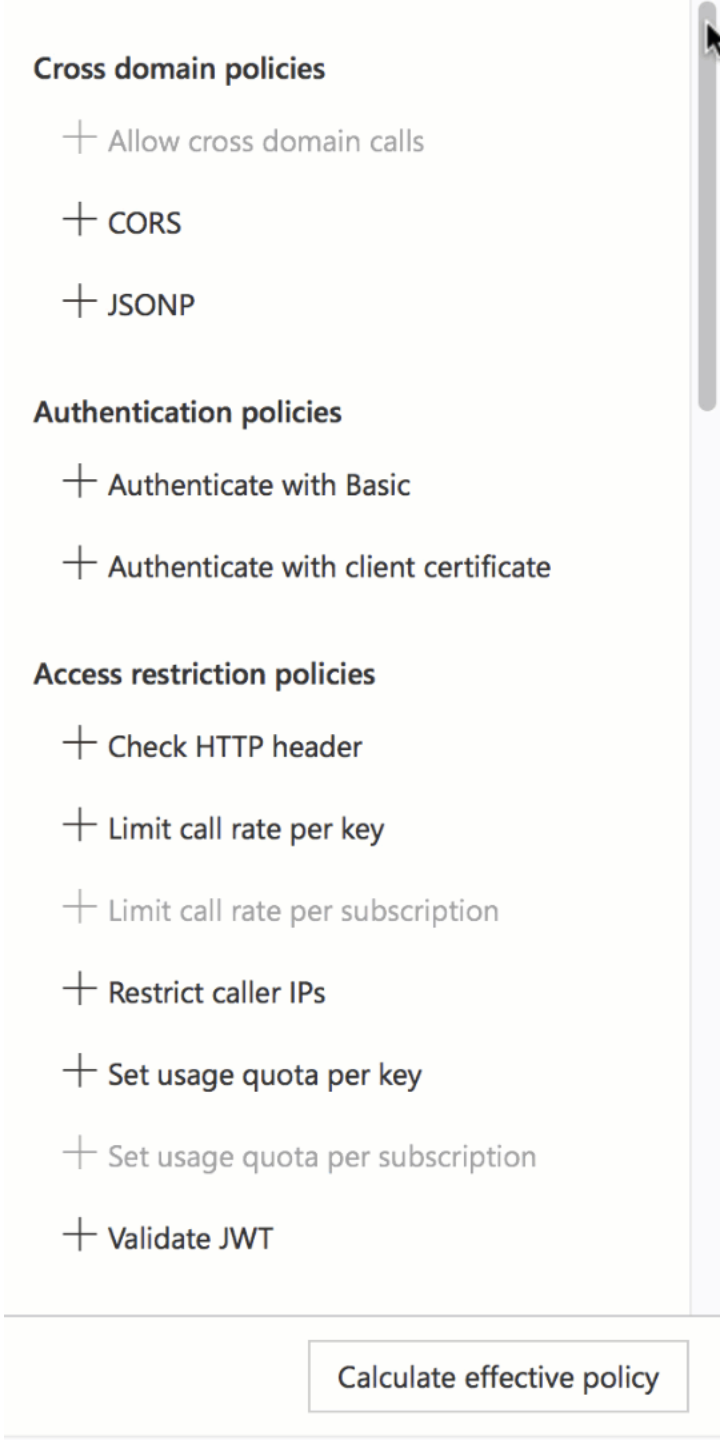
Integration

Throttling and quota limits

Transformations

Mocking

… and more



Policy expressions

C# code with selected .NET types

Access to the request context

Flexible extension of policies

Named values

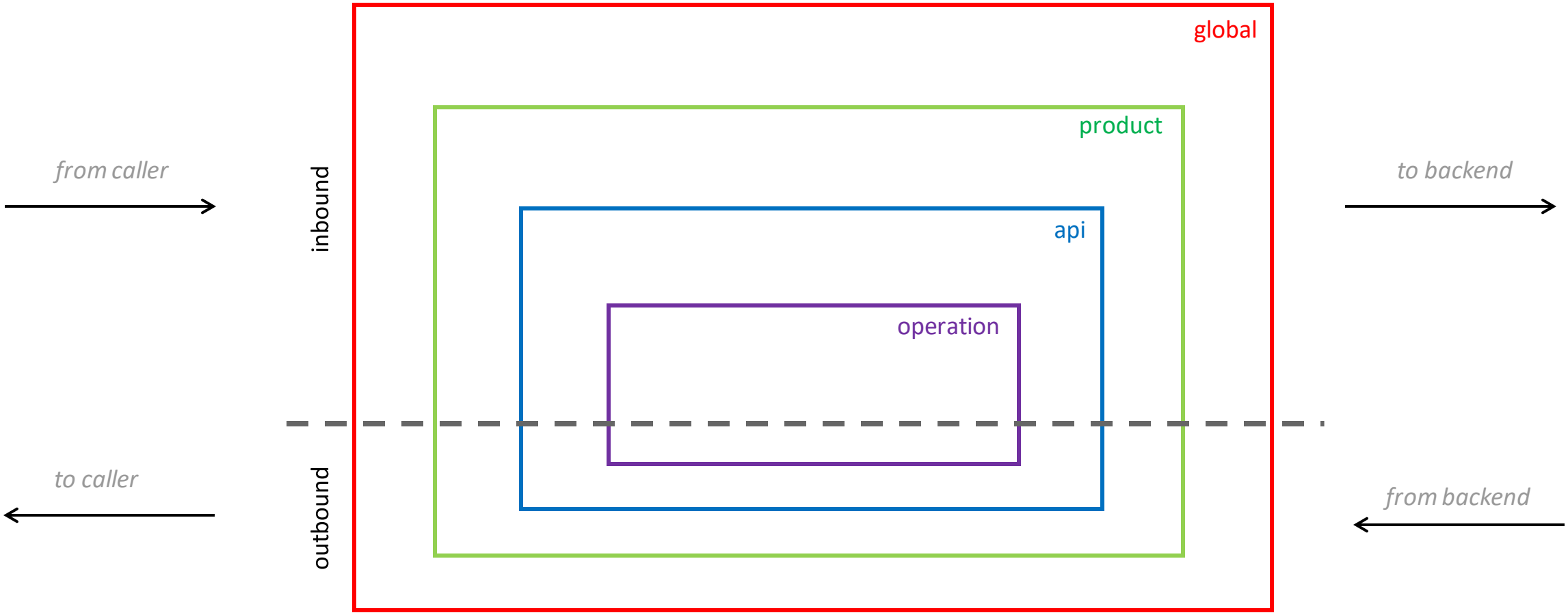
Variables for reuse in a service instance

May contain secrets

Single point of change

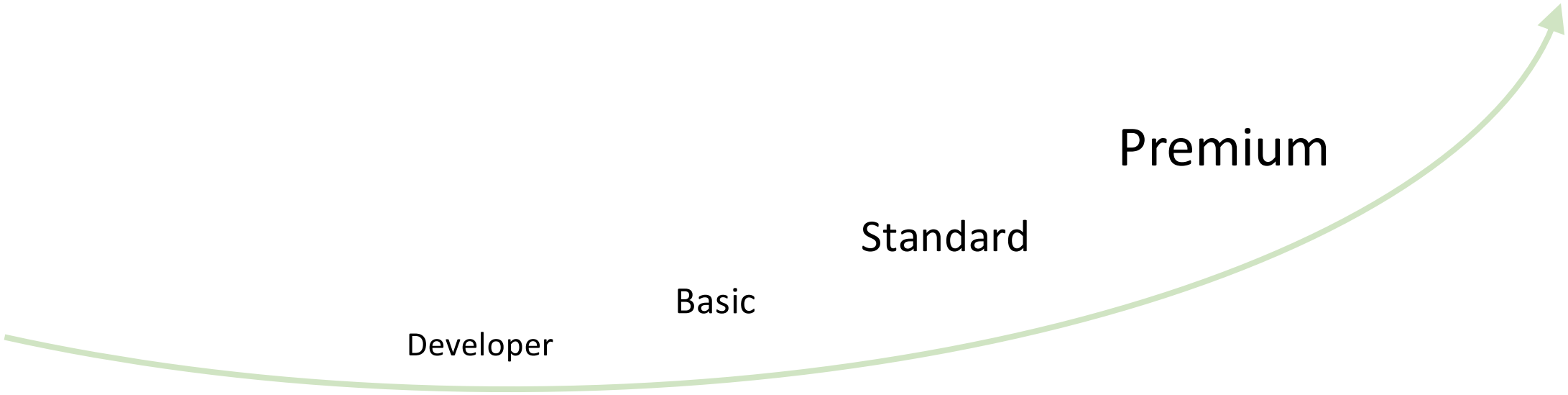
```
...
<inbound>
    <base />
    <set-variable name="content-length" value="@(context.Request.Headers["Content-Length"][0])" />
    <choose>
        <when condition="@(int.Parse(context.Variables.GetValueOrDefault<string>("content-length")) > {{max-content-length}})">
            <rewrite-uri template="{{alternate-path-and-query}}" />
            <set-backend-service base-url="{{alternate-host}}" />
        </when>
    </choose>
</inbound>
...
```

Policy scopes




Demo:
Policies

Dedicated tiers



Consumption tier

Consumption NEW	Developer | Basic | Standard | Premium
No infrastructure to provision or manage	No infrastructure to provision or manage
Built-in high availability	Built-in high availability
Built-in auto-scaling (down to zero)	Manual or external auto-scaling
Consumption-based micro billing	Billing based on reserved capacity
No reserved capacity	Reserved capacity
Shared resources	Dedicated resources
On-demand activation	Always on
Curated set of features	Full set of features
Usage limits	Ungoverned

Use cases for Consumption

Gateway for serverless microservices

- Functions, Logic Apps

Simplified and secure façade for serverless resources

- Service Bus queues and topics, Storage, etc.

Gateway for spiky traffic

Entry-level API management

Test and experimental environments

GA is planned for summer 2019

API versioning

Revisions

Providers choose when to deploy

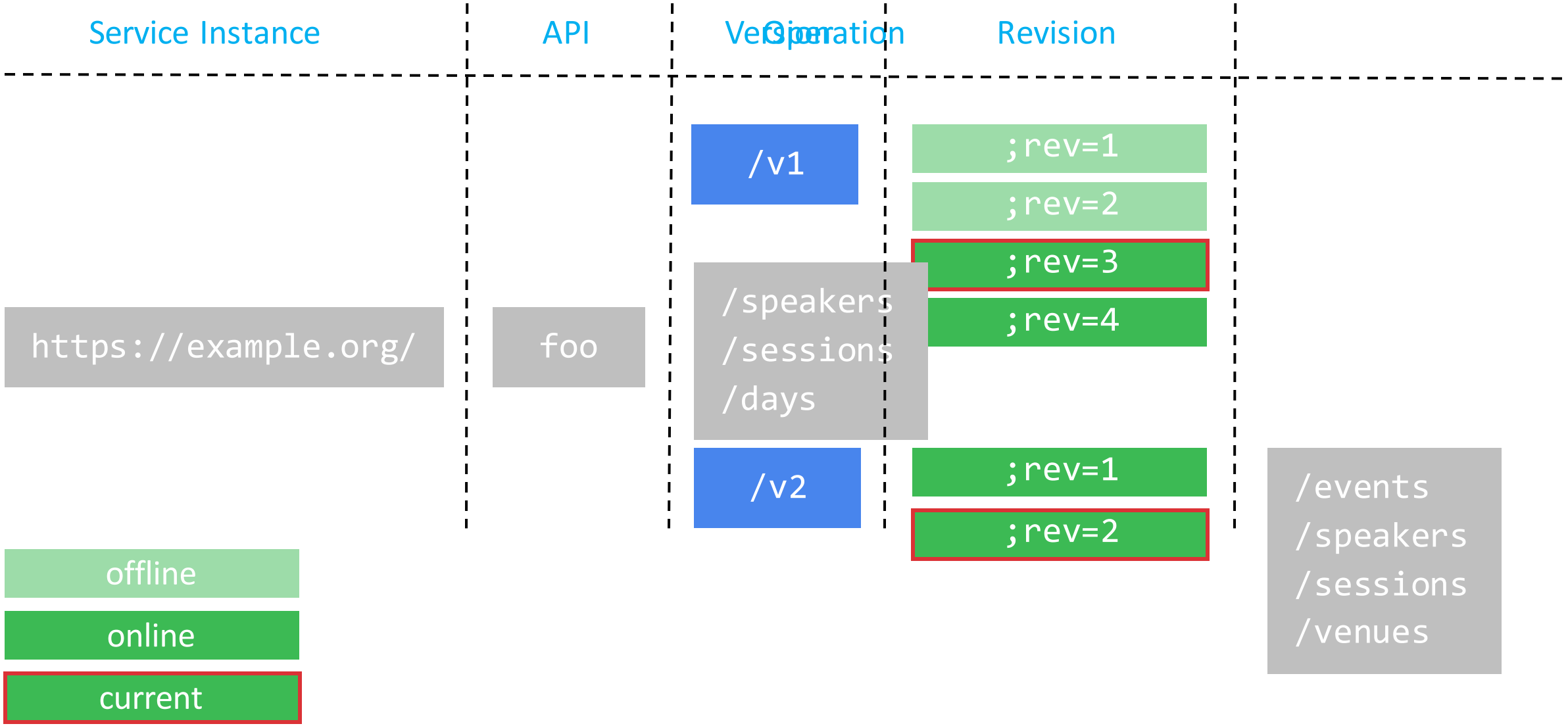
Non-breaking changes

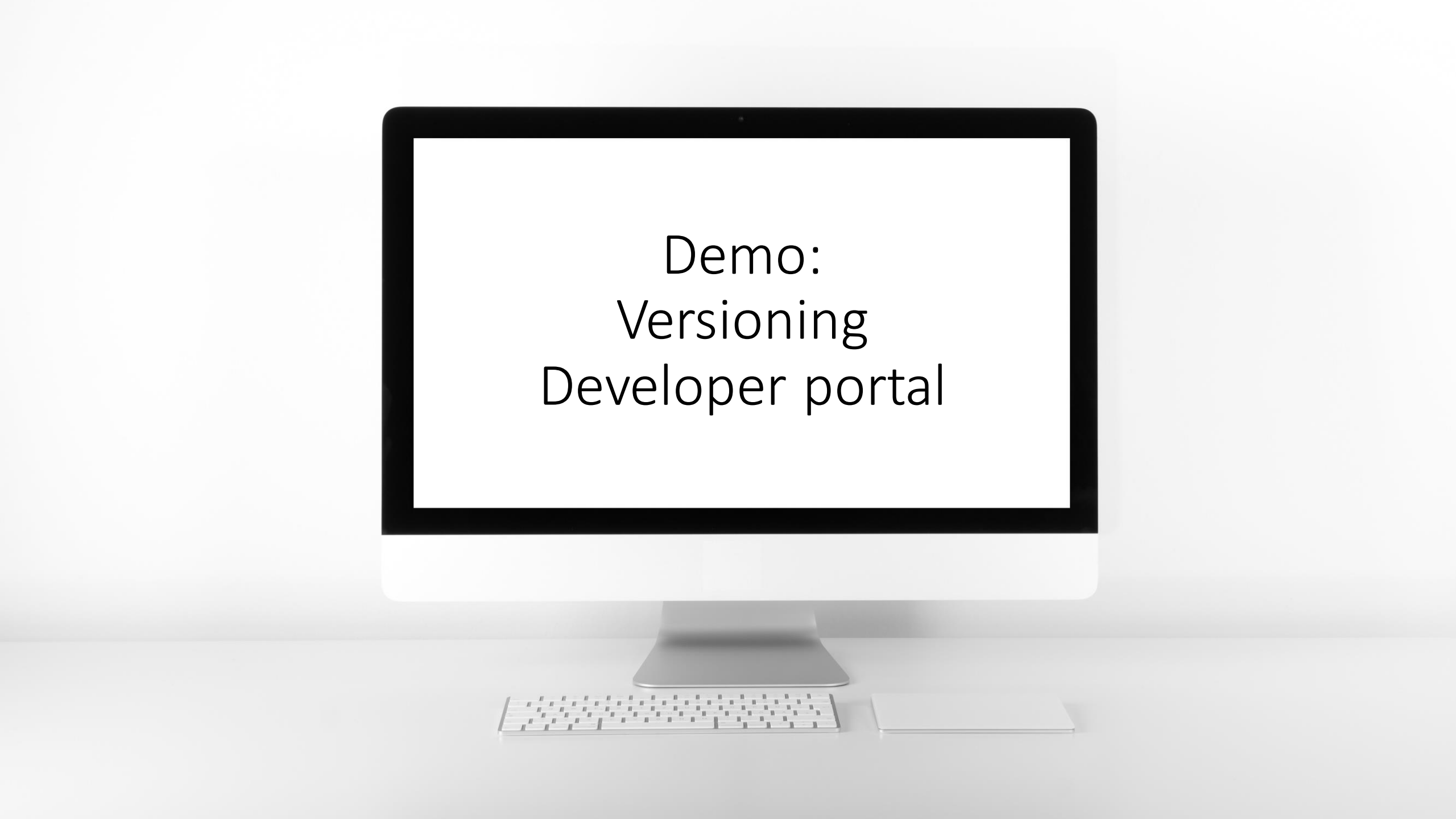
Versions

Consumers choose when to adopt

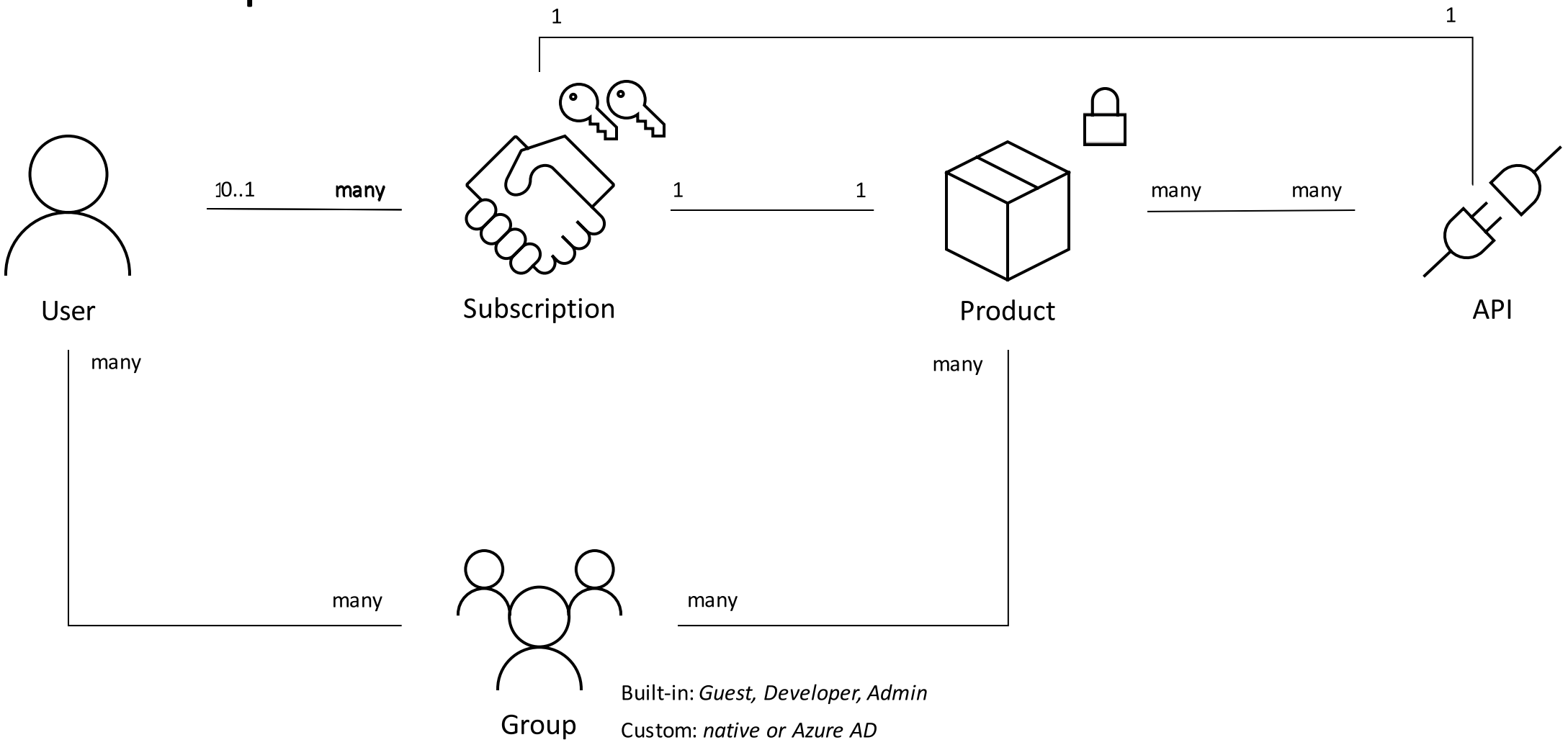
Breaking changes

Versions and revisions

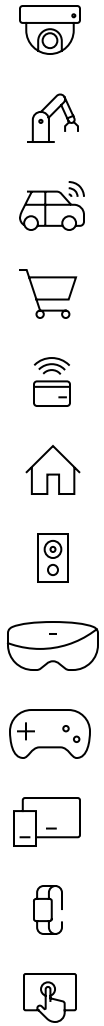



Demo:
Versioning
Developer portal

Users, groups, products, APIs, and subscriptions



Data plane security



Key

OAuth 2 & OpenID Connect

Client certificate

IP filter

External authorizer (custom)

Rate limits and quotas

Key

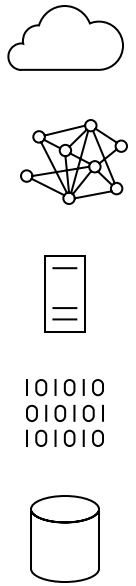
Mutual certificate

OAuth 2 & OpenID Connect

HTTP Basic

IP filter

Network security (VNET)



Developer portal security

API consumers

Username/Password

Internet identity providers:

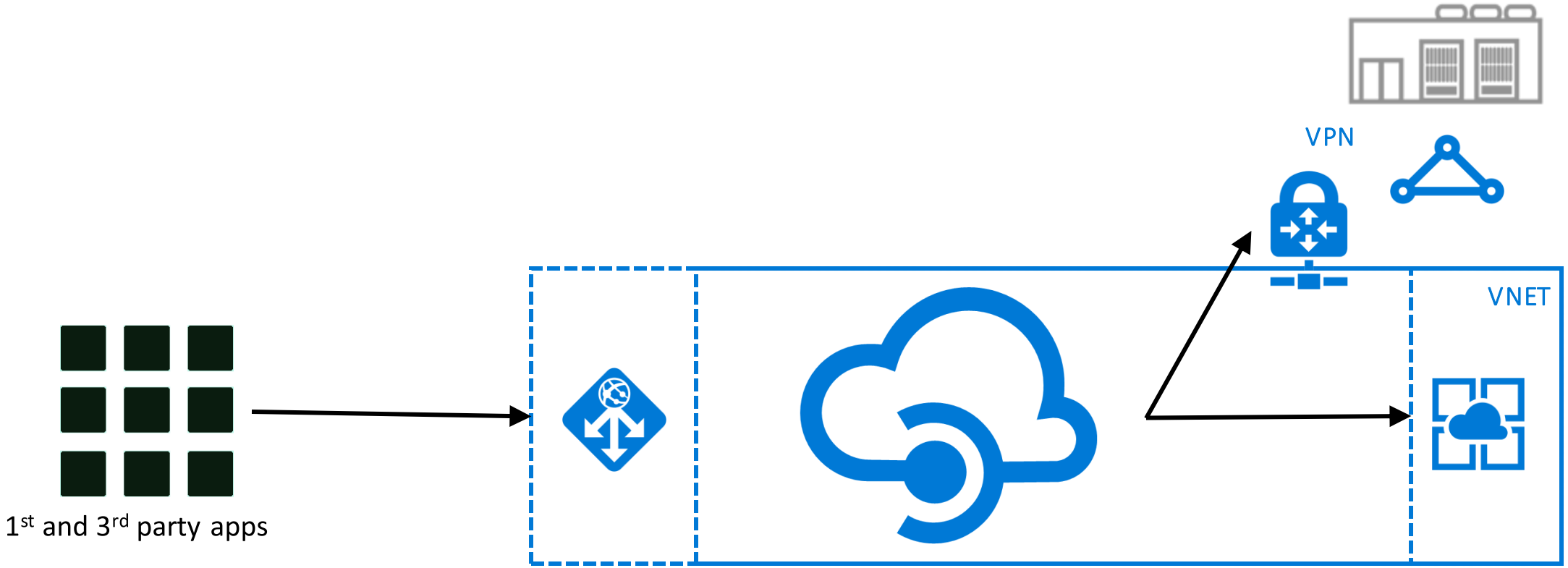
- Microsoft account
- Google account
- Facebook account
- Twitter account

Delegated (custom)

Azure AD

Azure AD B2C

VNETs and hybrid



Observability

Tech	Reporting	Monitoring	Debugging	Data lag	Retention	Sampling	Data schema	Data kind	Enabled
API inspector	-	-	Good	Instant	Last 100 traces	Turned on per request	Fixed can be extended	Request trace	Always
Built-in reports	Basic	-	-	Minutes	Unspecified	100%	Fixed	Reports Logs via API	Always
Azure Monitor Metrics	Basic	Good	-	Minutes	90 days export to extend	100%	Fixed	Metrics	Always
Azure Monitor	Good	Good	Good	Minutes	31 day (5GB) upgrade to extend	100% adjustable	Fixed	Logs	Optional
Azure App Insights	Good	Good	Good	Seconds	90 days (5GB) upgrade to extend	Custom	Choice of presets	Logs, metrics	Optional
Log to Event Hub	Custom	Custom	Custom	Seconds	User managed	Custom	Custom	Logs	Optional

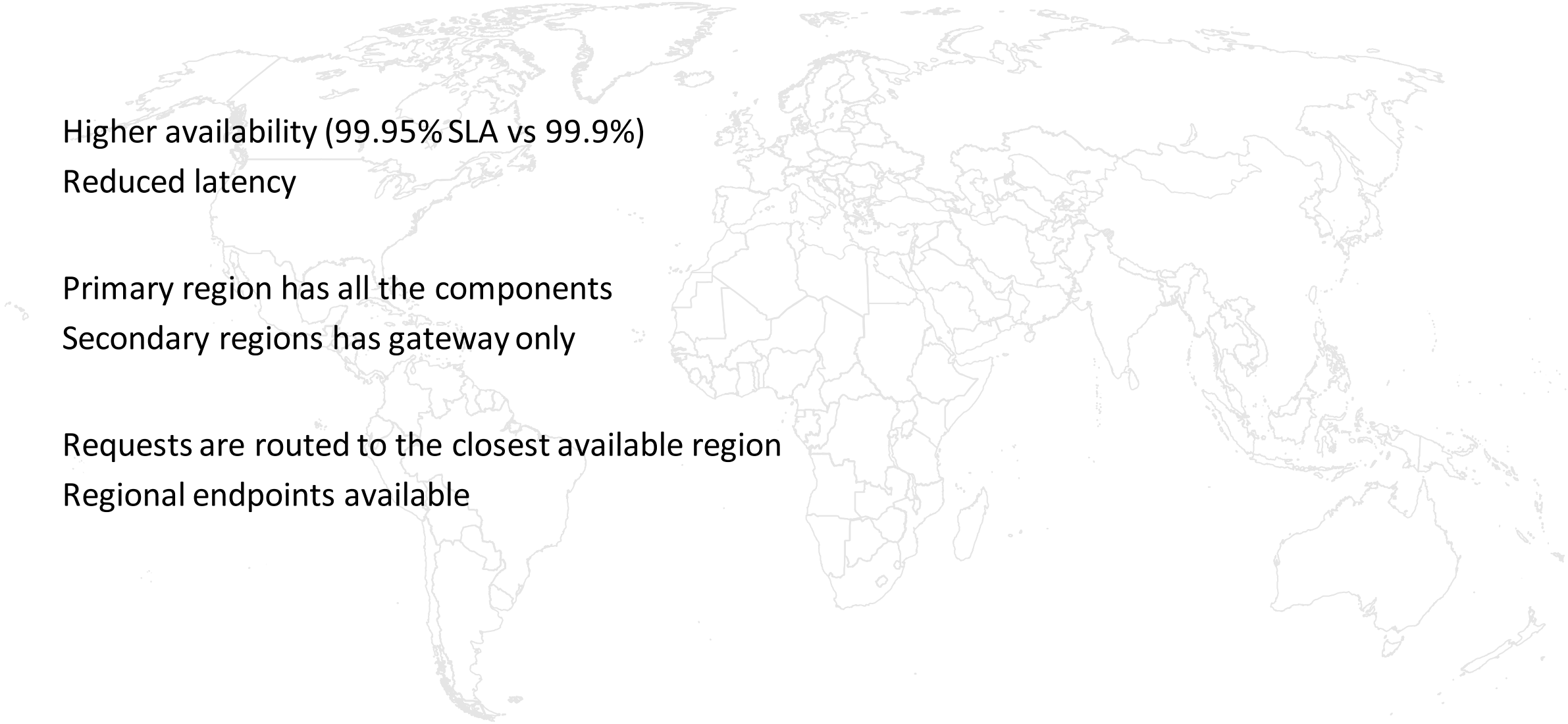

Demo:
Usage analytics

Regional availability

32 public regions in Americas, Europe, Asia and Australia

6 US Government regions and 4 regions in China

Multi-region in Premium

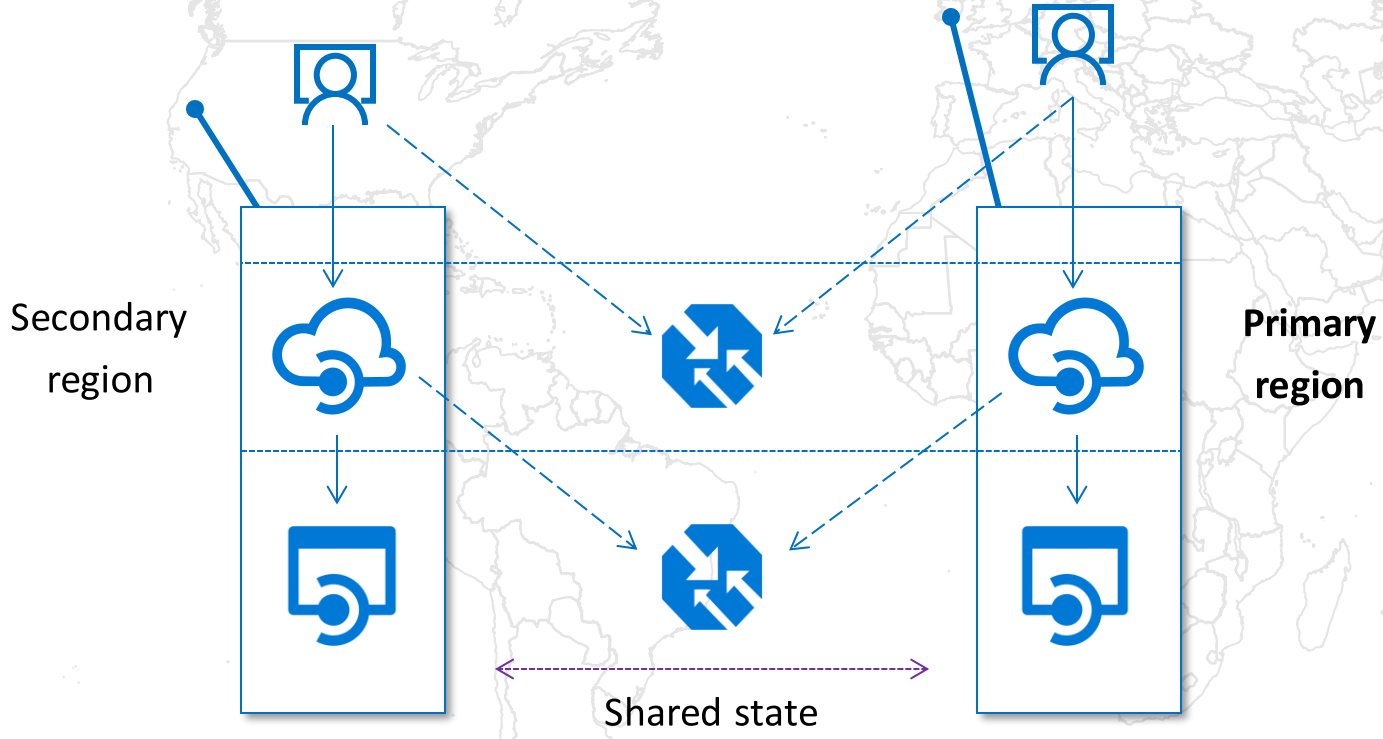


Higher availability (99.95% SLA vs 99.9%)
Reduced latency

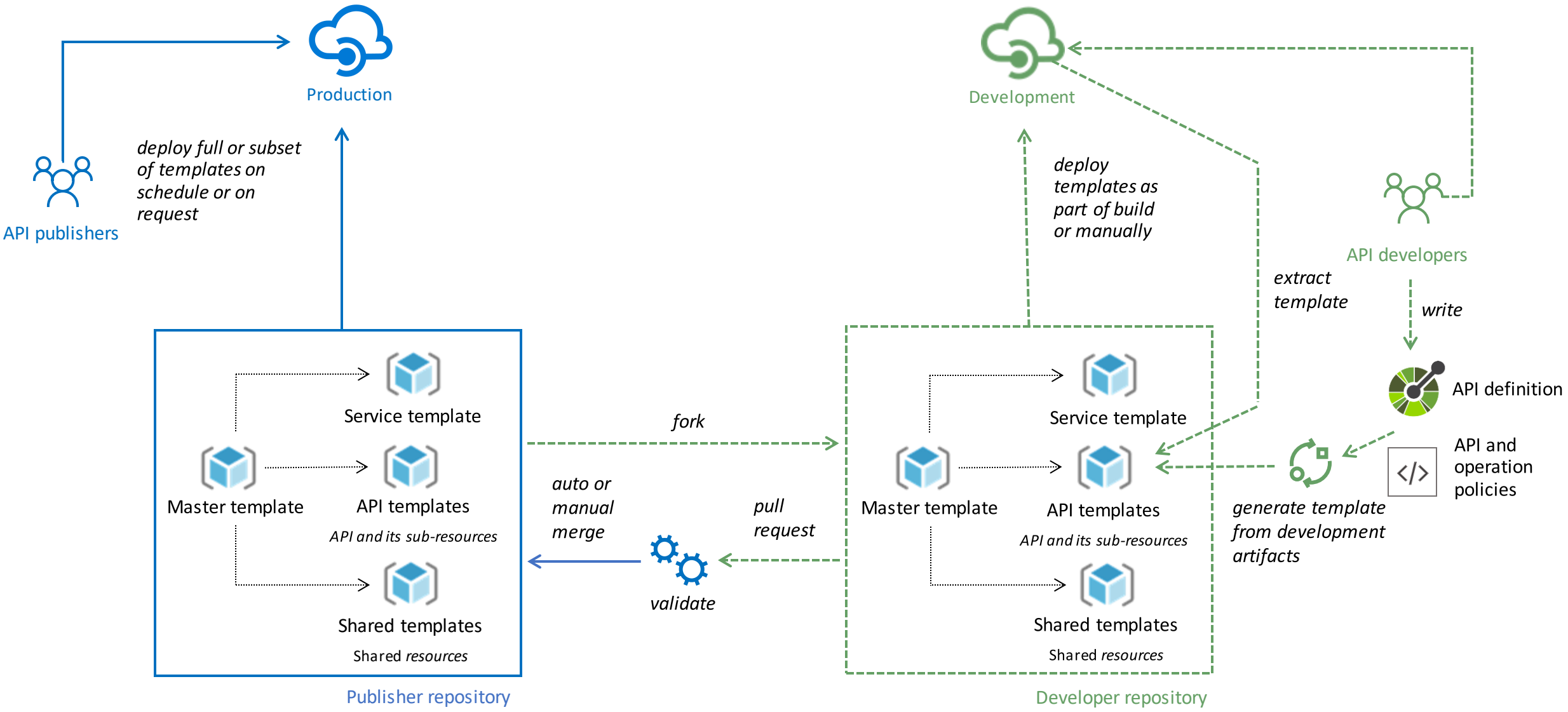
Primary region has all the components
Secondary regions has gateway only

Requests are routed to the closest available region
Regional endpoints available

Default multi-region topology



Automation


Production
API publishers
deploy full or subset of templates on schedule or on request
Development
deploy templates as part of build or manually
API developers
extract template
write
API definition
API and operation policies
generate template from development artifacts
Service template
Master template
API templates
API and its sub-resources
Shared templates
Shared resources
fork
auto or manual merge
pull request
validate
Publisher repository
Developer repository

Additional resources

Tutorials, documentation, and references	http://aka.ms/apim**docs**
Public discussion forum	http://aka.ms/apim**so**
Reusable policy examples	http://aka.ms/apim**policyexamples**
DevOps guidance and tools	http://aka.ms/apim**devops**
Public product updates	http://aka.ms/apim**updates**
Public roadmap	http://aka.ms/apim**roadmap**
Feedback and feature requests	http://aka.ms/apim**wish**
Customer stories	http://aka.ms/apim**customers**

API Management - Developer po

contoso

Home APIs Products Log In Sign Up

Welcome to Contoso

We provide industry-leading APIs for financial transactions.

Explore APIs Sign up

99.95% availability

Our reliable APIs can be used for mission-critical systems.

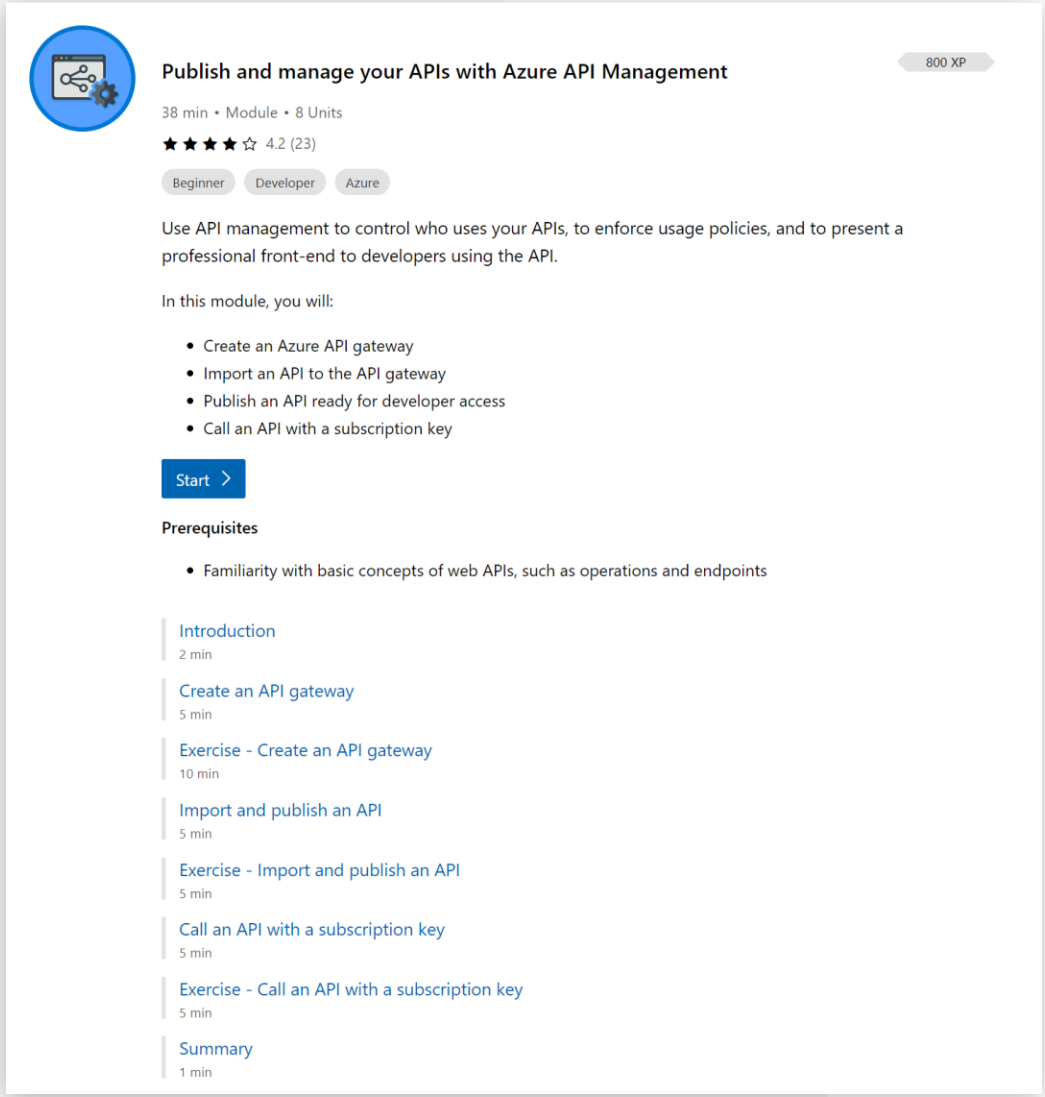
25 million API calls daily

Our APIs define the industry's standards.

1 million active users

Millions of people trust us.


Questions



Publish and manage your APIs with Azure API Management

800 XP

38 min • Module • 8 Units

★★★★☆ 4.2 (23)

Beginner | Developer | Azure

Use API management to control who uses your APIs, to enforce usage policies, and to present a professional front-end to developers using the API.

In this module, you will:

- Create an Azure API gateway
- Import an API to the API gateway
- Publish an API ready for developer access
- Call an API with a subscription key

Start >

Prerequisites

- Familiarity with basic concepts of web APIs, such as operations and endpoints

Introduction
2 min

Create an API gateway
5 min

Exercise - Create an API gateway
10 min

Import and publish an API
5 min

Exercise - Import and publish an API
5 min

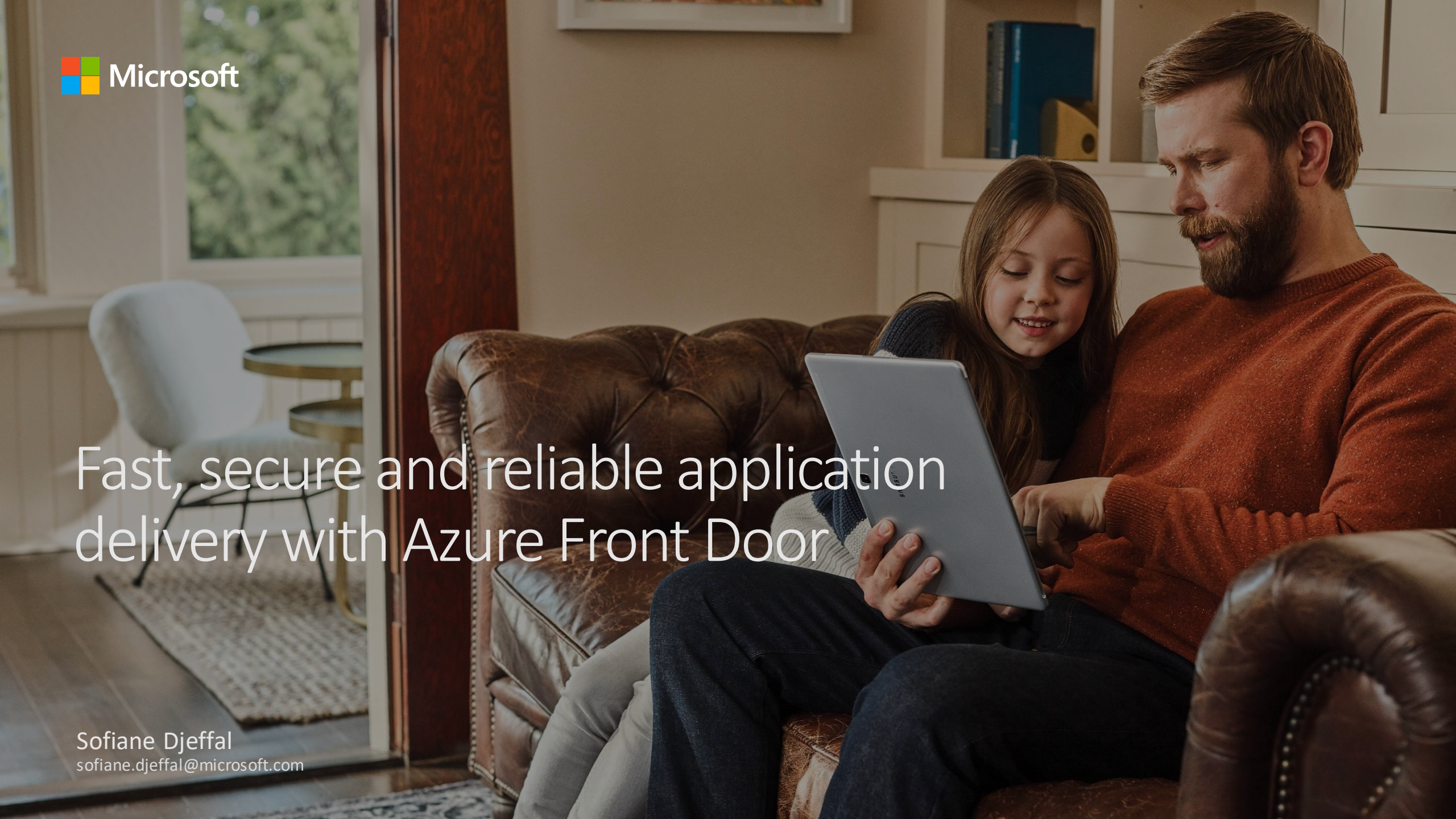
Call an API with a subscription key
5 min

Exercise - Call an API with a subscription key
5 min

Summary
1 min

Learning Paths

- Publish and manage your APIs with Azure API Management



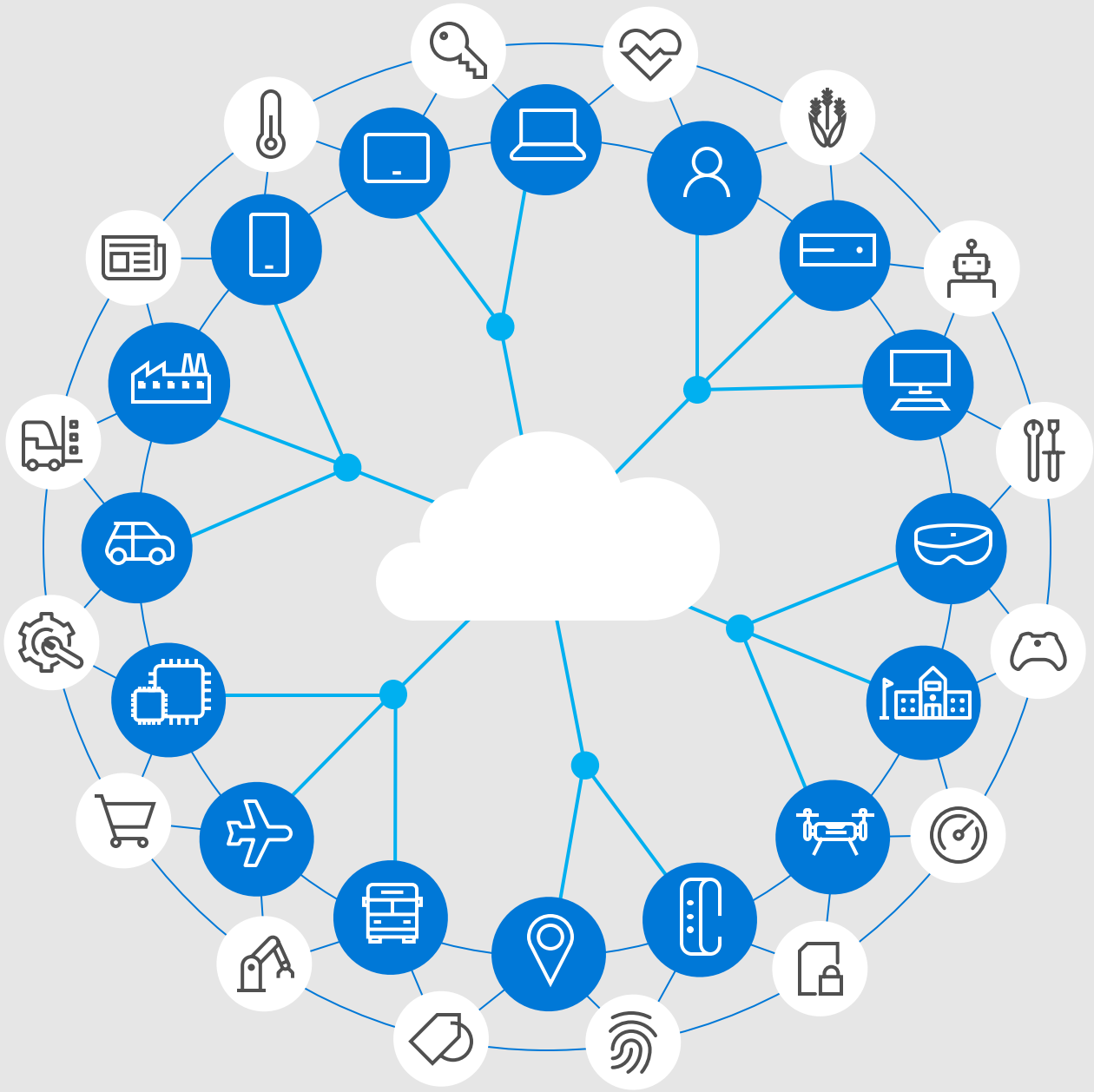
Microsoft

Fast, secure and reliable application delivery with Azure Front Door

Sofiane Djeffal
sofiane.djeffal@microsoft.com

Questions this presentation addresses

- Improved performance for global users – cost efficient
- Higher availability of web applications and microservices
- How to secure application against attacks?
- DevOps integration for application delivery and monitoring

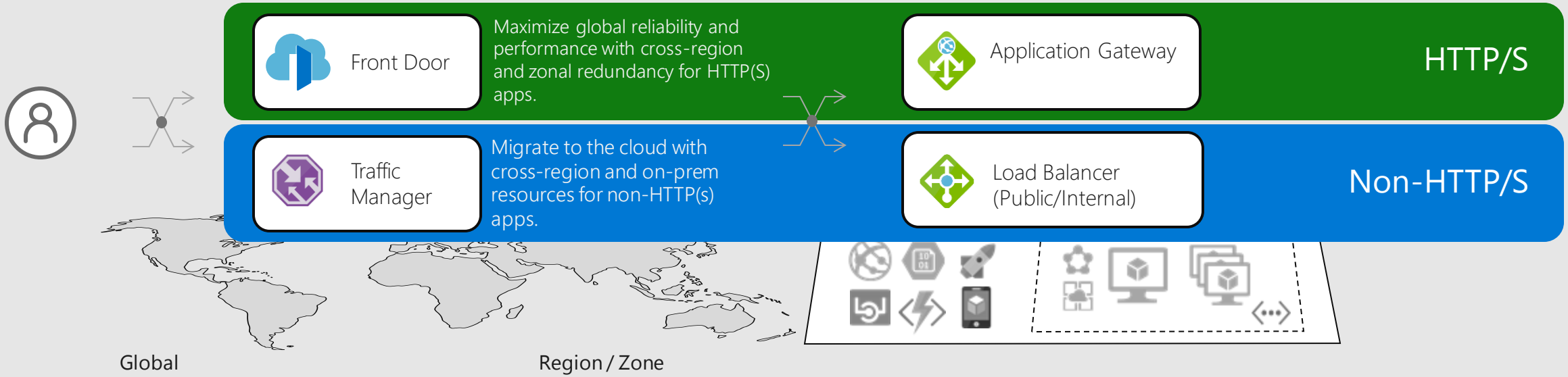


The cloud is changing the way we think about delivering content and applications over the internet.

With private global cloud connectivity from Azure, we can focus on:

- simplifying network ownership
- optimized end-to-end scenarios
- best practice architectures
- developer-centric experiences

Load balancing in Azure



Global

Route to your closest available service region or your on-prem DC. Offload SSL, improve performance / accelerate websites at the Edge.

Regional / Internal

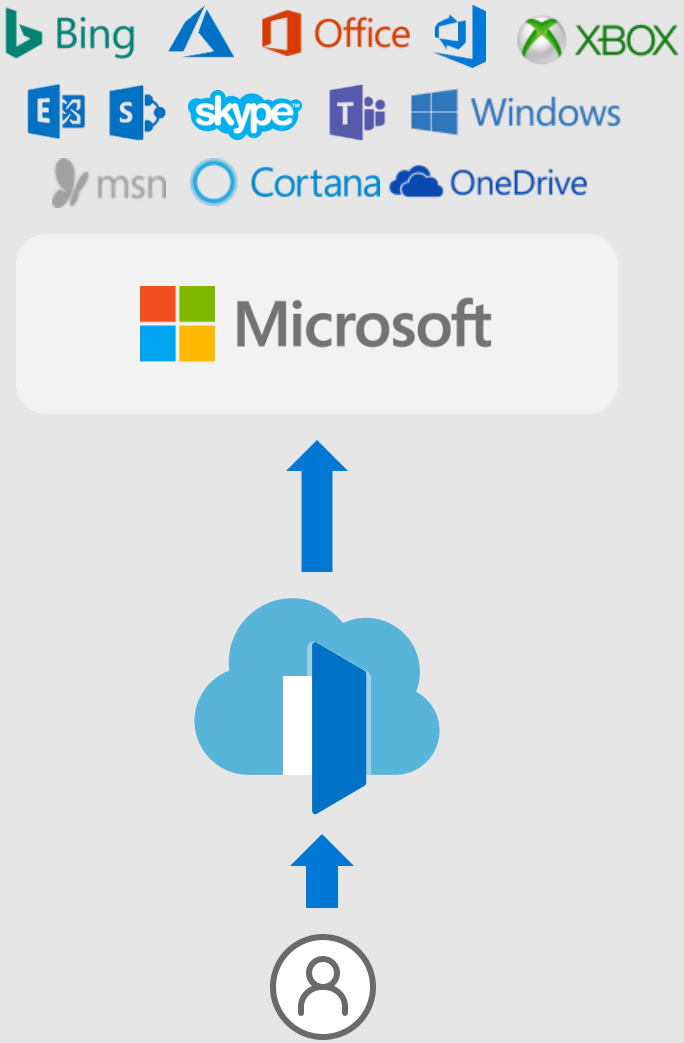
Route across zones and into your VNET. Private IP space routing and between your resources to build your regional application.

Azure Front Door Service

Build on the "battle-tested" platform used to power reliable and fast global services at Microsoft

"Azure DevOps has onboarded all of its microservices to the Azure Front Door Service over the past year. It provides us with significant benefits in terms of both performance and reliability."

Front Door enables Bing to operate at scale with competitive performance while also scaling agile development across many independent microservices.



https://azure.com/frontdoor

Azure CDN

- Static file / web site caching
- OTT video delivery
- Live video delivery
- Simple applications

Azure Front Door

- Dynamic site acceleration
- Global load balancing
- Web application protection
- Microservice apps / path based LB

Azure Front Door Service

Global secure entry-point to the cloud

- Application acceleration at Microsoft's edge
- Global HTTP load balancing with fast failover
- Massive SSL offload, integrated static caching
- Global WAF at edge, secure, protect services
- Free domain and certificate management
- Global app dashboard, service insights

Global HA, BCDR

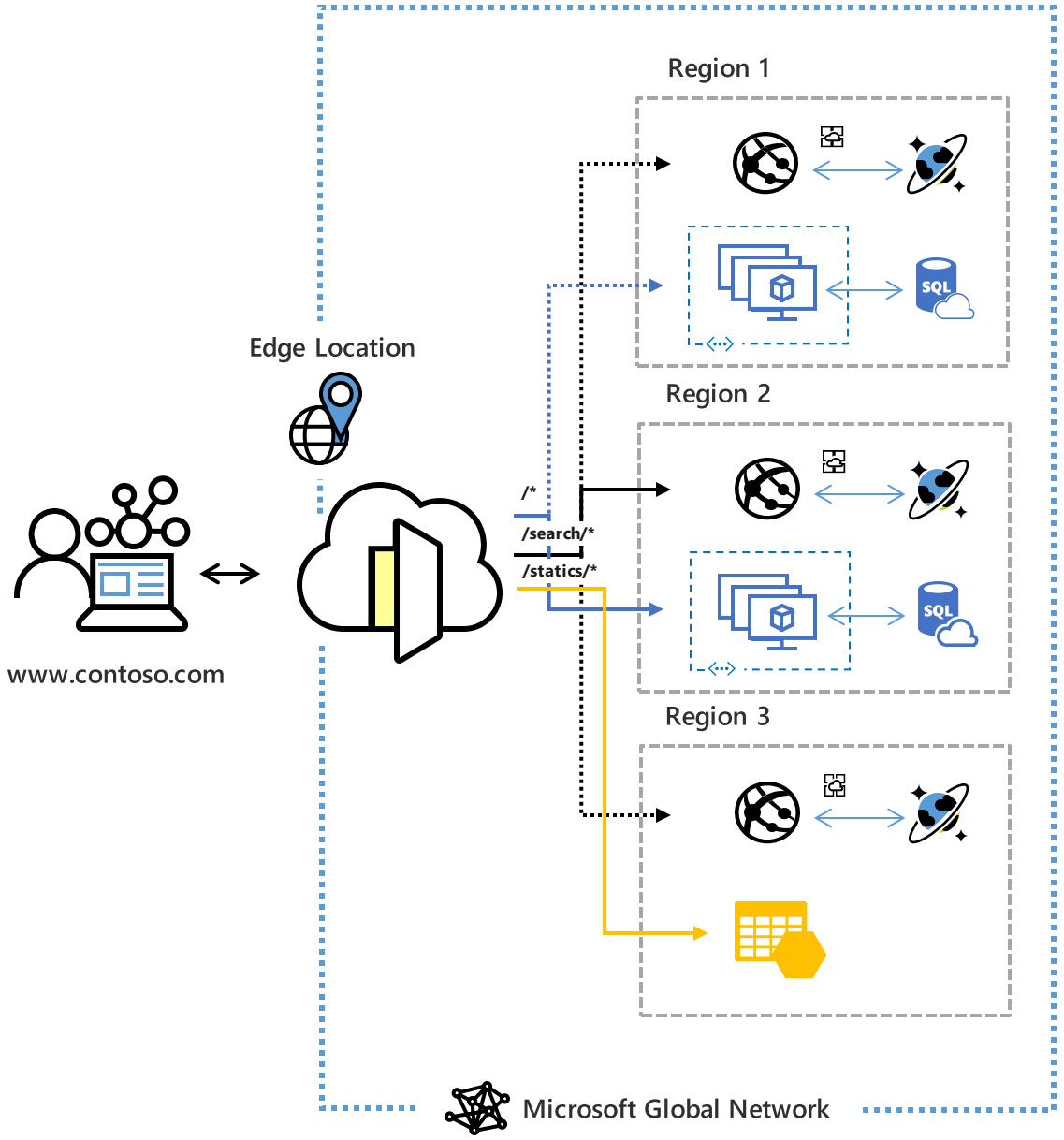
Enable fast-failover for regional services, microservices at the Edge with active path monitoring

Security at the Edge

Stop threats where they come from at the Edge with DDoS protection and customizable WAF

Faster apps

Reduce latency and increase throughput for apps by offloading SSL at the Edge and accelerating requests



Electrolux

"Electrolux is a global conglomerate of brands, selling more than 60 million products across 150 markets. Azure Front Door has enabled us to easily scale our service architecture and APIs to all our global developers and partners in the Wellbeing category.

We prefer to use integrated platform services where possible, and the fact that Azure Front Door provides global load balancing, site acceleration, security and super simple DevOps-oriented way of managing our APIs, makes it a great fit for us.

It took us 10 minutes to set up global routing for our API services, using custom domains and own SSL certs."

Andreas Larsson
Director of Engineering - Software Products

INMOBI™

"The TCP and TLS optimizations from Azure Front Door along with their global edge footprint is perfect for our high-volume services"

Ravi Krishnaswamy

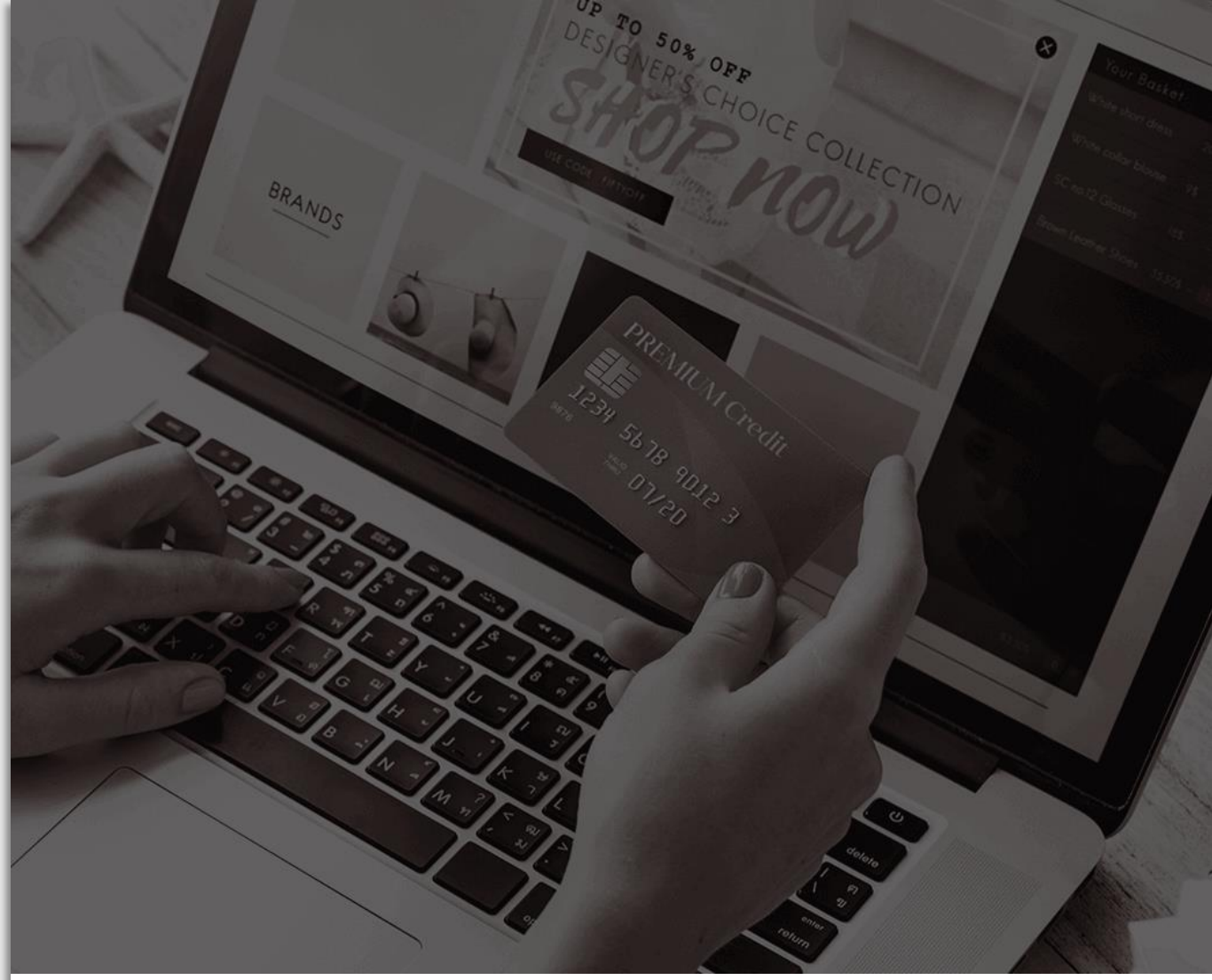
Chief Technology Officer

InMobi is a global provider of enterprise platforms for marketers. The platform enables consumers to discover new products and services by providing contextual, relevant, and curated recommendations on mobile apps and devices. Their mobile-first platform allows brands, developers and publishers to engage consumers through mobile advertising

eshopworld

"Azure Front Door Service allows us to manage our costs in a predictable way whilst ensuring performance for our end users"

Colin Farrelly
DevOps SME



eShopWorld is an eCommerce company that provides a technology platform to brands and retailers that wish to sell online into global markets. Their technology makes brands' websites feel local to the shoppers in those countries, and manages the end-to-end buyer journey, from checkout to returns.

Azure Front Door - Scenarios

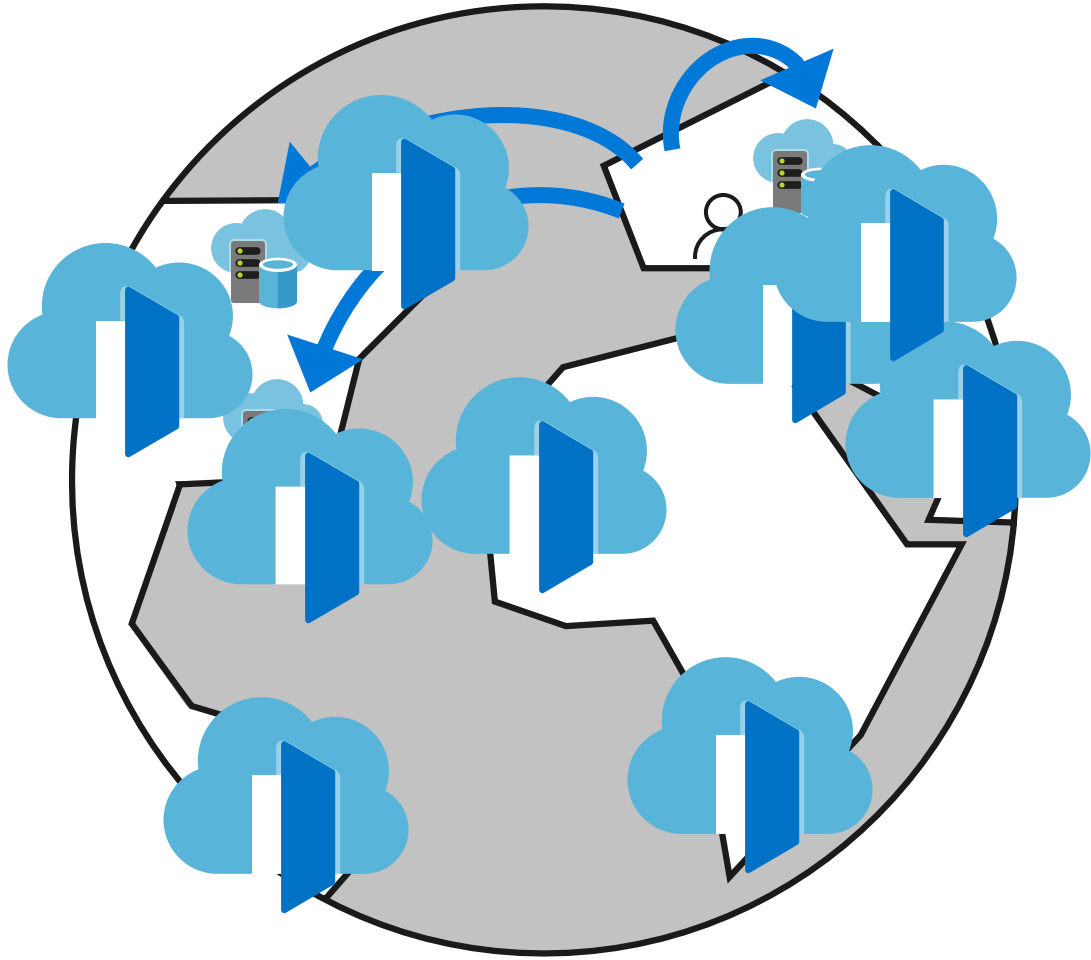
HTTP/HTTPS load balancing at global scale

Active probing for fast failover

- Active health and latency probing for each backend per POP
- As soon as backend is detected as unhealthy, AFD fails over to the next fastest and available backend
- Being in the data-path means global instant failover
- Optimized for best client experience

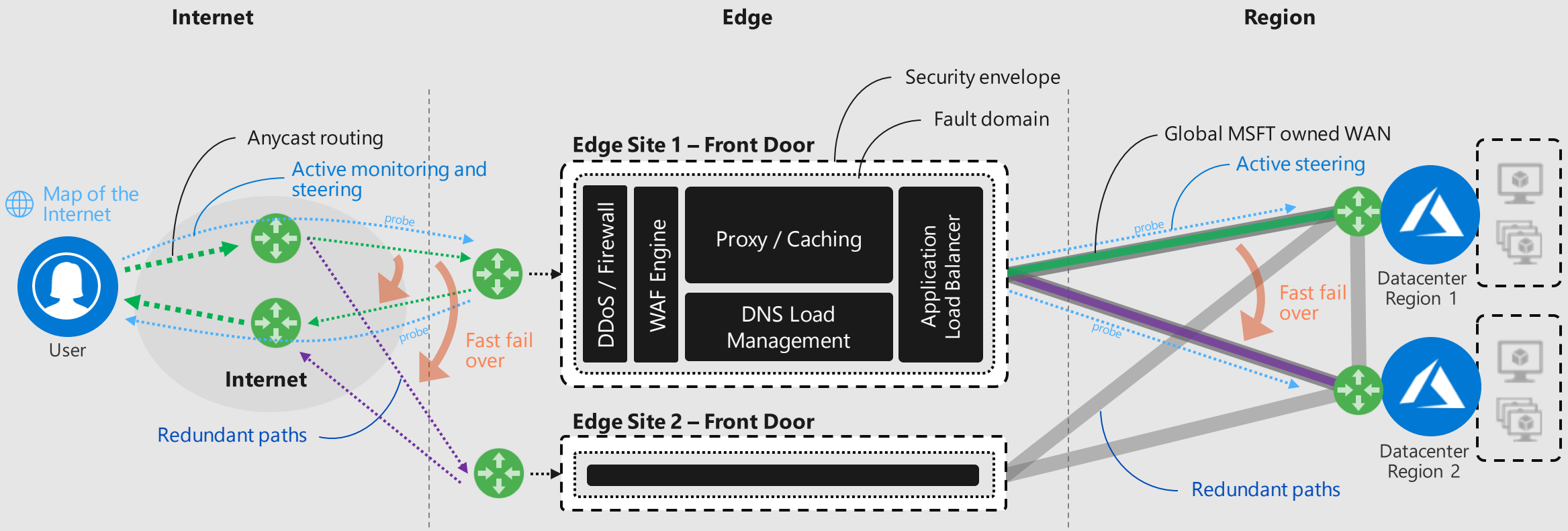
Anycast failover

- Built-in resiliency – POPs are Anycast based and so your DNS request goes to a one/two IP addresses globally.
    - So, if one of our POP goes down BGP does auto-failover to the next closest POP
- No failover delays due to DNS caching



Enterprise grade architecture with Front Door

High availability though consistent redundancy, edge-isolated fault-domains and live steering



Azure Front Door - Scenarios

Global app acceleration for single or multi-region deployments

Global Anycast architecture

- Your domains announced from each POP connecting user to the nearest AFD site

Per POP and per app server latency profile

- Each POP knows the fastest and most available backend
- Options to load balance or send traffic to fastest backend

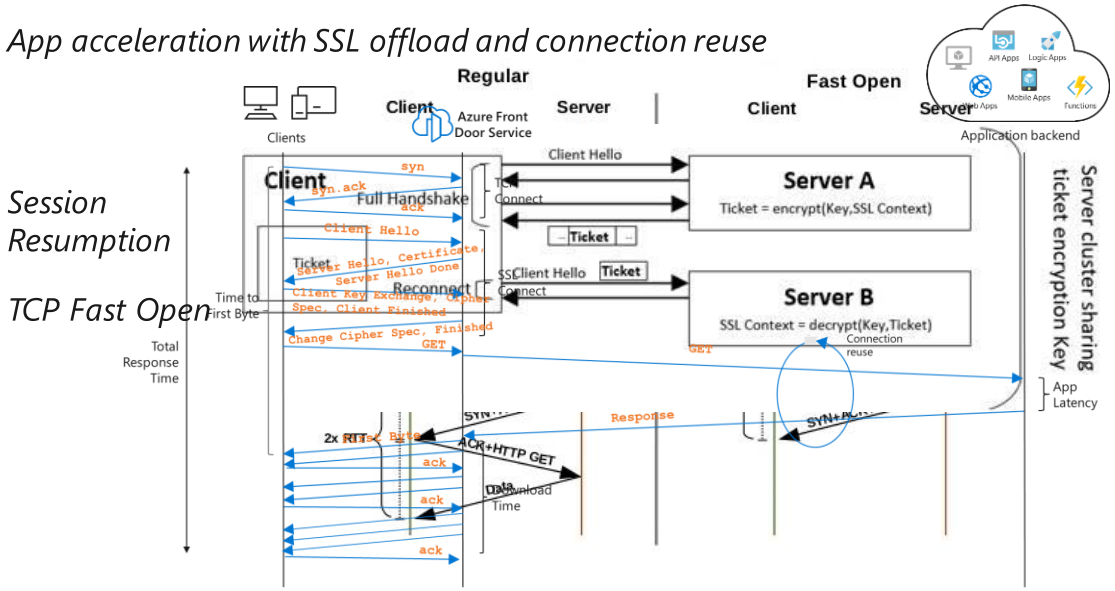
Best in class protocol support

- Support for HTTP/2, SSL resumption and TCP Fast Open ensures faster and more resilient client connectivity.

WAN optimizations

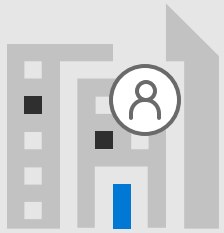
- Constantly monitoring and optimizing our WAN for best experience

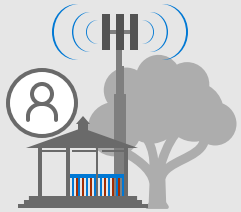
App acceleration with SSL offload and connection reuse



Fast and reliable delivery of apps, services, APIs…

Clients

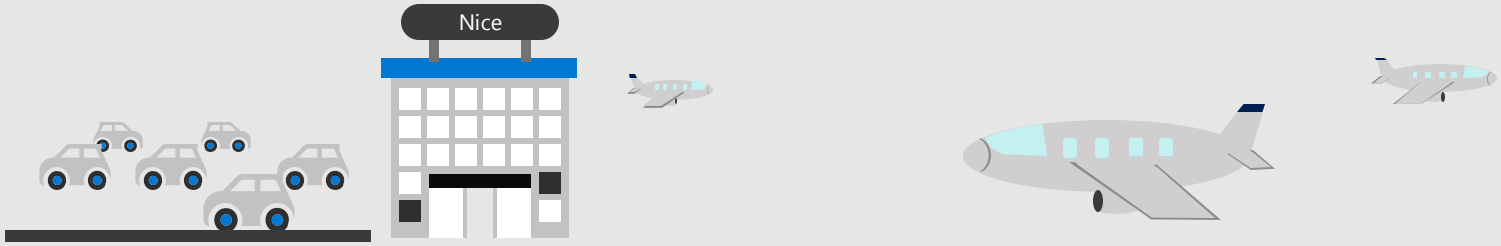




Connecting to the Cloud without Dynamic Site Acceleration (DSA)

Connecting directly to cloud services relies on "last-mile", unoptimized solutions to traverse global connections at high cost

Connecting to the Cloud with typical DSA platforms

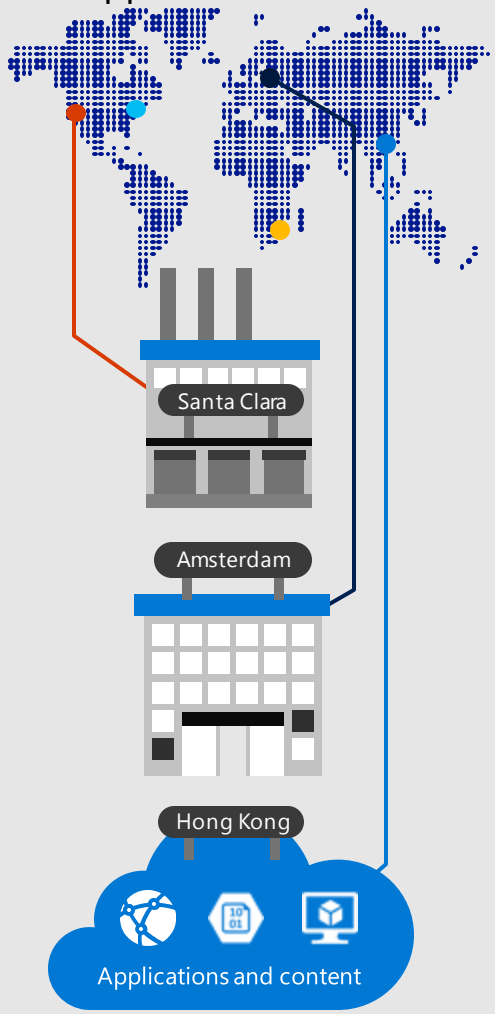


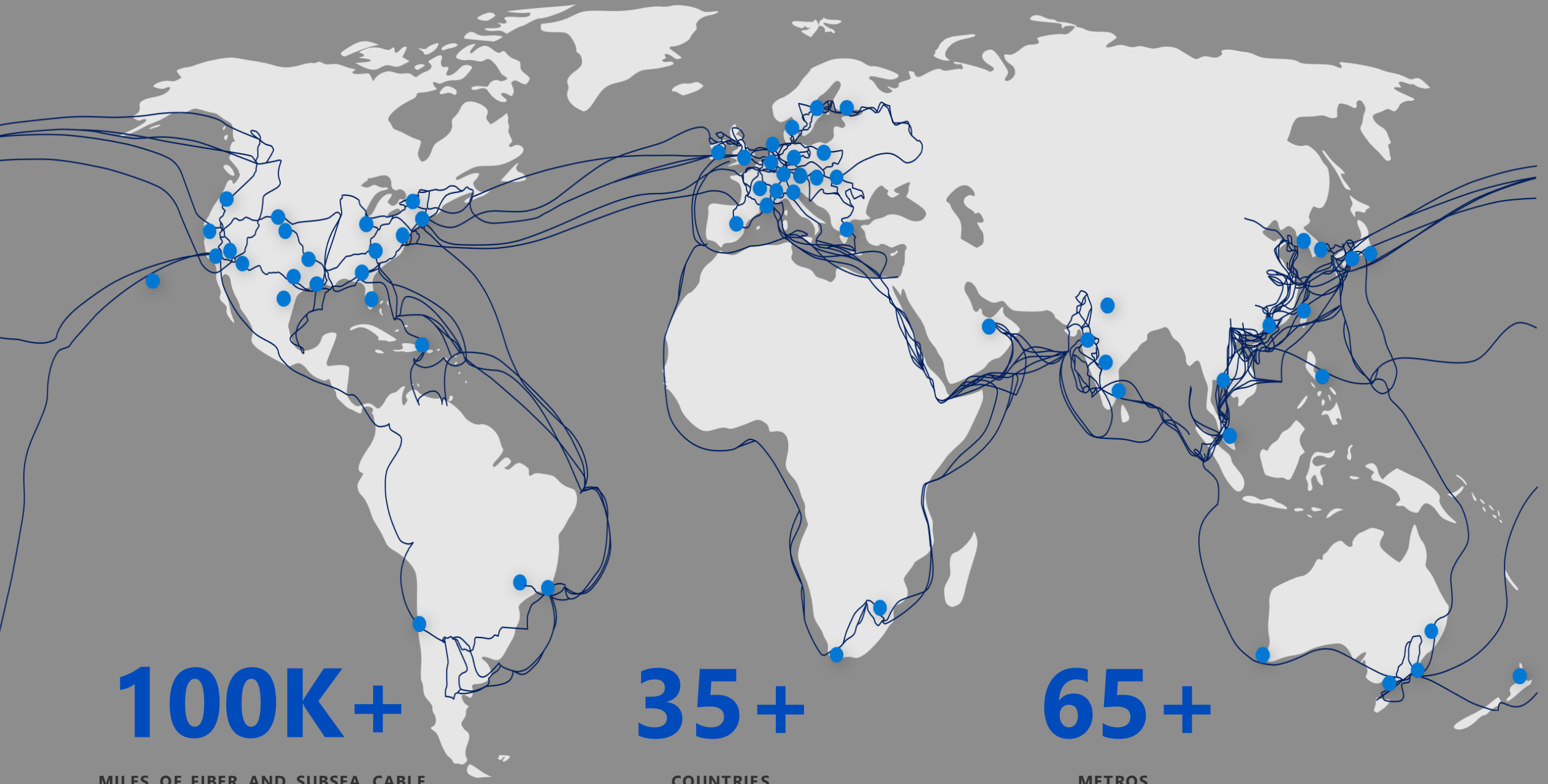
ADN serves as **distribution**, **routing**, and **logistics** to enable delivery and cost by **optimizing local and global connections separately**

Connecting to the Cloud with Azure's DSA offering - Front Door

Front Door further enhances global connectivity for applications by using **Anycast** protocol and **Microsoft's Global network** thereby **guaranteeing higher availability and reliability while maintaining performance**

Application Server





100K+

MILES OF FIBER AND SUBSEA CABLE

35+

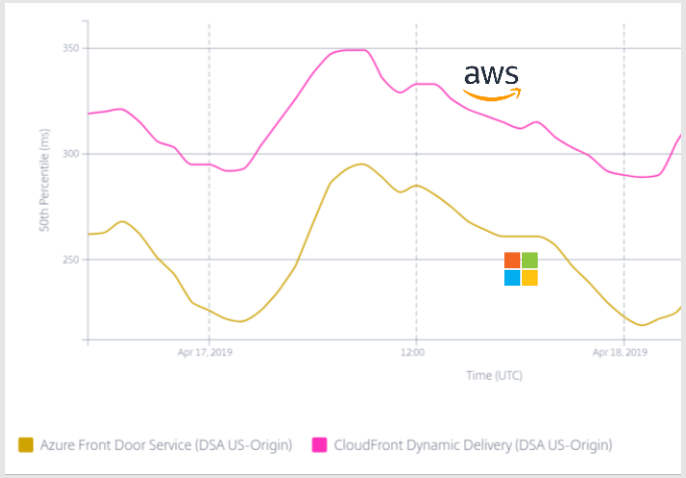
COUNTRIES

65+

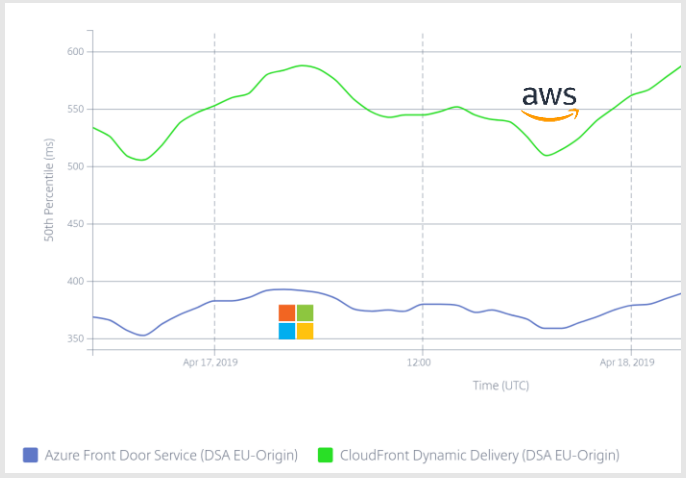
METROS

Azure Front Door latency vs. AWS Cloudfront

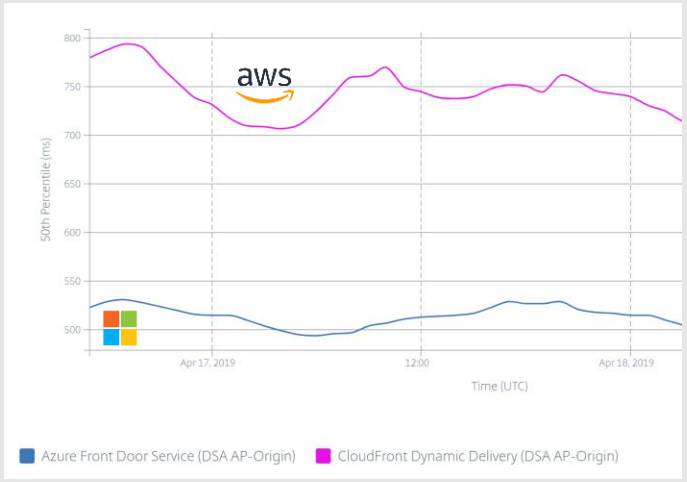
Measurements below are application latency from public Cedexis.com users (DSA/proxy latency).
Lower is better.



Cedexis Origin in US
(-60ms)



Cedexis Origin in EU
(-200ms)



Cedexis Origin in AP
(-250ms)

** Internal assessment shows that the numbers will be even better if origin is in Azure*

Stop global attacks with WAF at edge

Scalable, best practice WAF on demand

- ✓ Always on inline protection, usage-based meters
- ✓ Stops attack close to the sources
- ✓ DDoS resilient
- ✓ Best practice OWASP top 10

Stopped at the edge

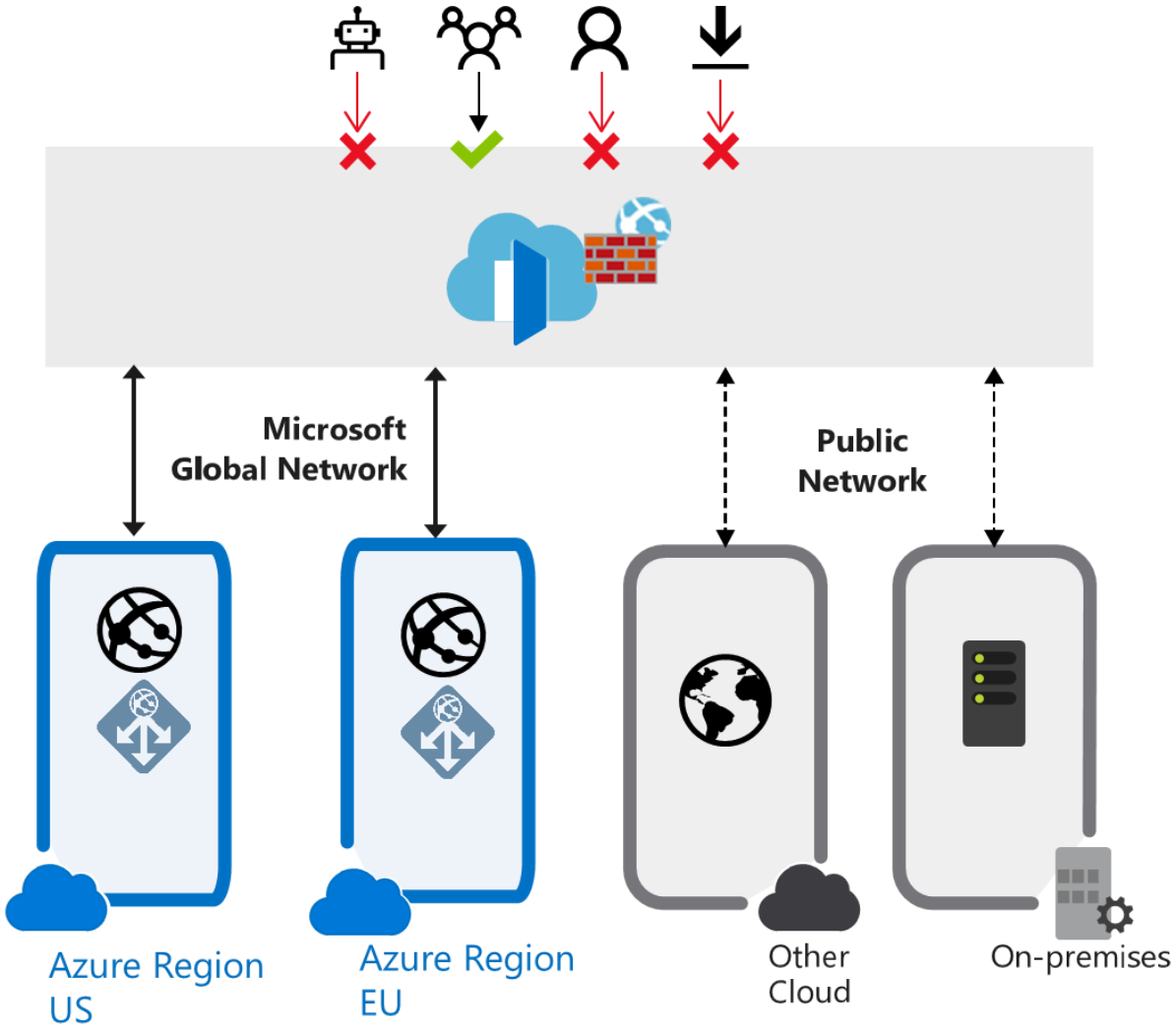
Maximize availability while saving on cost by protecting global services at the edge with unified rules and global actions.

Robust, real-time apps

Quickly add-on WAF to improve service reliability through best practice patterns, bot detection and custom rules.

Understand attacks

Get detailed attack logs for each blocked request; understand the who, when and why in detail or globally track block statistics.



WAF at Front Door / CDN feature list

Global, network DDoS defense at edge

Customizable access control

IP allow or block list

Geo filtering

Http parameters matching

Request methods restriction

Size constraint

Preconfigured OWASP TOP 10 ruleset

Conditional rate limiting

Match condition

Rate threshold

Bot manager basic (planned for GA)

Detect malicious bots based on Microsoft Threat Intelligence feeds

Flexible Actions

Allow, Block, Monitor, or Redirect

Custom response code and message

DevOps integration

API, PS, Azure CLI and Portal

WAF logs integrated with Azure monitoring

Near real time dashboard

Customer storage account, Event hub, log analytics

WAF Pricing

WAF policy charges : $5 per policy per month

Custom rules:

$1 per rule per month

$0.60 per million requests

Azure Managed Ruleset:

$20 per month

$1.00 per million requests

Azure Front Door - Scenarios

Global domain and certificate management with massive SSL offloads

Onboard multiple custom domains

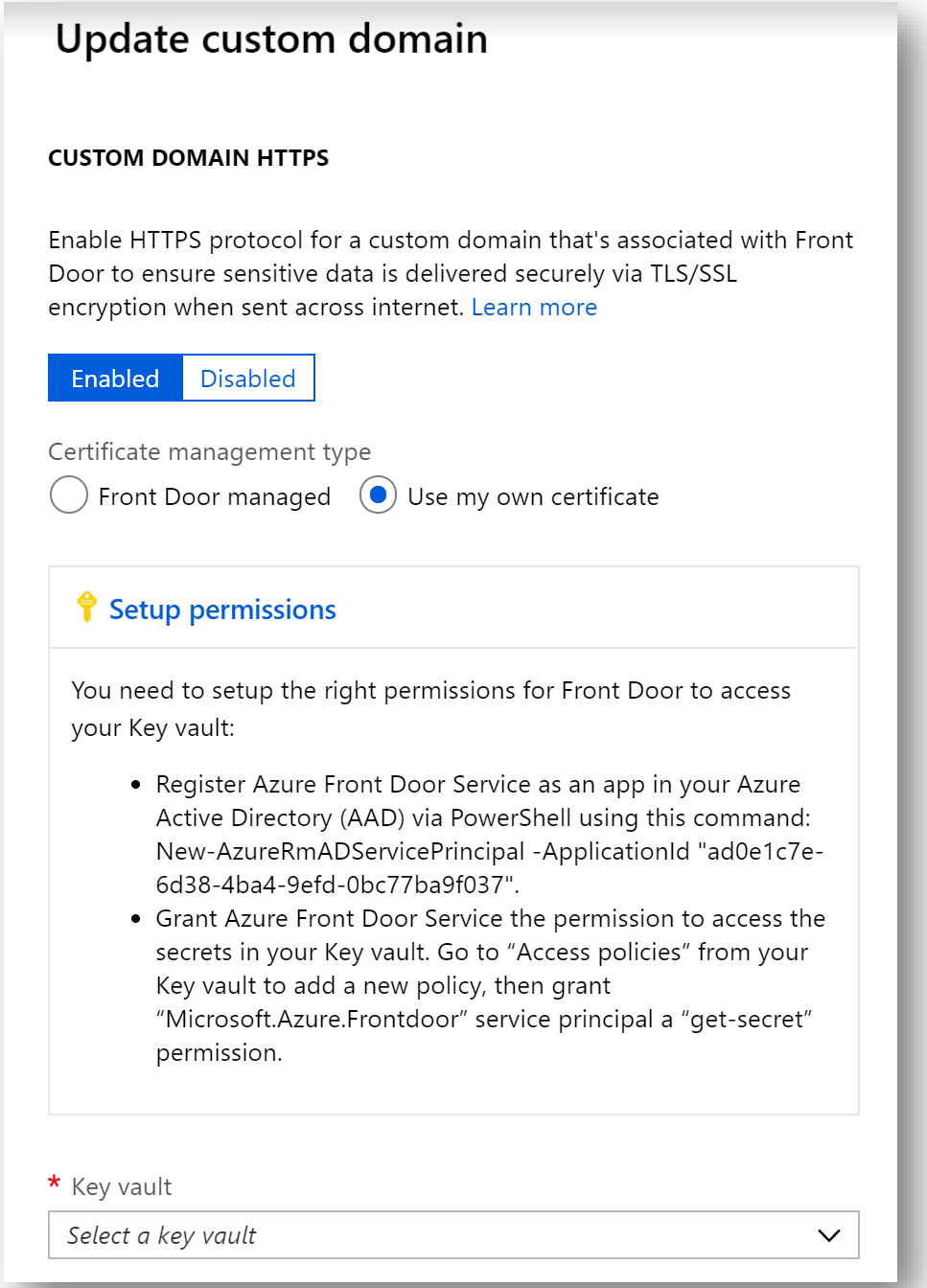
- Each Front Door can have over 100s of custom domains
- Single dashboard for easy management of traffic routing

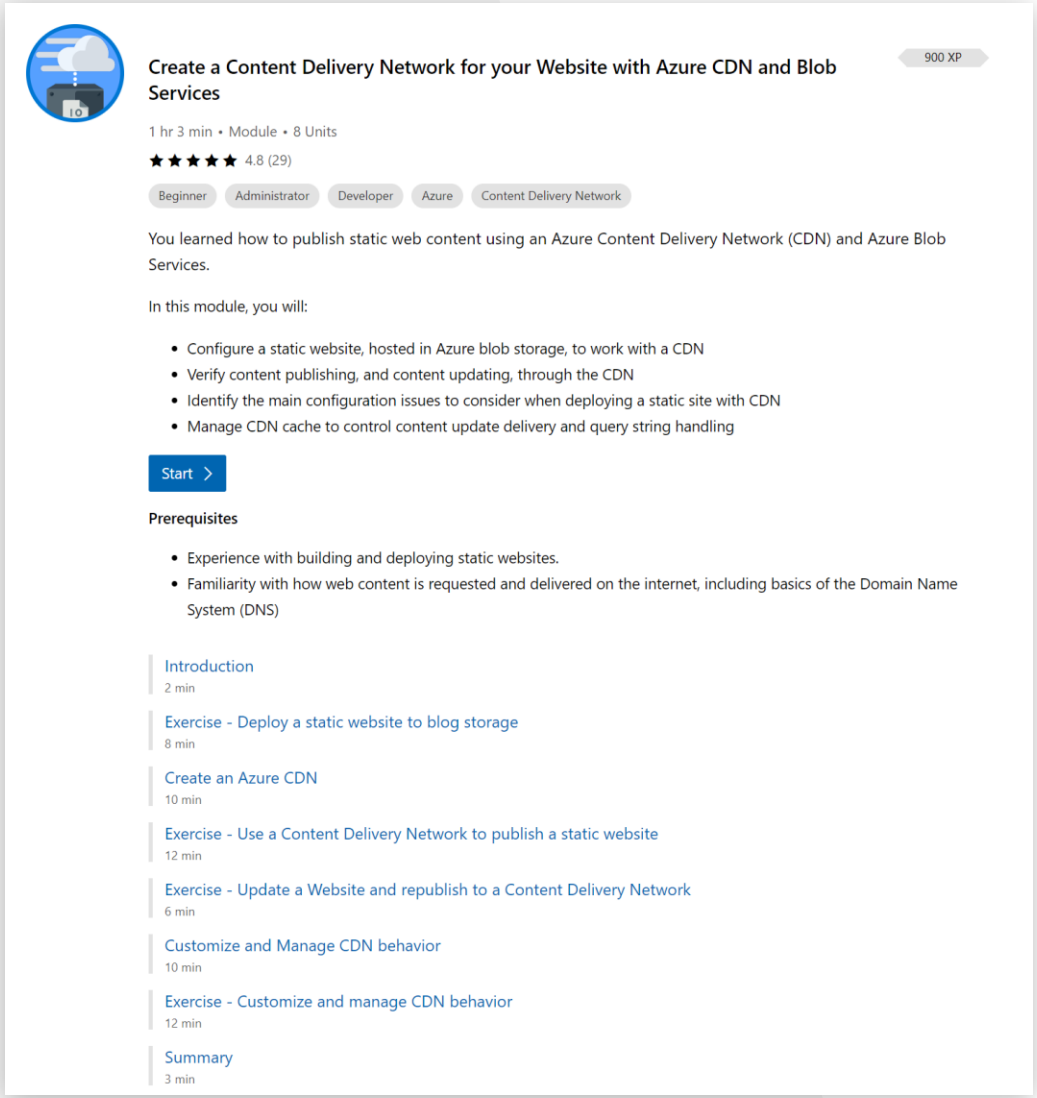
Free and custom certificates

- You can leverage free certs managed, auto-rotated by AFD
- You can also use your own custom SSL certificate

No additional cost

- No extra charges for certificates





Create a Content Delivery Network for your Website with Azure CDN and Blob Services

900 XP

1 hr 3 min • Module • 8 Units

★★★★★ 4.8 (29)

Beginner | Administrator | Developer | Azure | Content Delivery Network

You learned how to publish static web content using an Azure Content Delivery Network (CDN) and Azure Blob Services.

In this module, you will:

- Configure a static website, hosted in Azure blob storage, to work with a CDN
- Verify content publishing, and content updating, through the CDN
- Identify the main configuration issues to consider when deploying a static site with CDN
- Manage CDN cache to control content update delivery and query string handling

Start >

Prerequisites

- Experience with building and deploying static websites.
- Familiarity with how web content is requested and delivered on the internet, including basics of the Domain Name System (DNS)

Introduction
2 min

Exercise - Deploy a static website to blog storage
8 min

Create an Azure CDN
10 min

Exercise - Use a Content Delivery Network to publish a static website
12 min

Exercise - Update a Website and republish to a Content Delivery Network
6 min

Customize and Manage CDN behavior
10 min

Exercise - Customize and manage CDN behavior
12 min

Summary
3 min

Learning Paths

- Create a Content Delivery Network for your Website with Azure CDN and Blob Services
- Load balance your web service traffic with Application Gateway

Extension resource example

Request:

PUT
/subscriptions/mysubscription/resourceGroups/myresourcegroup/providers/Microsoft.Storage/containers/myblobcontainer/providers/Microsoft.EventGrid/eventSubscriptions/mystoragesubscription?api-version={2017-04-14}

Request Body:

```
{"properties": {
    “destination“: {
        "endpointType": “WebHook",
        “properties”: {
          "endpointURL": "https://eghttpendpoint1.azurewebsites.net/api/SubscriptionTest?code=abc123"}},
    “filter ": {
      “beginsWith": "blobContainer1  ",
      "endsWith ": "*.jpg",
      "eventTypes": [ "eventType1", "eventType2", “eventType3”]
    }
  }
}
```

What an Event Subscription looks like

```
{
  "properties": {
    "destination": {
      "endpointType": "webhook",
      "properties": {
        "endpointUrl": "https://dogfoodtesting.azurewebsites.net/api/HttpTriggerCSharp1?
                        code=VXbGWce53l48Mt8wuotr0GPmyJ/nDT4hgdFj9DpBiRt38qqnnm5OFg=="
      }
    },
    "filter": {
      "includedEventTypes": [ "blobCreated", "blobDeleted" ],
      "subjectBeginsWith": “/blobServices/default/containers/mycontainer/log",
      "subjectEndsWith": ".jpg",
      "subjectIsCaseSensitive": "true"
    }
  }
}
```