Serverless Azure Automation Part 1

Event Grid & Azure Functions

Speaker: Massimo Bonanni

Technical Trainer @ Microsoft

Hello!

Thank you for joining us today

Speaker: Massimo Bonanni

- Trainer, Speaker, Writer……Geek……LEGO addicted!!!
- Based in Rome, Italy
- 20+ years of experience in IT
- 100+ sessions in technical conferences
- Former Microsoft MVP (Development tools, Windows development)
- Community Guy!!!!

linkedin.com/in/massimobonanni
massimo.bonanni@microsoft.com
github.com/massimobonanni

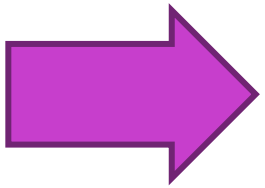
"**Automation** is the technique of making an apparatus, a process, or a system operate **automatically**."

ISA (International Society of Automation)

Automation components

React

- This component "observes" a resource or condition and reports its change.
- The two main reaction technologies in Azure are **events** and **alerts**
- Even a **timer** can be considered a react mechanism



Compute

- This component actually performs the automation task.
- The technologies used must be able to interact natively with the reaction component.
- The two Serverless technologies in Azure that integrate with events and alerts are **Azure Functions** and **Azure Logic App**.

Why Serverless?

Event-Driven Automation

Serverless platforms provide an event-driven compute platform that allows you to write code to react to critical events from various sources, enhancing automation capabilities.

Scalability

Serverless solutions automatically scale up and down in response to traffic, which is ideal for automation tasks that can vary in volume, ensuring efficient resource utilization.

Focus on Business Logic

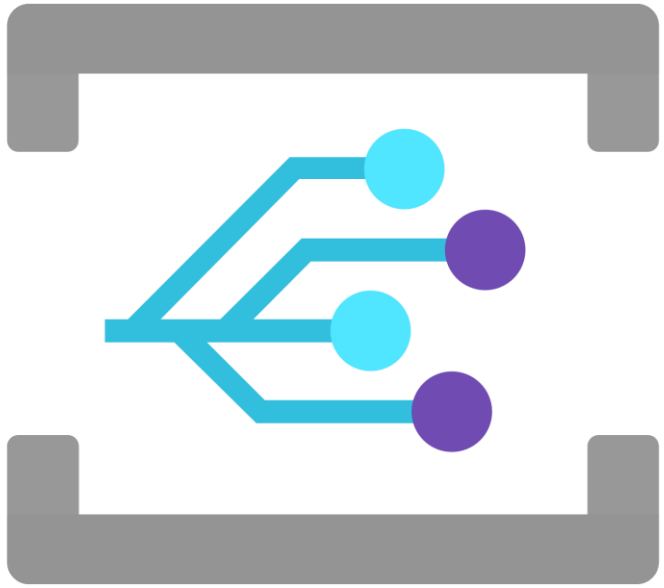
By automating server management tasks, serverless computing allows developers to concentrate on writing code and optimizing business logic, increasing productivity and efficiency.

Cost Efficiency

Serverless computing can be more cost-effective than traditional cloud services: you only pay for the resources you use, which means you're not paying for idle capacity.

Event Grid

Azure Event Grid is a complete event routing service invented to build event-based and serverless applications on Azure at an ease.



Events

An event is the smallest amount of information that fully describes something that happened in a system.

We often refer to an event as a discrete event because it represents a distinct, self-standing fact about a system that provides an insight that can be actionable.

Examples include:

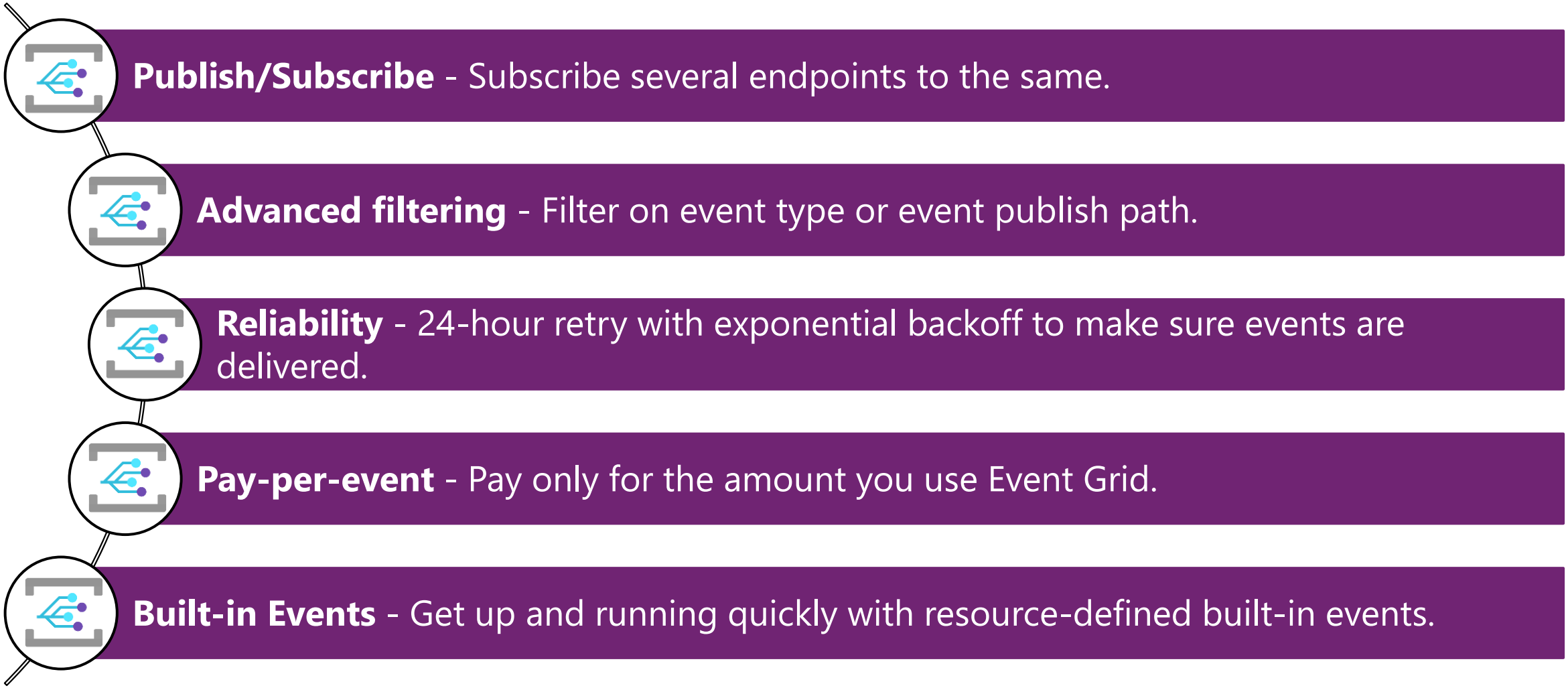
- ✓ `com.yourcompany.Orders.OrderCreate`
- ✓ `org.yourorg.GeneralLedger.AccountChanged`
- ✓ `io.solutionname.Auth.NumberOfUserLogged`

```
[
  {
    "topic": string,
    "subject": string,
    "id": string,
    "eventType": string,
    "eventTime": string,
    "data":{
      object-unique-to-each-publisher
    },
    "dataVersion": string,
    "metadataVersion": string
  }
]
```

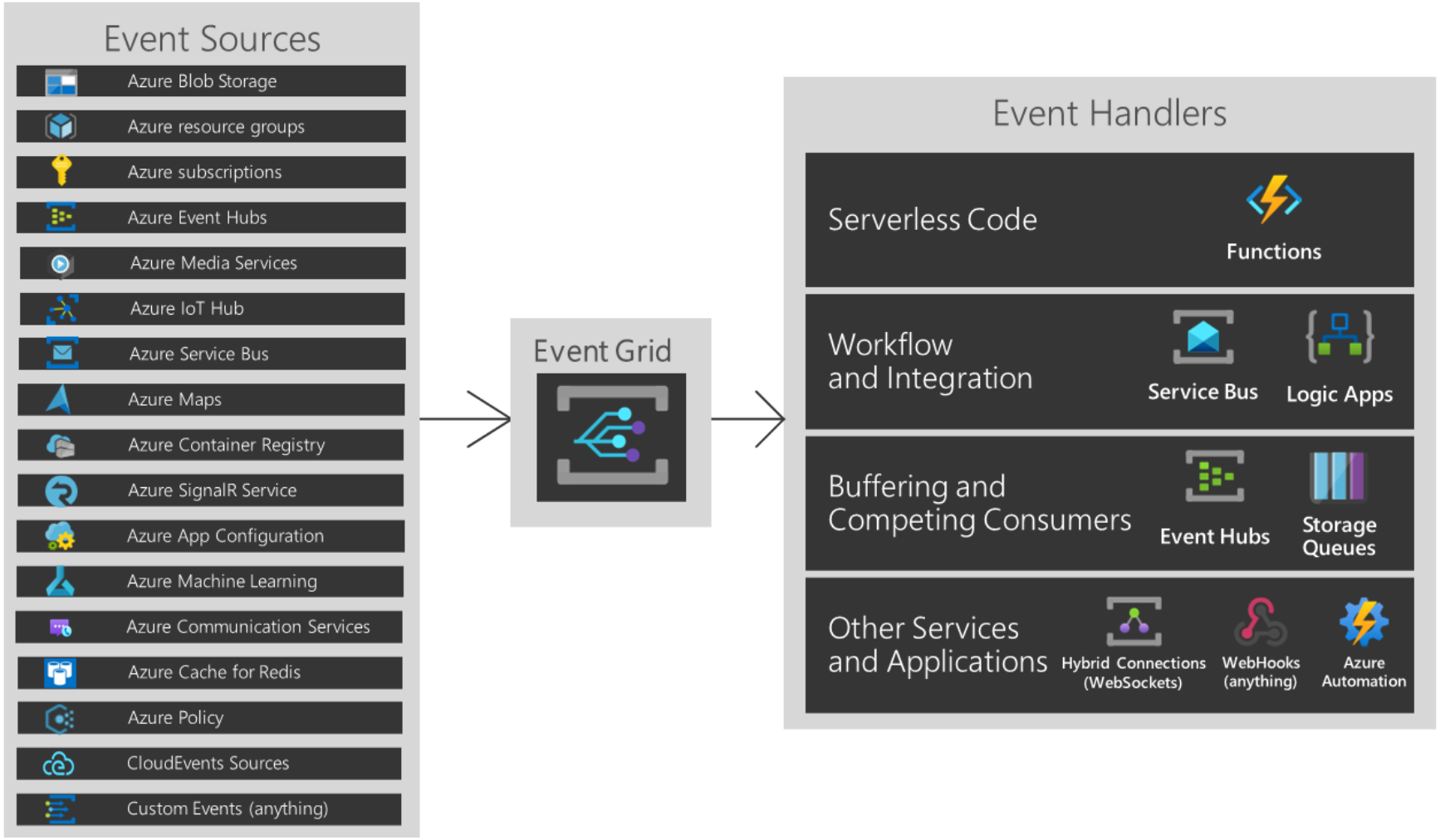
Event Schemas

- Event sources send events to Azure Event Grid in an array
- The array can have a total size of up to 1 MB
- Each event in the array is limited to 1 MB
- Event Grid sends the events to subscribers in an array that has a single event
- You can use Event Grid Schema or Cloud Schema (v1.0)

Event Grid capabilities

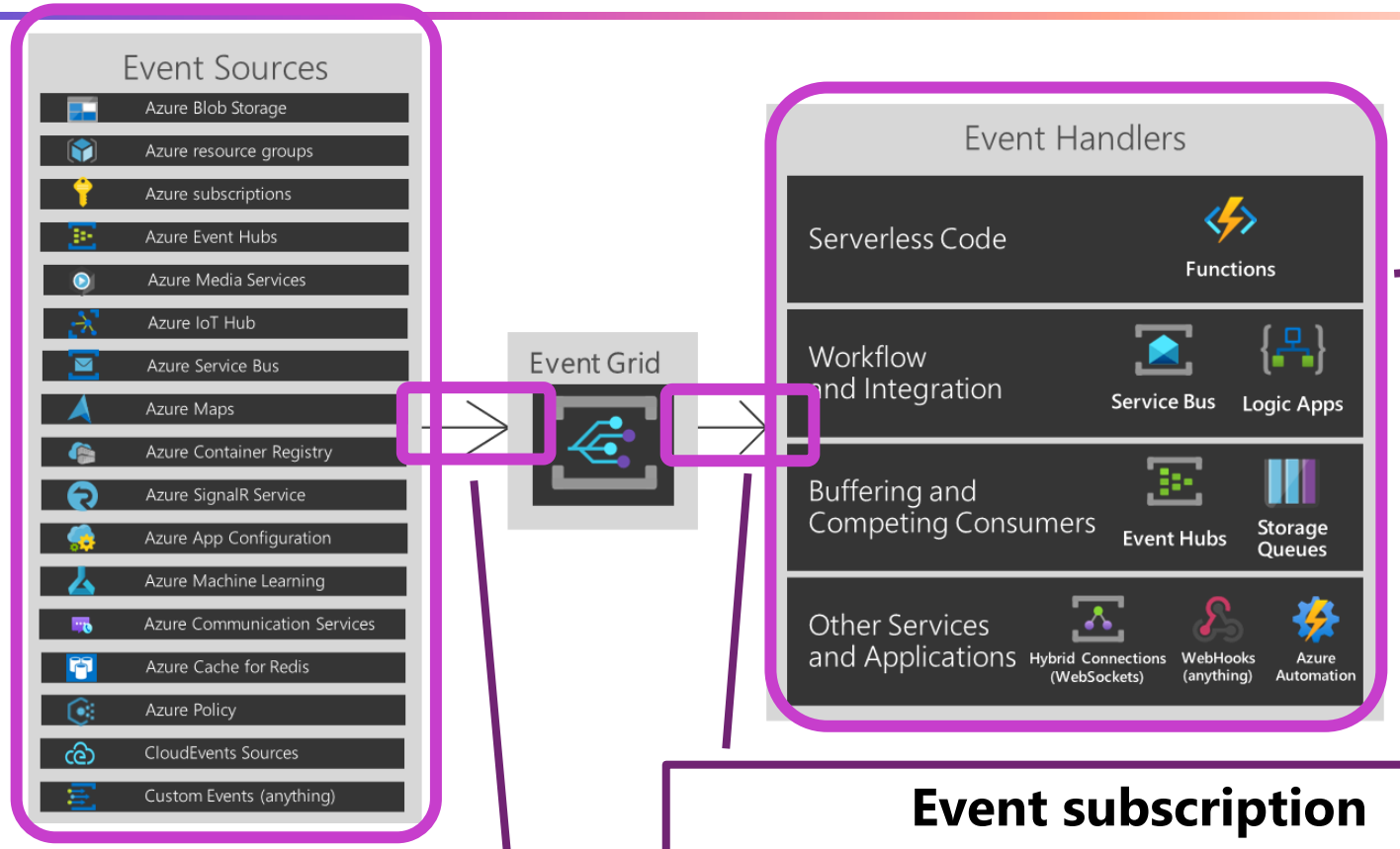


Event Grid architecture



Event Grid architecture

Event Source
An event source is where the event happens. Each event source is related to one or more event types.



Event handler
An event handler is the place where the event is sent. The handler takes some further action to process the event.

Topic
Provides an endpoint where the source sends events.

Event subscription
Tells Event Grid which events on a topic you're interested in receiving. You provide an endpoint for handling the event and you can filter the events.

When use Push Delivery

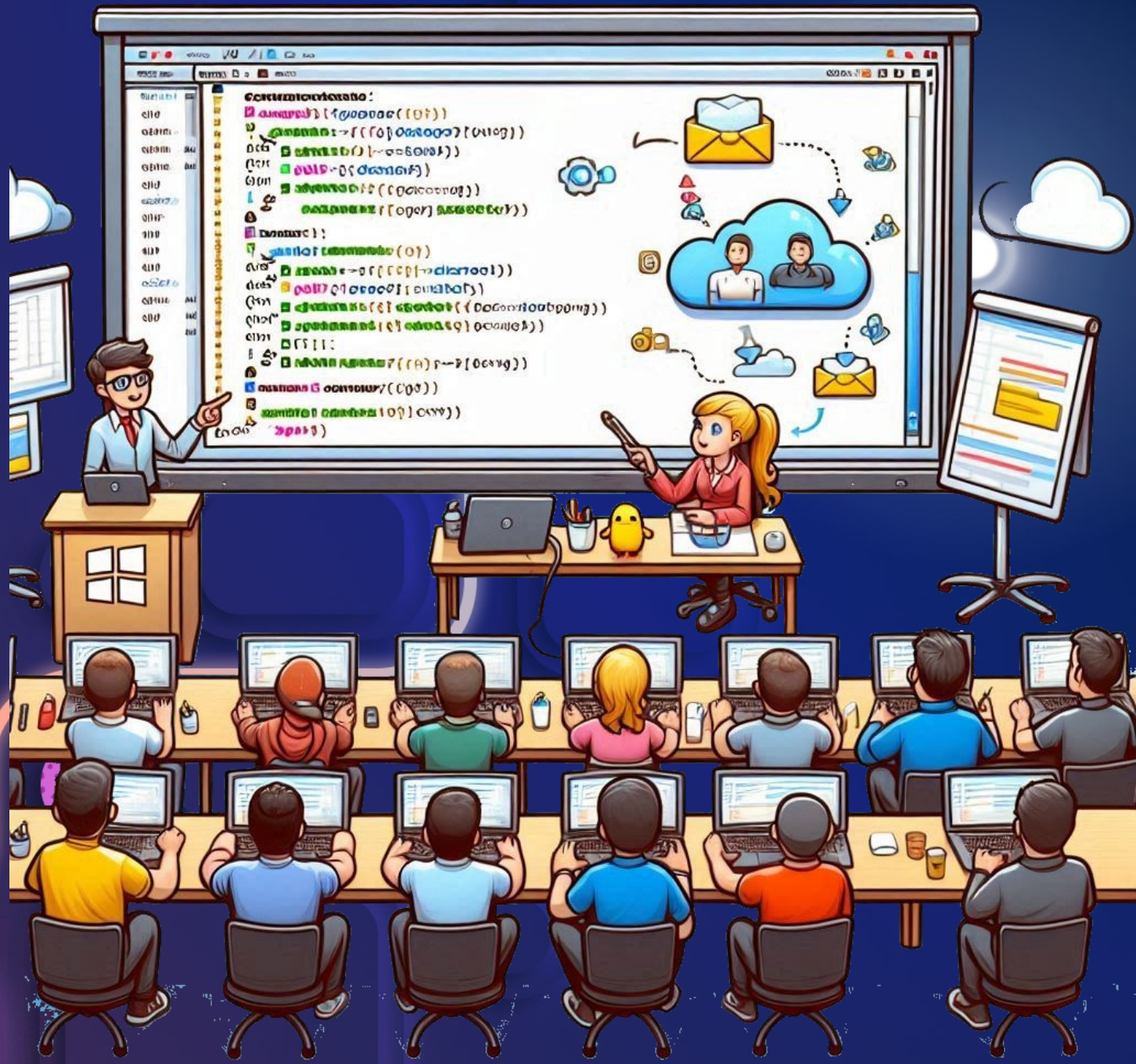
You need to receive events from Azure services, partner (SaaS) event sources or from your applications.

You want to avoid constant polling to determine that a system state change has occurred. You rather use Event Grid to send events to you at the time state changes happen.

You have an application that can't make outbound calls. Your application can receive events through a public endpoint.

DEMO

Event Grid



Event Grid Costs

Price per million operations	**$0.60**
Free usage per month	100,000 operations

Example : An **Azure Function** is connected to **Blob Storage** through **Event Grid**, and restores blobs each time a blob is deleted. In the blob storage **1 million blobs** are deleted each month - each one triggering the Function through Event Grid.

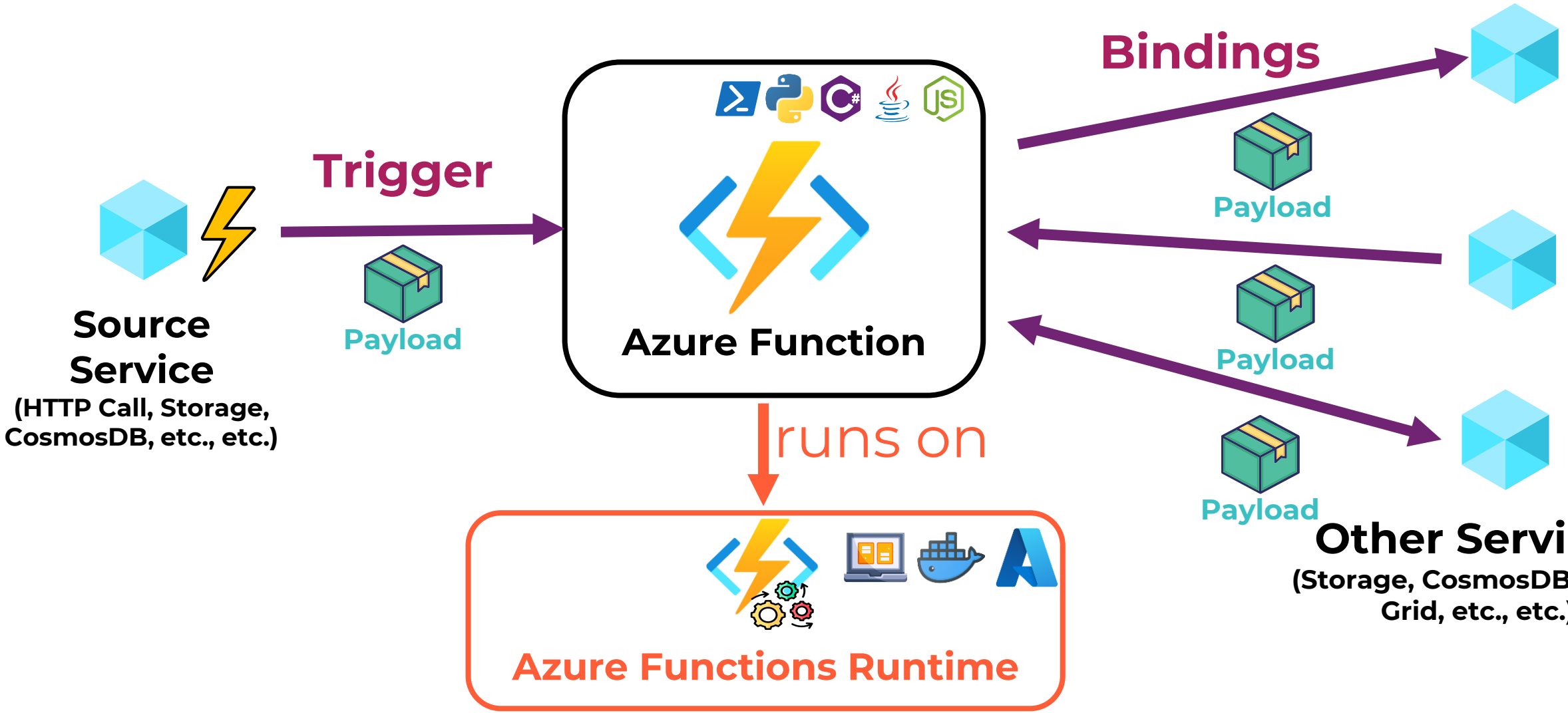
- You publish **1 million events** to Event Grid in a month.
- All events are delivered to 1 https endpoint.

Number of operations	
Published events	1 million operations
Delivery attempts	1 million operations
Monthly free grant	- 100,000 operations
Total operations Price per million operations	1.9 million x **$0.60**
Total monthly cost	**$1.14**

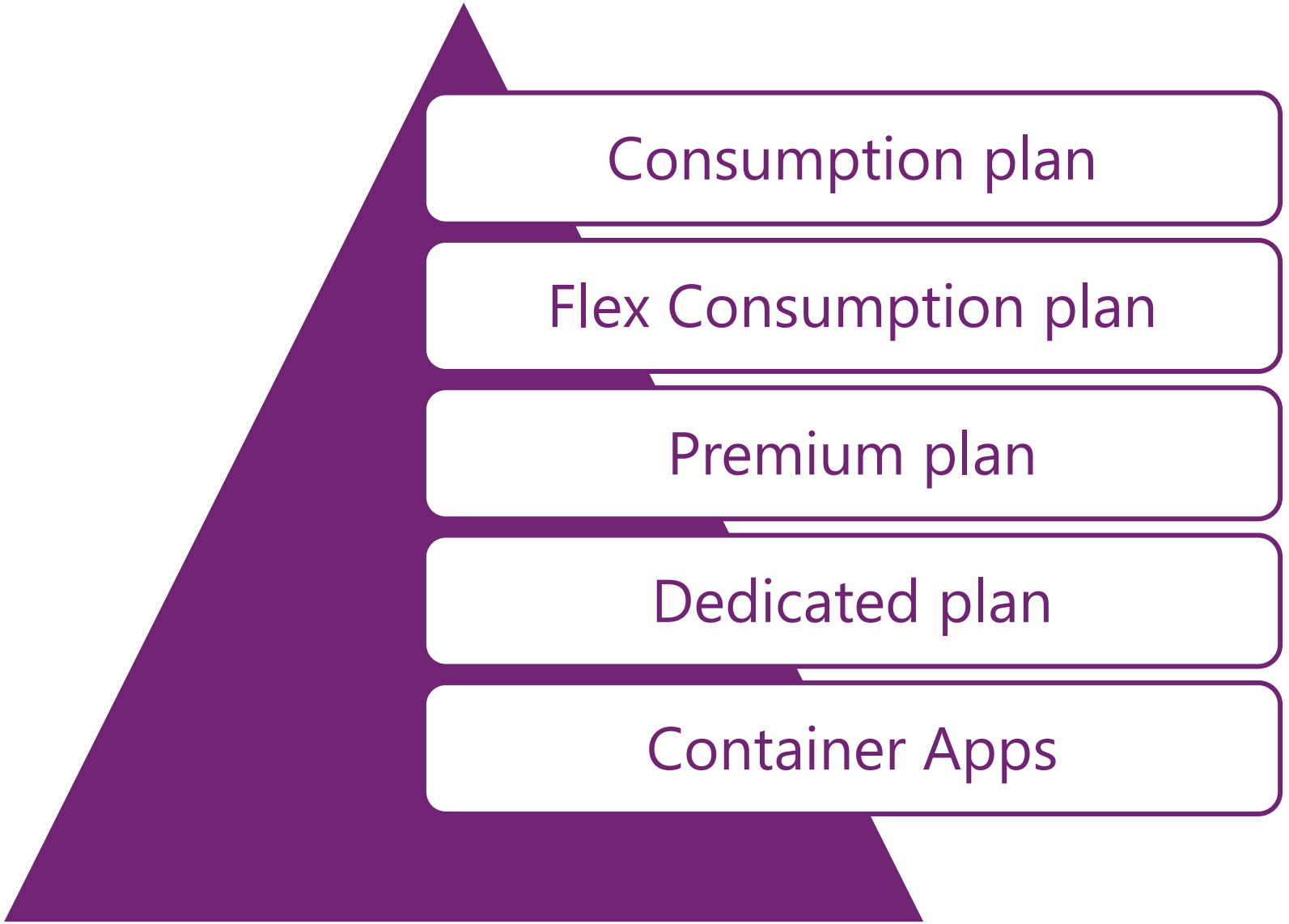
Azure Functions

Azure Functions is a serverless solution that allows you to write less code, maintain less infrastructure, and save on costs. The cloud infrastructure provides all the up-to-date resources needed to keep your applications running.

Azure Functions



Hosting


Consumption plan
Flex Consumption plan
Premium plan
Dedicated plan
Container Apps

Hosting

- Consumption plan
- Flex Consumption plan
- Premium plan
- Dedicated plan
- Container Apps

- ✓ Default hosting plan that provides true *serverless* hosting.
- ✓ Pay only when your functions are running.
- ✓ Scales automatically, even during periods of high load.

Hosting

- Consumption plan
- **Flex Consumption plan**
- Premium plan
- Dedicated Plan
- Container Apps

- ✓ Reduce cold starts by specifying a number of pre-provisioned (always ready) instances.
- ✓ Supports virtual networking for added security.
- ✓ Pay when your functions are running.
- ✓ Scales automatically, even during periods of high load.

Hosting

- Consumption plan
- Flex Consumption plan
- **Premium plan**
- Dedicated plan
- Container Apps

- ✓ Your function apps run continuously, or nearly continuously.
- ✓ You want more control of your instances and want to deploy multiple function apps on the same plan with event-driven scaling.
- ✓ You need more CPU or memory options than are provided by consumption plans.
- ✓ Your code needs to run longer than the maximum execution time allowed on the Consumption plan.
- ✓ You require virtual network connectivity.
- ✓ You want to provide a custom Linux image in which to run your functions.

Hosting

- Consumption plan
- Flex Consumption plan
- Premium plan
- **Dedicated plan**
- Container Apps

- ✓ You have existing and underutilized virtual machines that are already running other App Service instances.
- ✓ You must have fully predictable billing, or you need to manually scale instances.
- ✓ You want to run multiple web apps and function apps on the same plan
- ✓ You need access to larger compute size choices.
- ✓ Full compute isolation and secure network access provided by an App Service Environment (ASE).
- ✓ Very high memory usage and high scale (ASE).

Hosting

- Consumption plan
- Flex Consumption plan
- Premium plan
- Dedicated plan
- **Container Apps**

- ✓ You want to package custom libraries with your function code to support line-of-business apps.
- ✓ You need to migration code execution from on-premises or legacy apps to cloud native microservices running in containers.
- ✓ When you want to avoid the overhead and complexity of managing Kubernetes clusters and dedicated compute.
- ✓ Your functions need high-end processing power provided by dedicated GPU compute resources.

Local Development

Azure Functions Core Tools lets you develop and test your functions on your local computer.

When you're ready, you can also use Core Tools to deploy your code project to Azure and work with application settings.

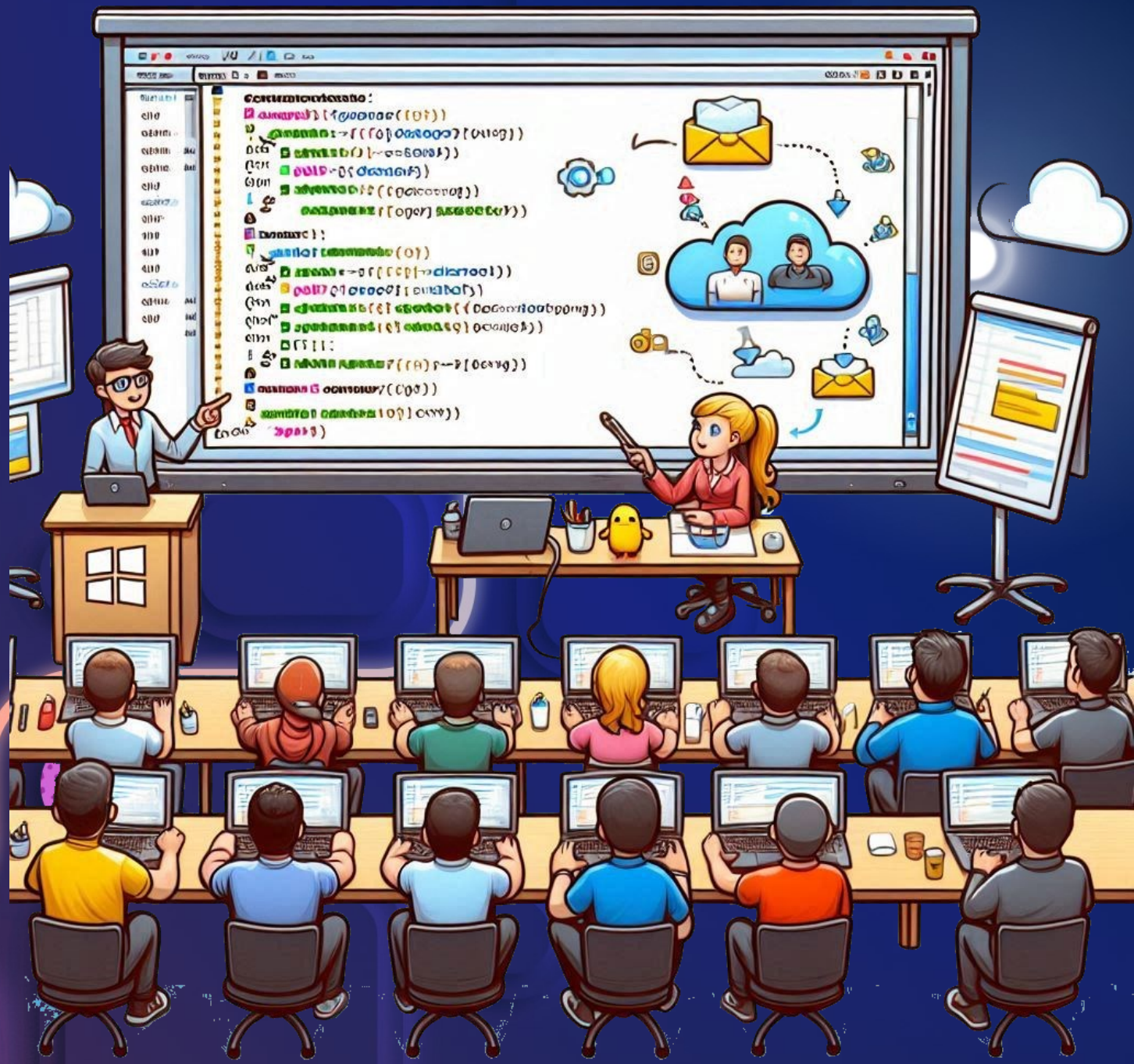
```
func init MyProjFolder --
worker-runtime dotnet-isolated
```

```
func new --template "Http
Trigger" --name MyHttpTrigger
```

```
func start
```

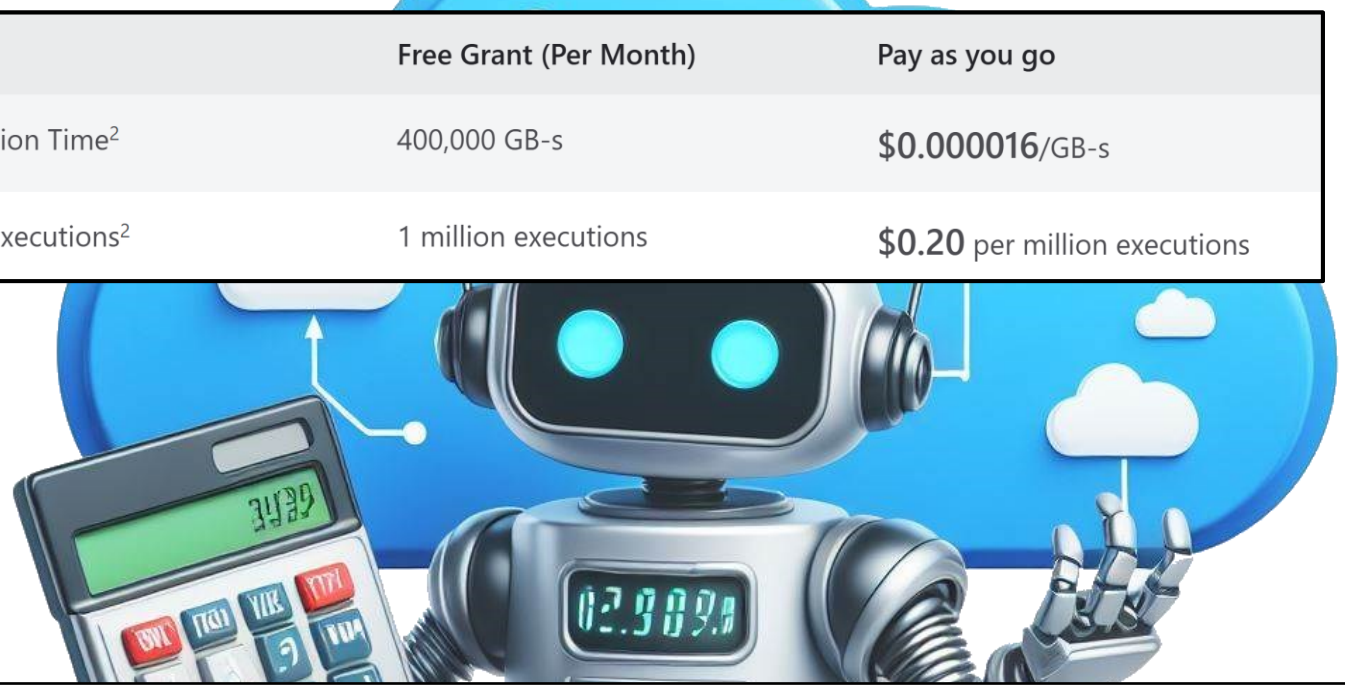
DEMO

Azure Functions



Azure Functions Costs

Meter	Free Grant (Per Month)	Pay as you go
Execution Time[2]	400,000 GB-s	$0.000016/GB-s
Total Executions[2]	1 million executions	$0.20 per million executions



Example : An **Azure Function** is connected to **Blob Storage** through **Event Grid**, to restore blobs each time a blob is deleted. In the blob storage **1 million blobs** are deleted each month - each one triggering the Function through Event Grid.

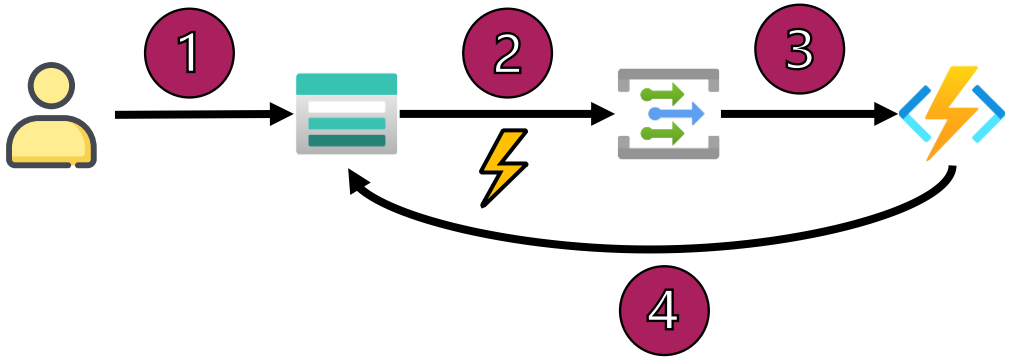
- Your function will be called 1 million times from Event Grid in a month
- Let's assume that the function occupies 512Mb and lasts 1 second.

	Total	**Monthly Free**
Execution time	500,000 GB-sec	400,000 GB-sec
Totals executions	1 million	1 milion
Total monthly cost	**$1,6**	

Connect the dots….

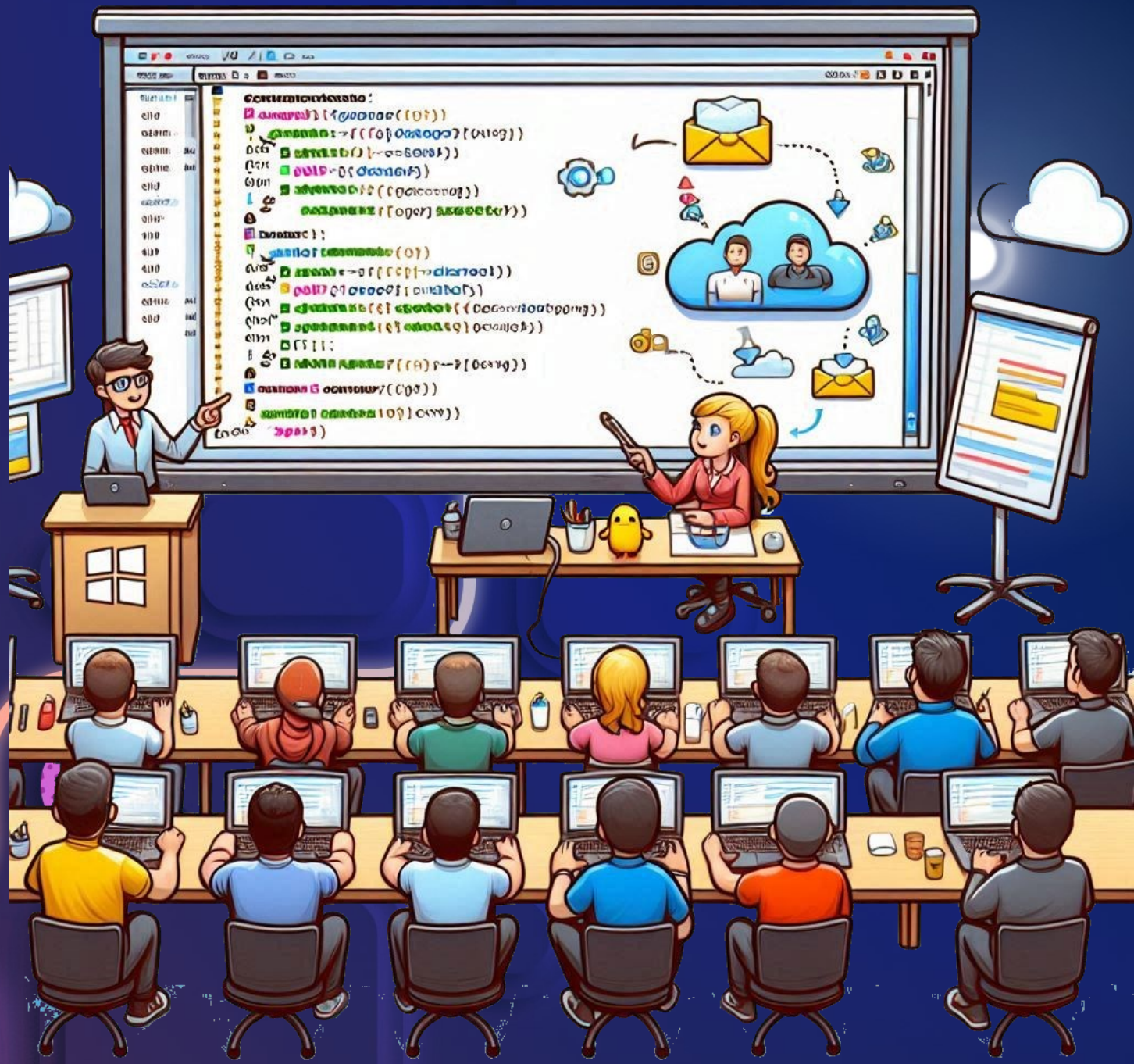
Restore a deleted Blob using Event Grid and Azure Functions

1. The user deletes a blob
2. The Storage Account throws the `Microsoft.Storage.BlobDeleted` event
3. Event Grid routes the event to the Azure Functions
4. Azure Functions, using Storage Account SDK, undeletes the blob



DEMO

Event Grid + Azure Functions

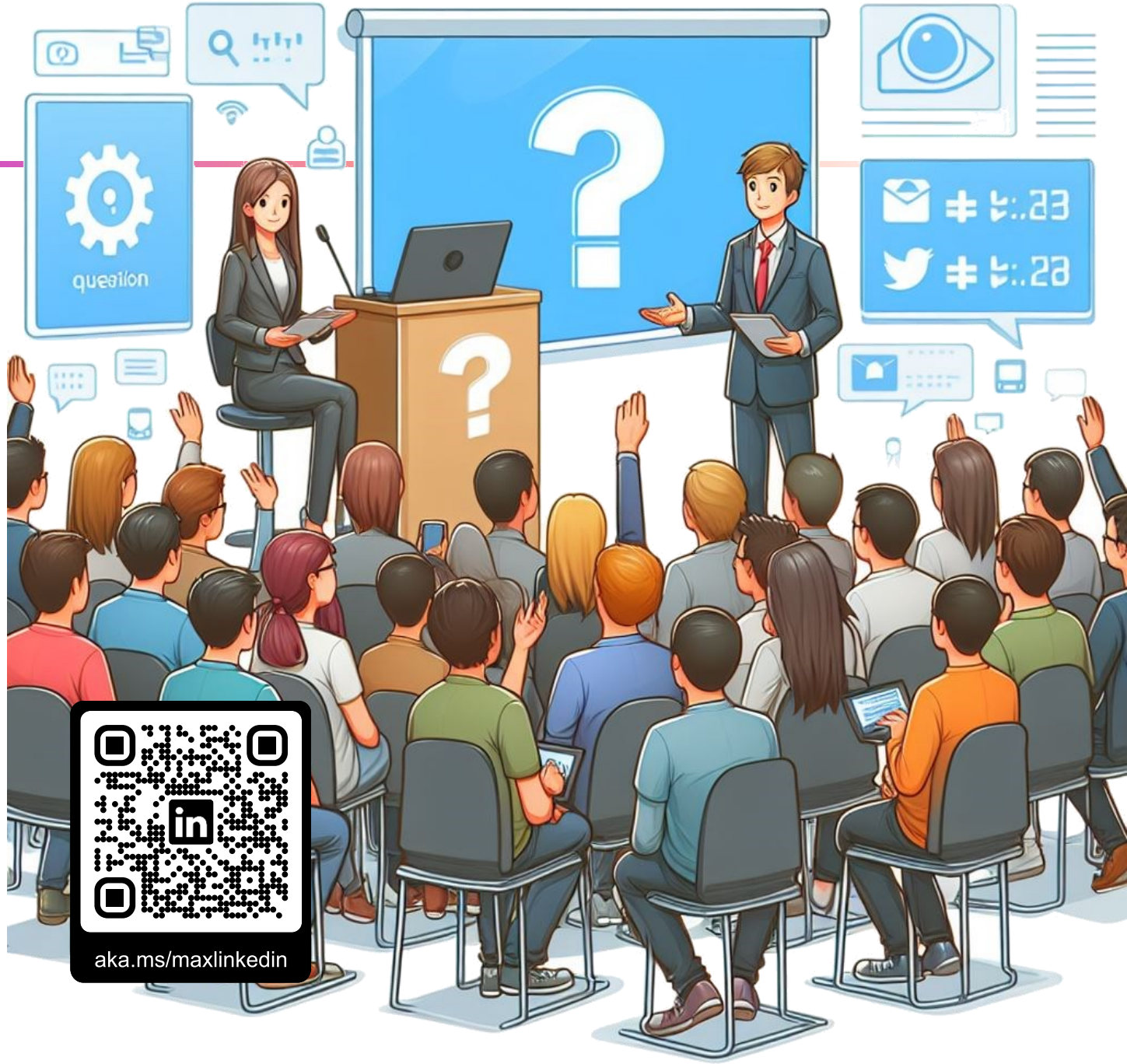


Q&A

Massimo Bonanni

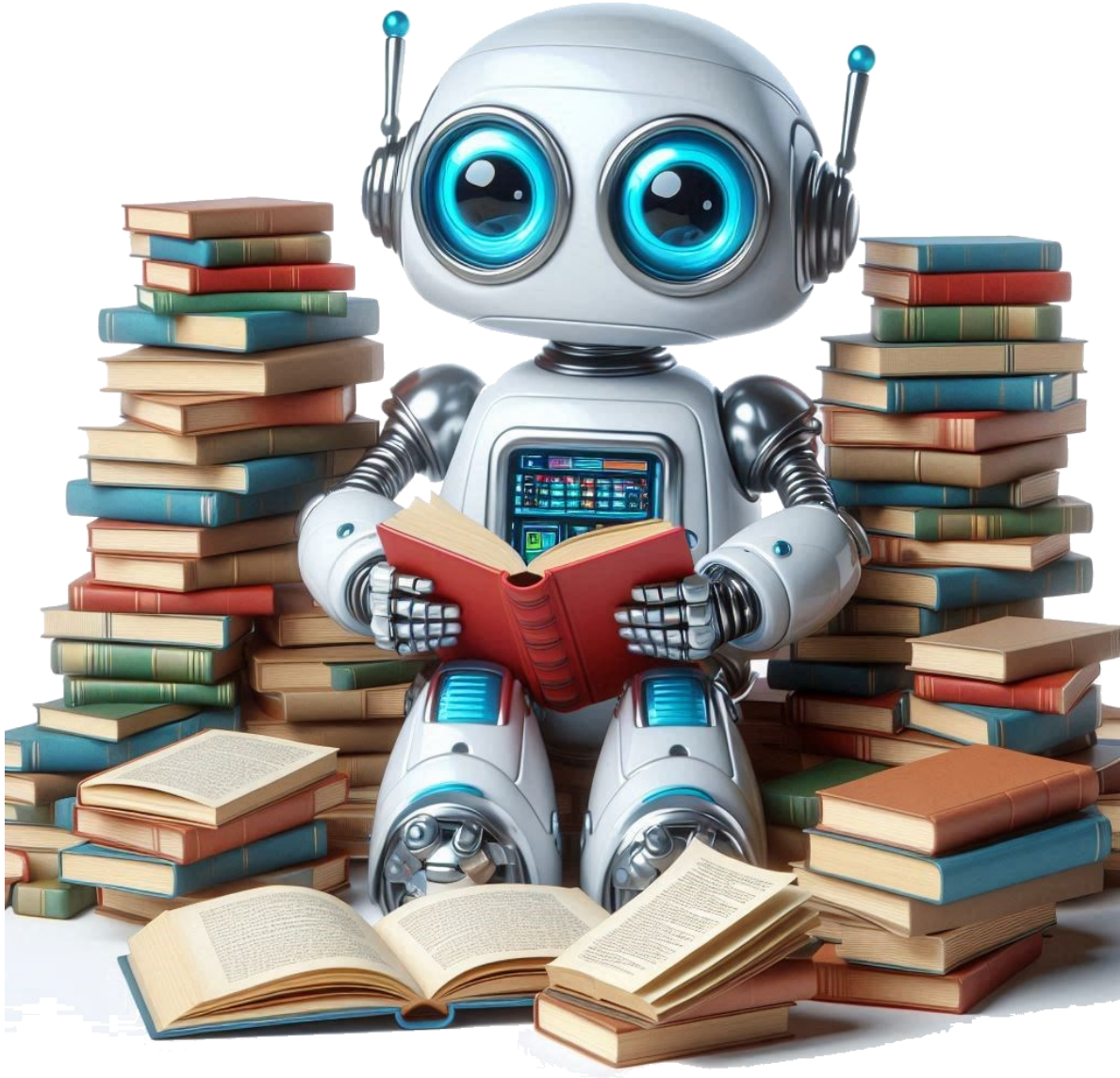
Technical Trainer @ Microsoft

massimo.bonanni@microsoft.com



References

- Overview - Azure Event Grid | Microsoft Learn
- AZ-204: Develop event-based solutions - Training | Microsoft Learn
- Azure Functions Overview | Microsoft Learn
- Introduction to Azure Functions - Training | Microsoft Learn
- Explore Azure Functions - Training | Microsoft Learn
- AZ-204: Implement Azure Functions - Training | Microsoft Learn
- Azure Event Grid Viewer - Code Samples | Microsoft Learn
- massimobonanni/ServerlessBlobManager




THANK
YOU