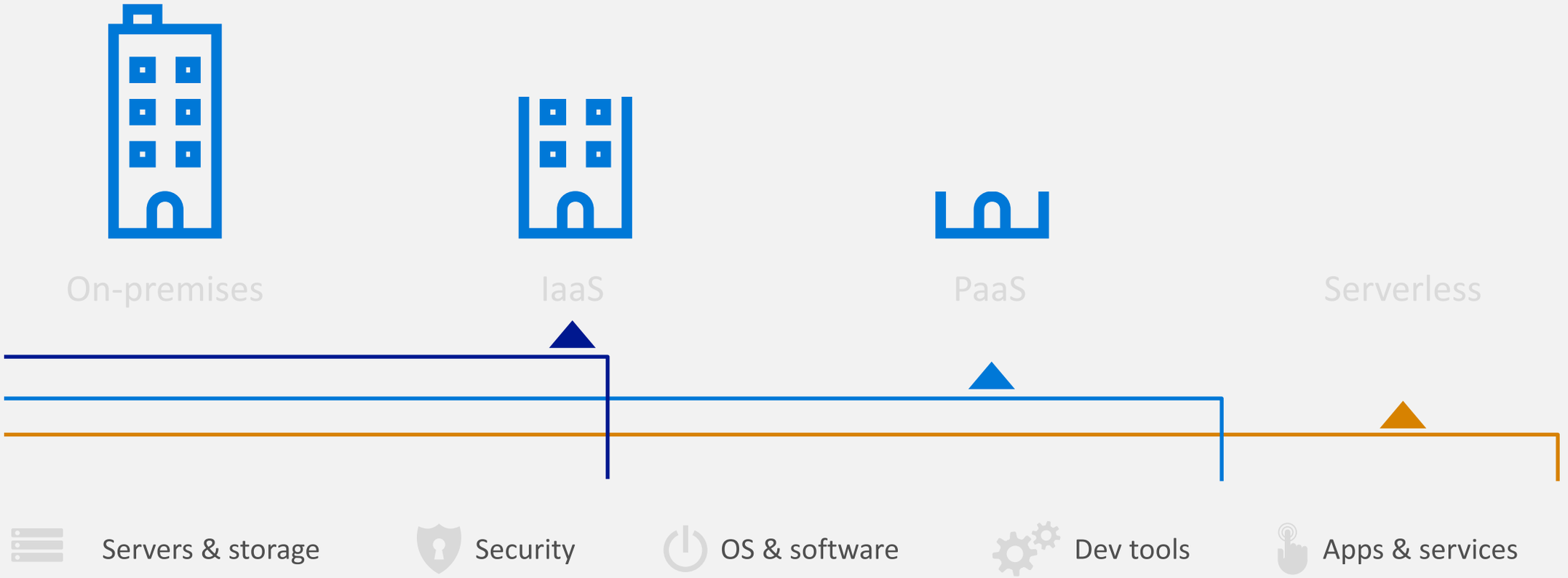
Serverless and Azure Functions

Build apps faster with serverless technologies

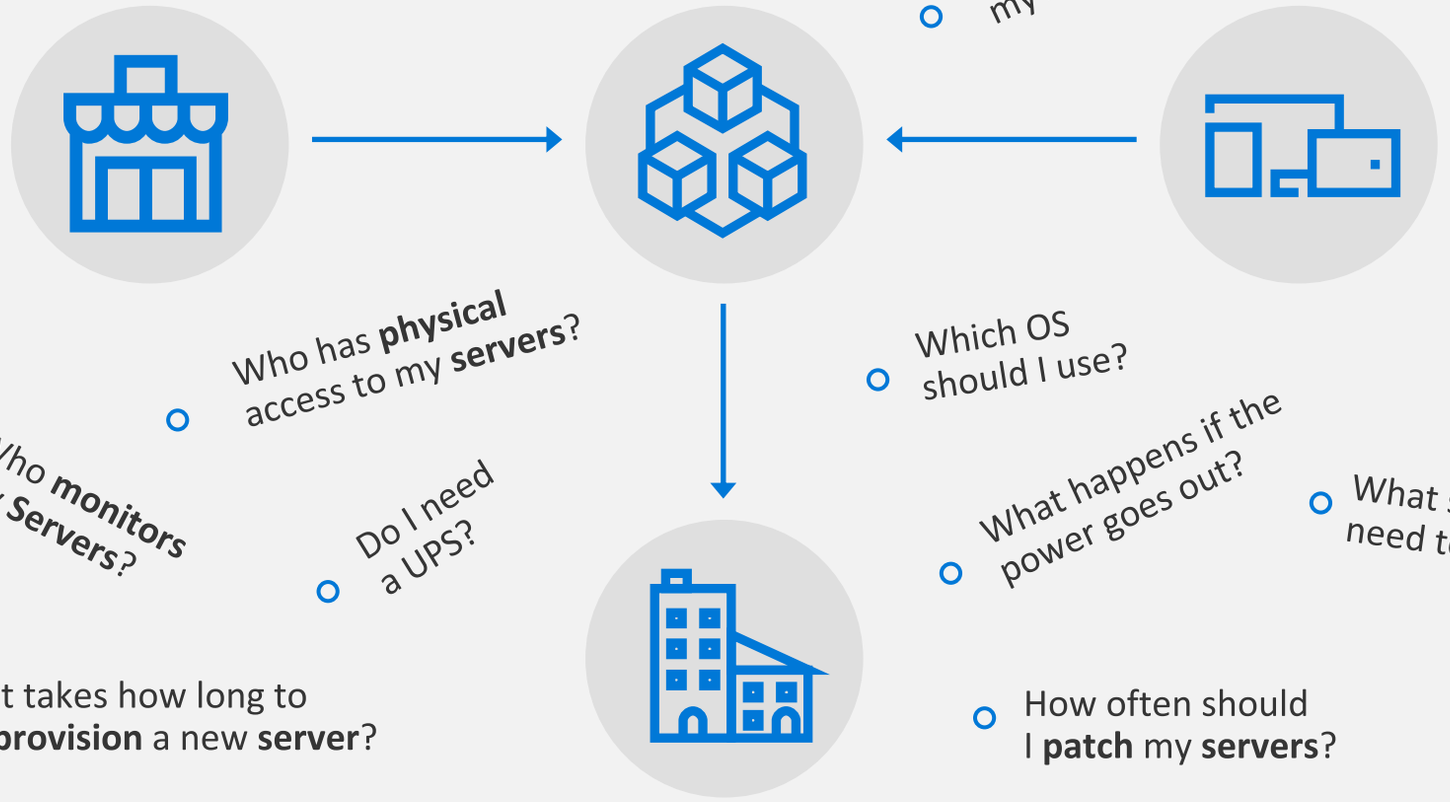
Microsoft

History of cloud development

Increasingly advanced cloud technologies have led companies to entrust more and more of their IT activities to service providers



Before cloud...



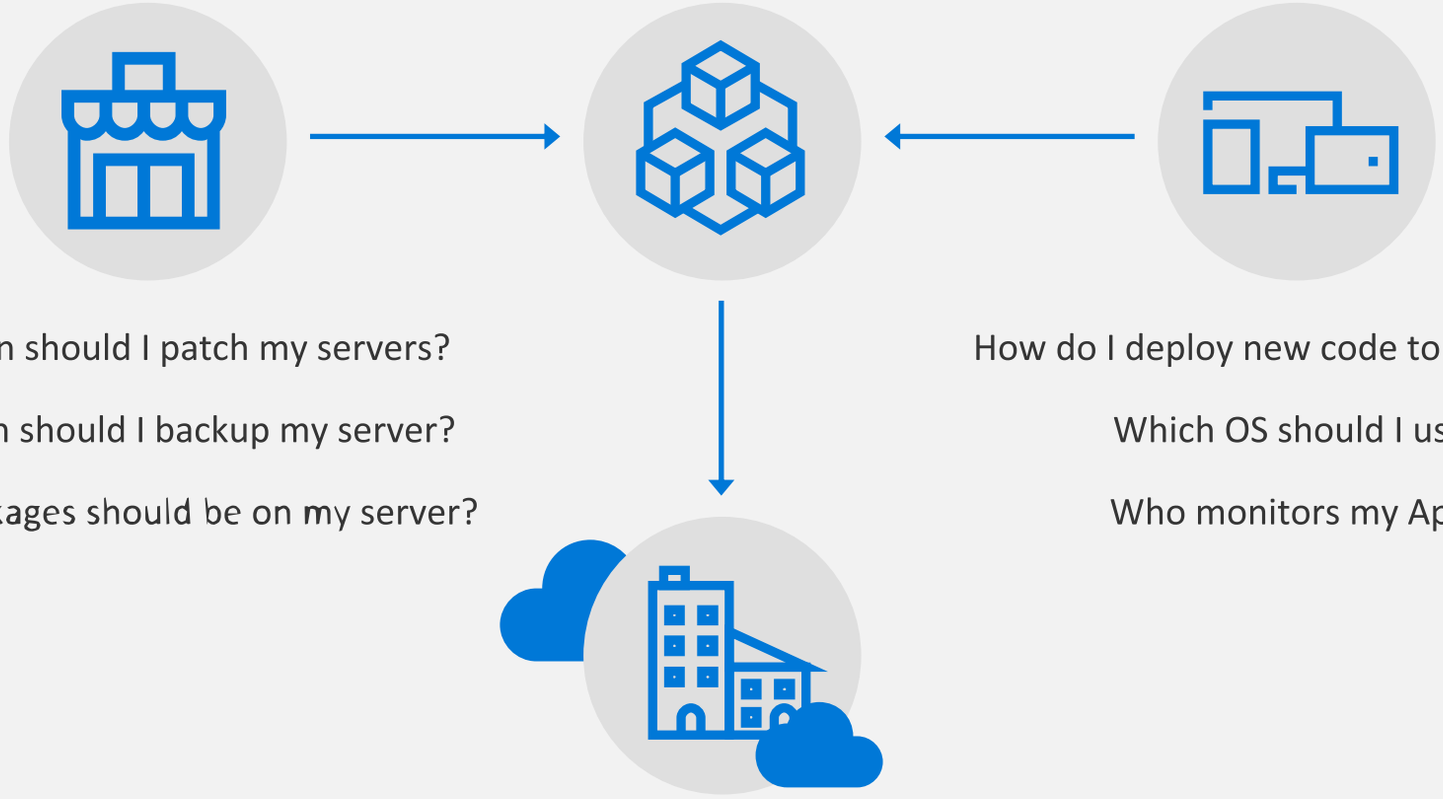
…then IaaS set the table stakes for digital business…

What is the right size of servers for my business needs?

How can I increase server utilization?

How many servers do I need?

How can I scale my app?



How often should I patch my servers?

How often should I backup my server?

Which packages should be on my server?

How do I deploy new code to my server?

Which OS should I use?

Who monitors my App?

…then PaaS, critical for digital transformation

What is the right **size** of “servers” for my business needs?

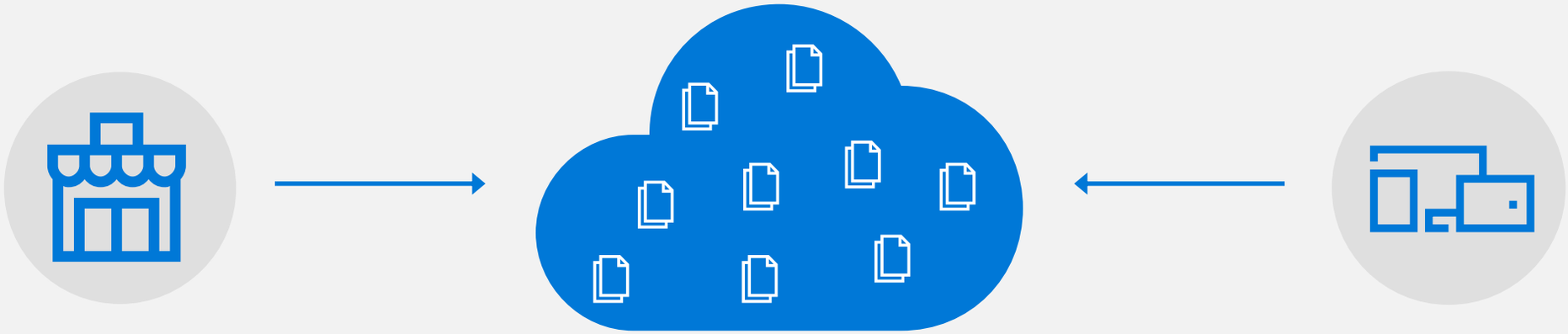
How can I increase “server” utilization?

How many “servers” do I need?

How can I scale my app?

Serverless: the platform for next gen apps, today

How do I **architect** my app to become Serverless?



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

What are the benefits?

Focus

Solve business problems—not technology problems related to undifferentiated heavy lifting

Efficiency

- Shorter time to market
- Fixed costs converted to variable costs
- Better service stability
- Better development and testing management
- Less waste

Flexibility

- Simplified starting experience
- Easier pivoting means more flexibility
- Easier experimentation
- Scale at your pace—don’t bet the farm on Day 1
- Natural fit for microservices

Full integration with Azure ecosystem

Functions is the center piece of the Serverless platform

Development

- IDE support
- Integrated DevOps
- Local development
- Monitoring
- Visual debug history

Platform

Event Grid

Manage all events that can trigger code or logic

Functions

Execute your code based on events you specify

Logic Apps

Design workflows and orchestrate processes

- Database
- Storage
- Analytics
- Intelligence
- Security
- IoT

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

What is Azure Functions?

An event-based, serverless compute experience that accelerates app development

Azure Functions = FaaS++

Integrated programming model

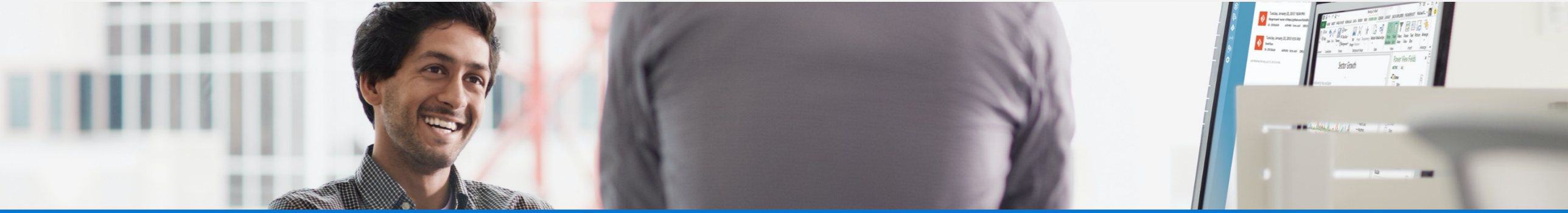
Use built-in triggers and bindings to define when a function is invoked and to what data it connects

Enhanced development experience

Code, test and debug locally using your preferred editor or the easy-to-use web-based interface including monitoring

Hosting options flexibility

Choose the deployment model that better fits your business needs without compromising development experience

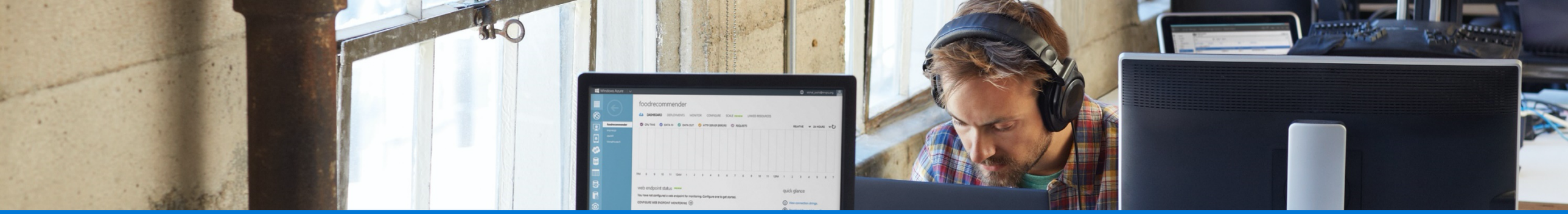


Focus on code, not plumbing

No infrastructure management

Auto-scale based on your workload

No wasted resources, pay only for what you use



Boost development efficiency

Triggers

Use triggers to define how functions are invoked
Avoid hardcoding with preconfigured JSON files
Build serverless APIs using HTTP triggers

Bindings

Connect to data with input and output bindings
Bind to Azure solutions and third-party services
Use HTTP bindings in tandem with HTTP triggers

Proxies

Define one API surface for multiple function apps
Create endpoints as reverse proxies to other APIs
Condition proxies to use variables

Local debugging

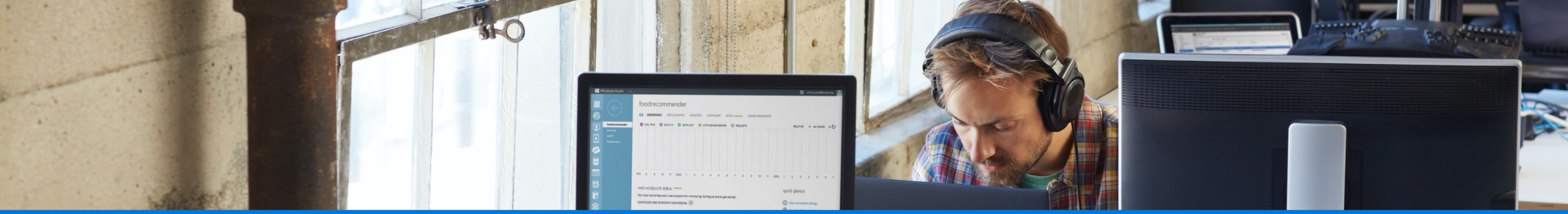
Debug C# and JavaScript functions locally
Use debugging tools in Azure portal, VS, and VS Code

CI/CD

Save time with built-in DevOps
Deploy functions using App Service for CI
Leverage Microsoft, partner services for CD

Monitoring

Integrate with Azure Application Insights
Get near real-time details about function apps
See metrics around failures, executions, etc.



Boost development efficiency

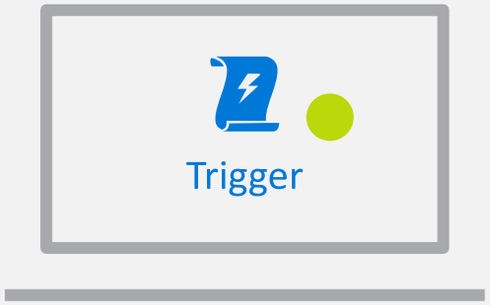
Trigger object

Your code

Input object

Output object

Input Binding



Output Binding

Gain flexibility and develop your way

Multiple languages

Write code in C#, JavaScript, F#, and Java
Continuous investment in new, experimental languages

Durable Functions

Write stateful functions in a serverless environment
Simplify complex, stateful coordination problems
Add the extension to enable advanced scenarios

Hosting options

Choose from six consumption plans to run Functions
Run your first million function executions for free

Dev options

Simplify coding for new users with native Azure portal
Select from popular editors, like VS, VS Code, CLI, Maven*

*VS and VS Code only support C#, Maven only supports Java

Gain flexibility and develop your way

Hosting options

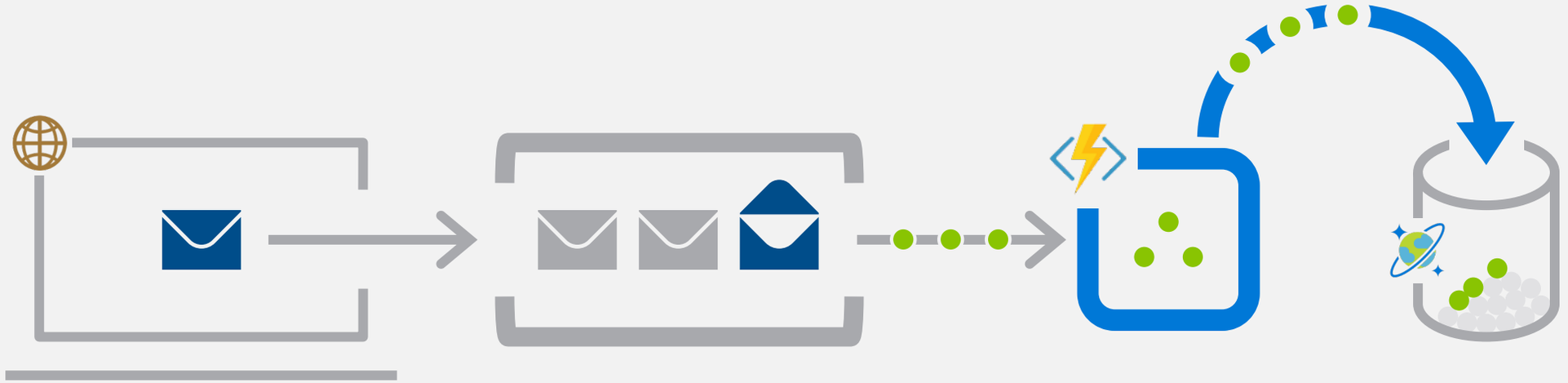
Consumption	AS Plan	AS Environment	Azure Stack	Runtime	IoT Edge
Serverless	*Basic, Standard, Premium*	*Network isolation*	*On-premises*	*Functions on your server*	*On devices*
Only pay for what you use; charges apply per execution and per GB second	Gain all the advantages of Functions along with Microsoft's 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

Scenario Example

Retail

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

Web application backends

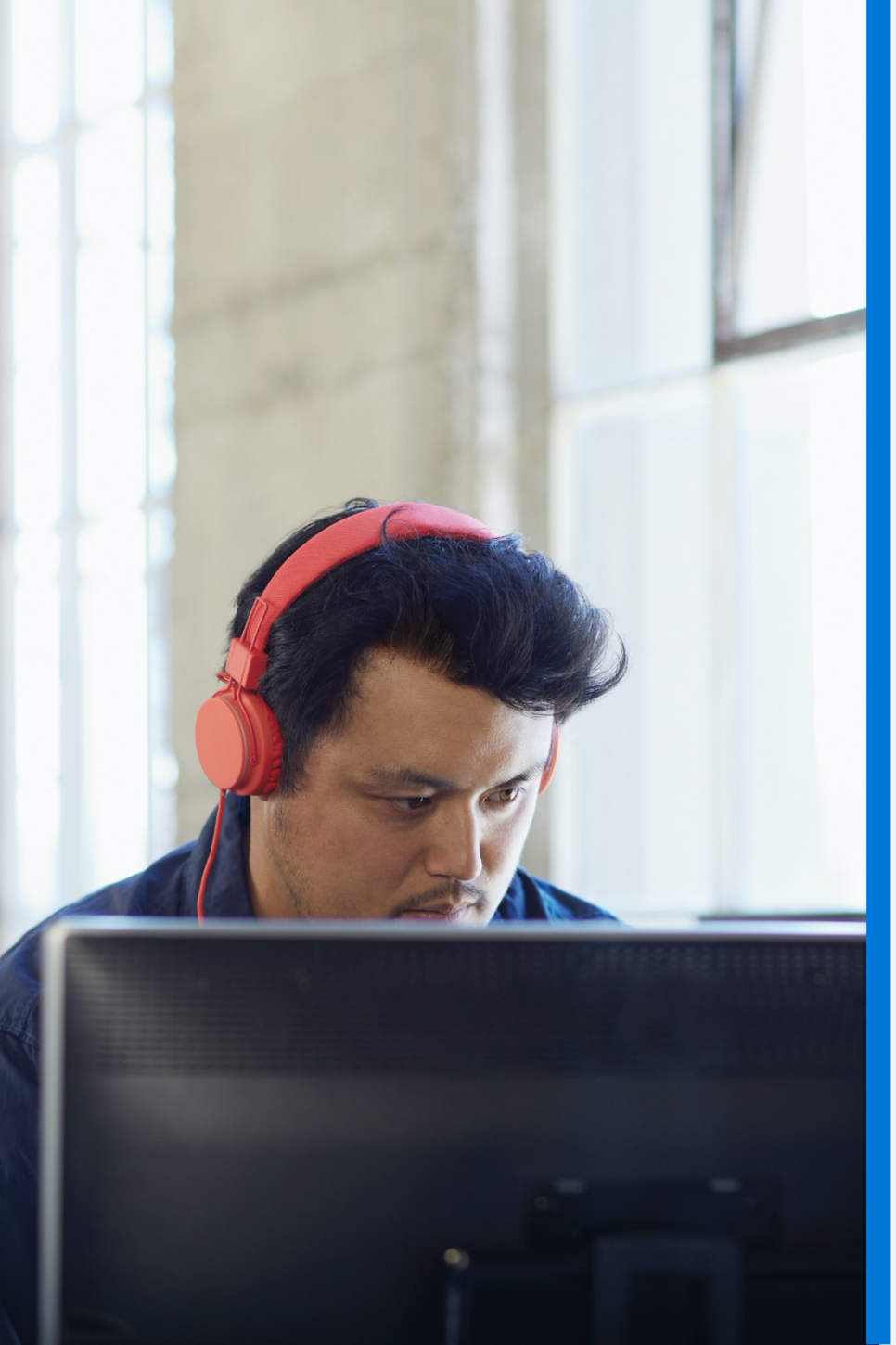


Request made in a web app

Request queued in Service Bus

A function processes the request…

…sends output to Cosmos DB



Sample scenarios for Functions

Web application backends

Mobile application backends

IoT-connected backends

Conversational bot processing

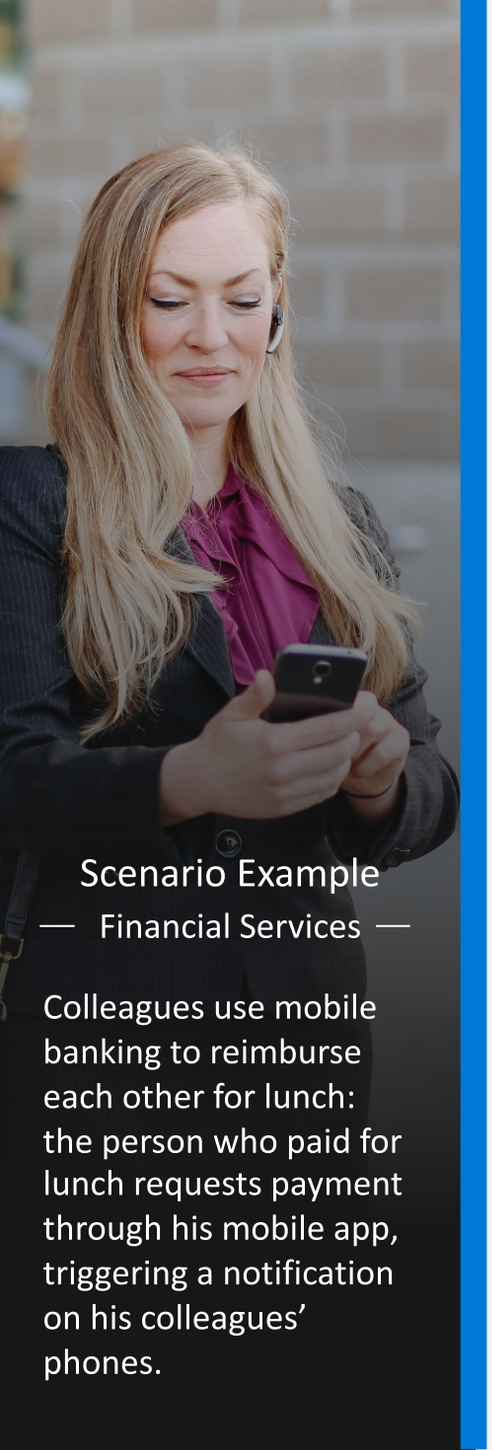
Real-time file processing

Real-time stream processing

Automation of scheduled tasks

Extending SaaS Applications

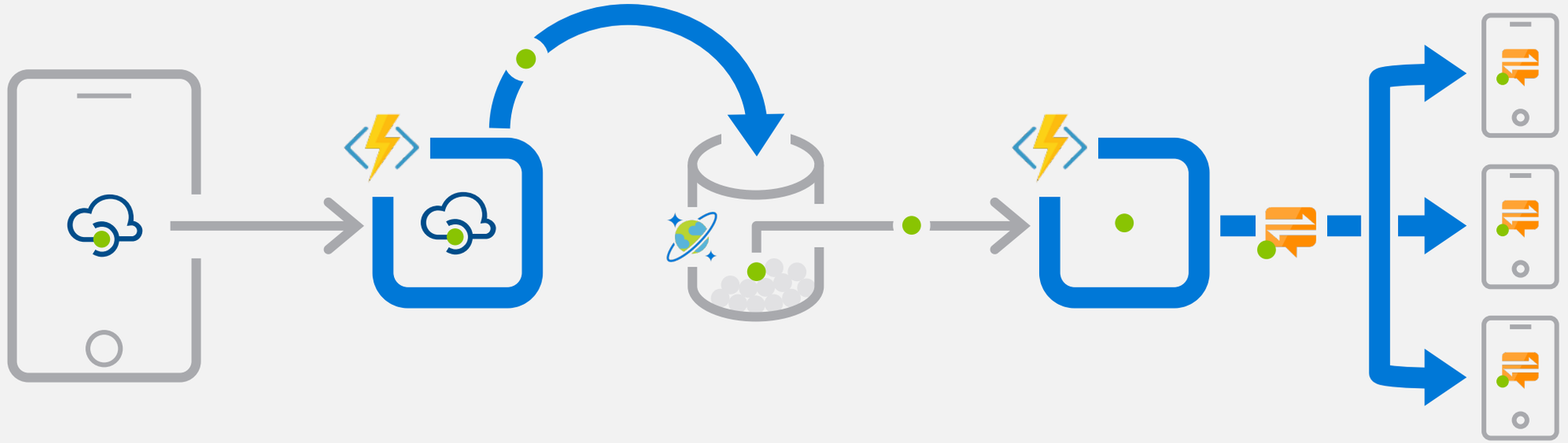
Mobile application backends



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.



HTTP API call from a mobile app

Call processed by a function

Output data stored in Cosmos DB

Data transfer triggers second function…

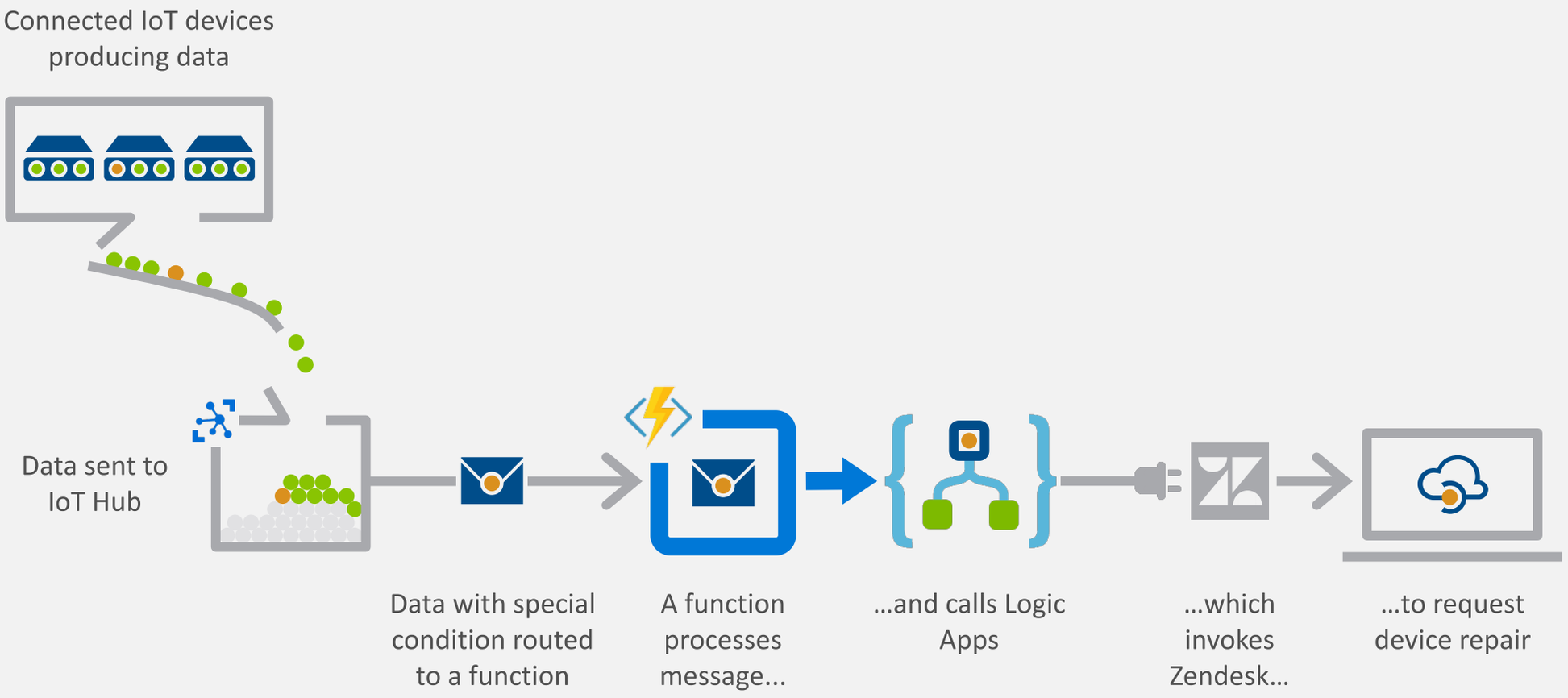
…which sends notifications using Notifications Hub

IoT-connected backends

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.

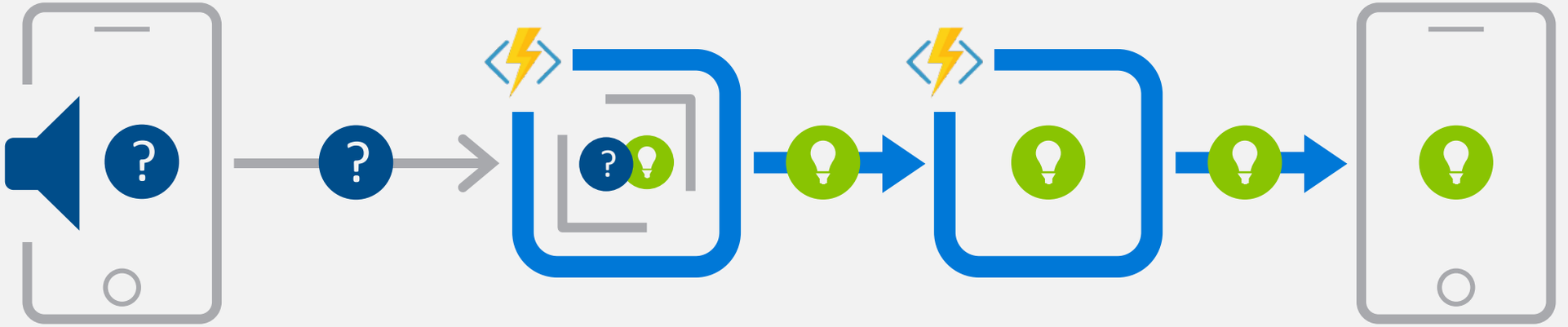


Scenario Example

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

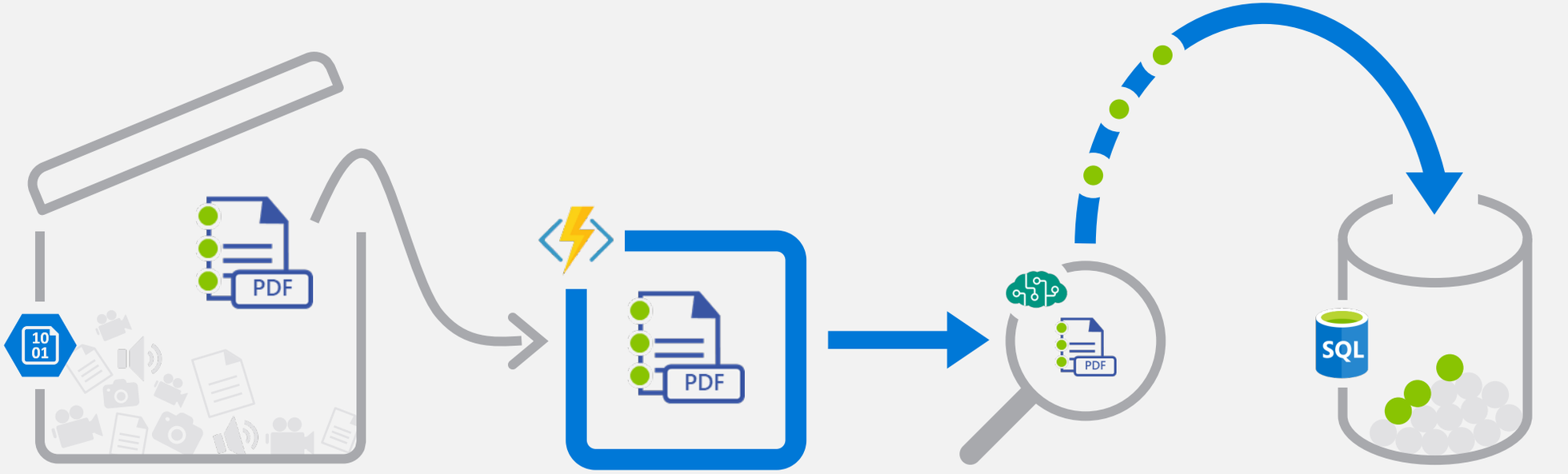
…and sends response to original requester

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

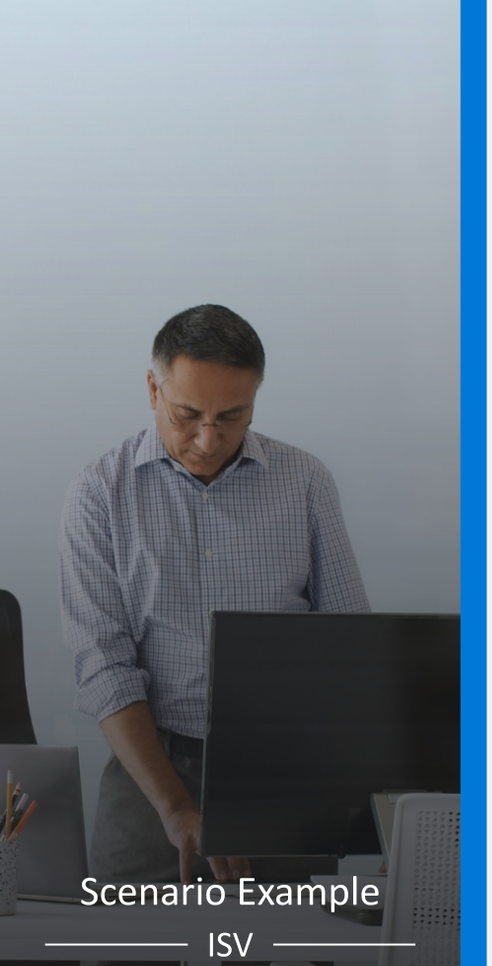


PDF file added to Blob Storage

A function decomposes PDF file…

…and sends it to Cognitive Services for OCR detection

Structured data from file sent to SQL DB

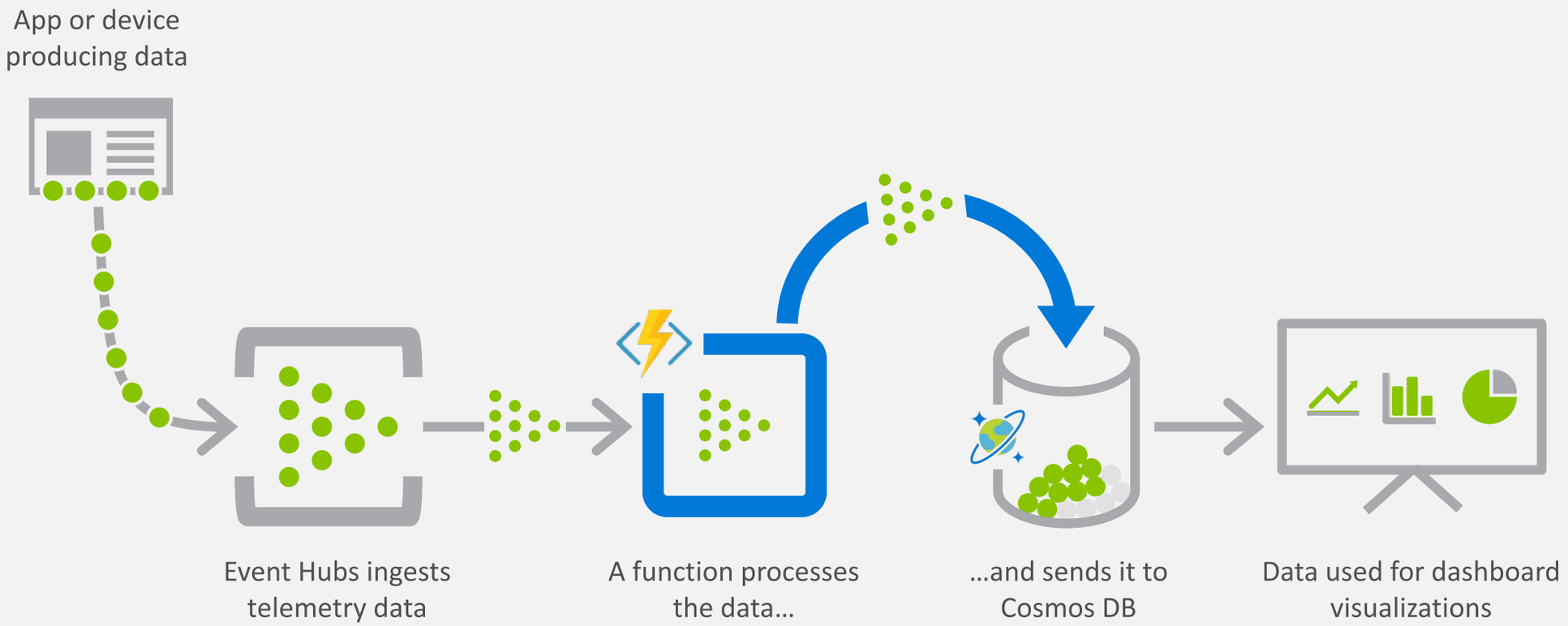


Scenario Example

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

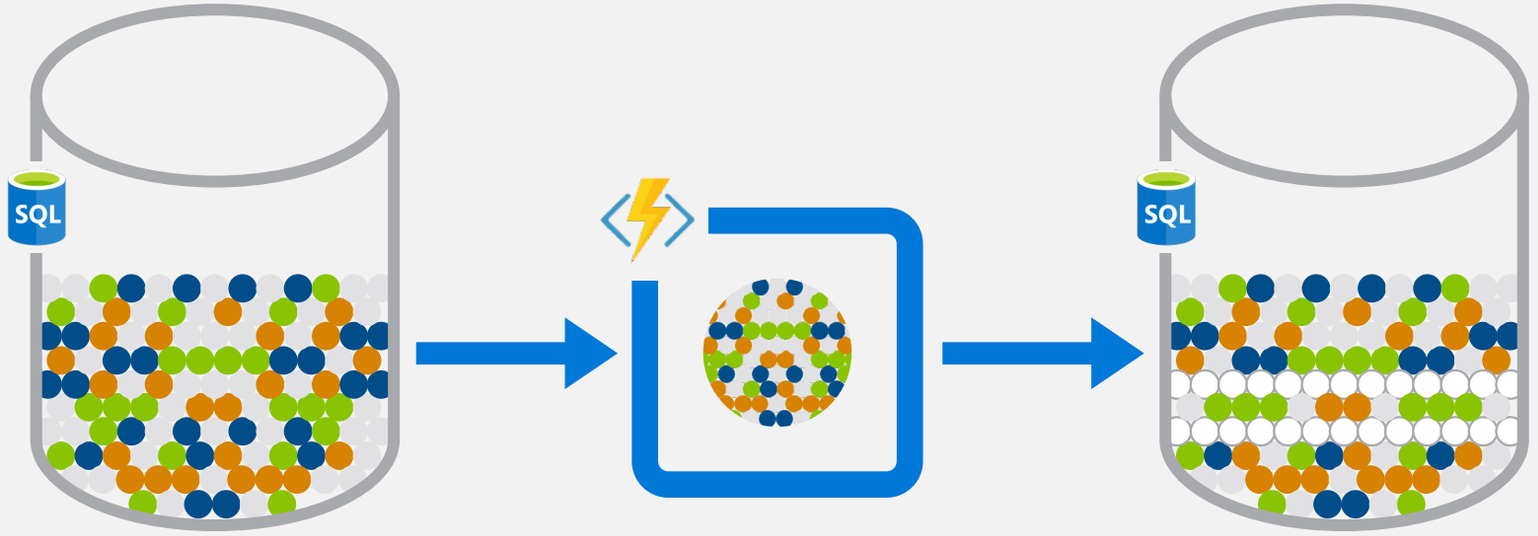


Scenario Example

— 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…

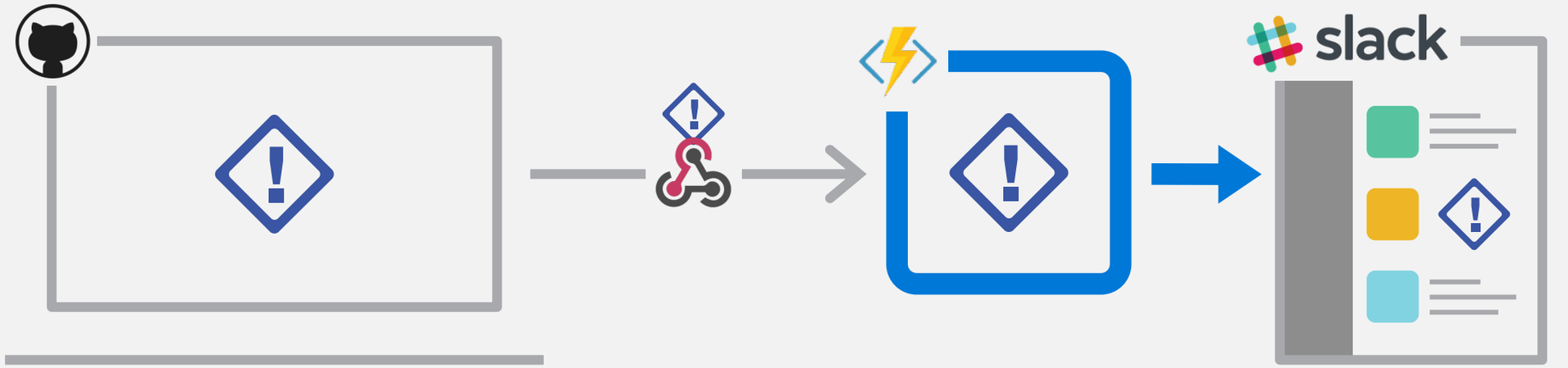
…deduplicating entries based on business logic

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

What makes Functions unique?

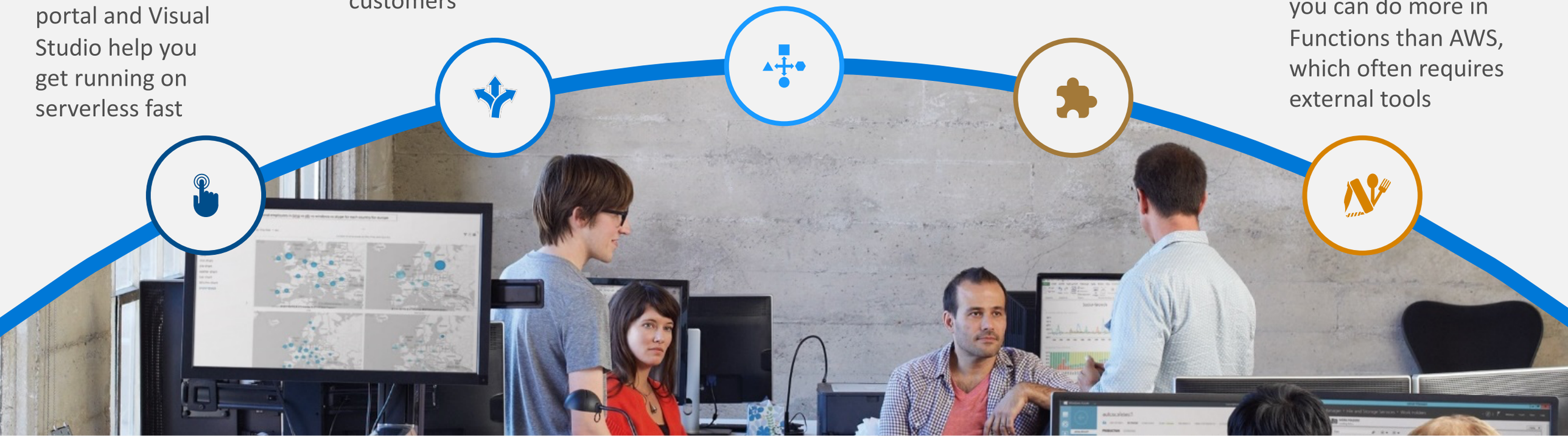
Intuitive experience
Easy-to-use, familiar tools like the Azure portal and Visual Studio help you get running on serverless fast

Flexible run options
With so many plan options, you can choose the level of access that's best for your company and customers

Feature variety
A host of features, from bindings to code editors, gives you the tools needed to quickly create the best apps

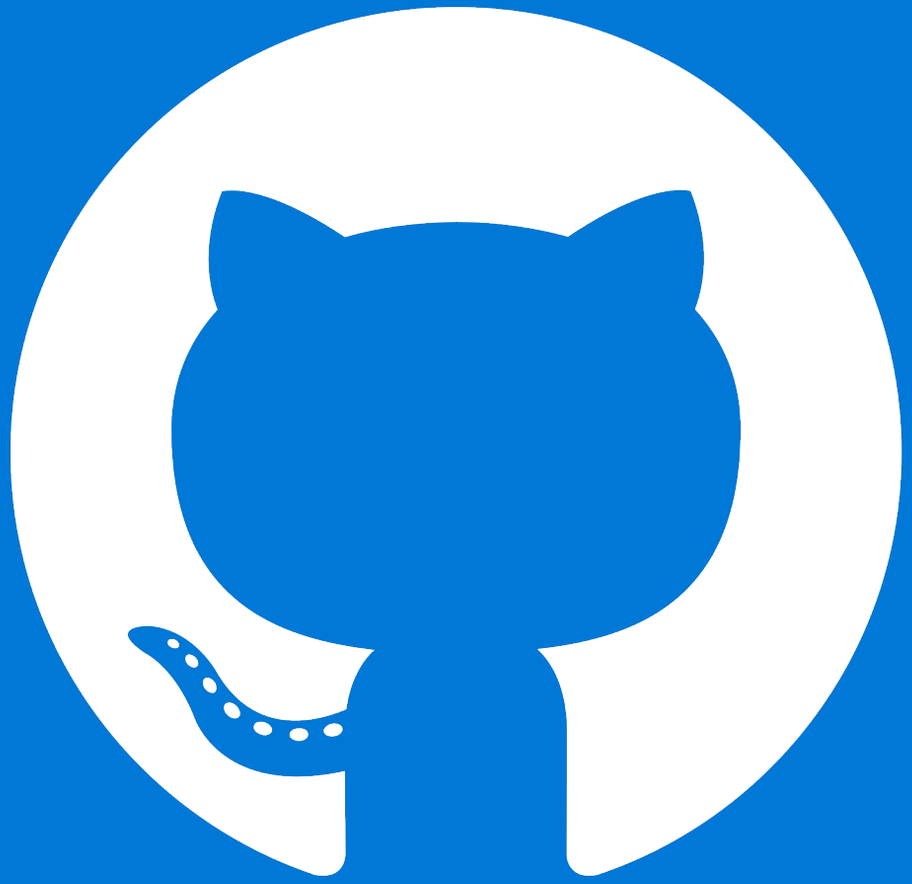
Durable Functions
With this extension Azure Functions help you simplify complex, stateful orchestration problems

Consolidated tools
Thanks to so many built-in solutions, you can do more in Functions than AWS, which often requires external tools



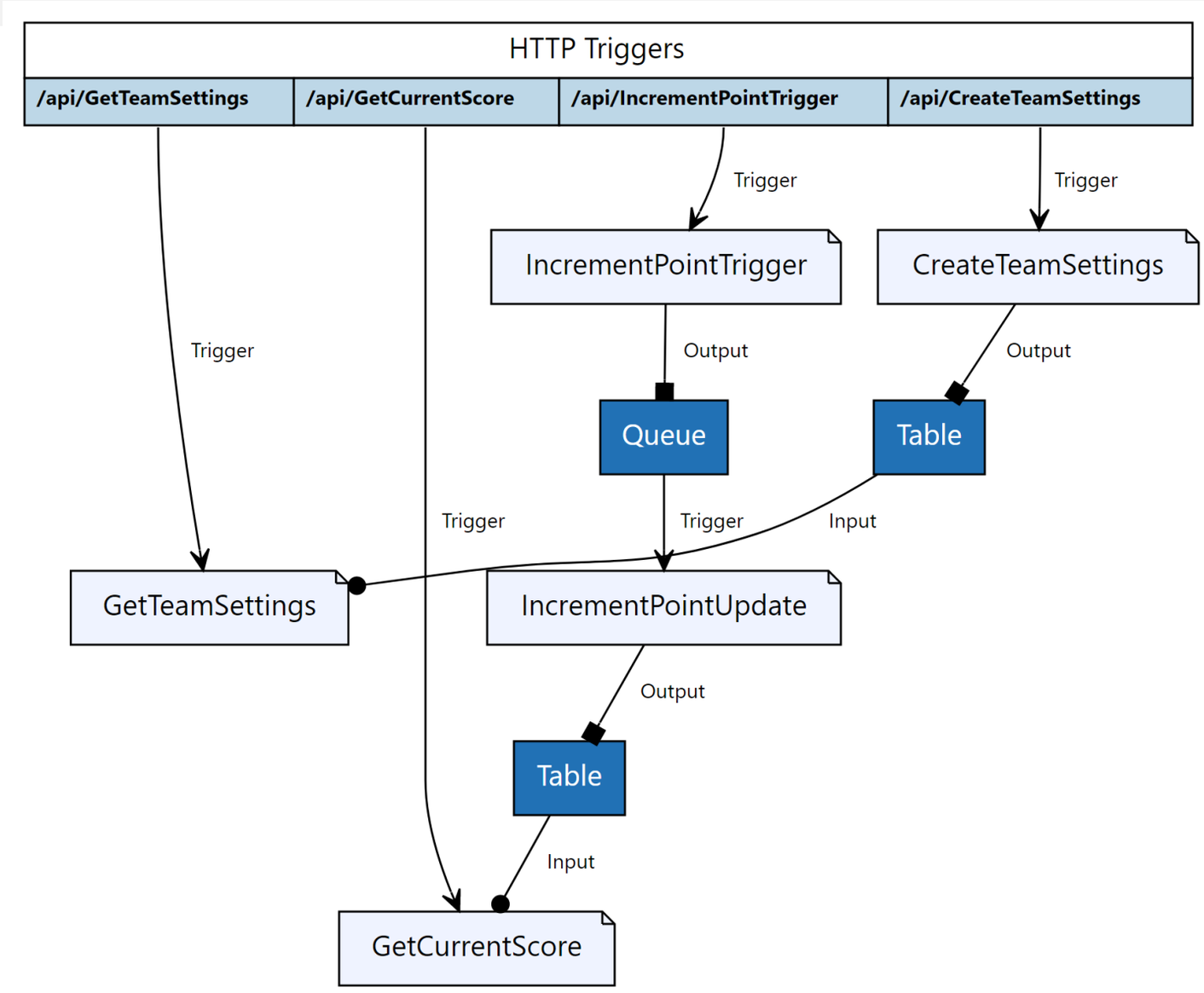
Azure Functions is an open-source project

Functions runtime and all extensions are fully open source



https://github.com/Azure/Azure-Functions

Demo


HTTP Triggers
/api/GetTeamSettings
/api/GetCurrentScore
/api/IncrementPointTrigger
/api/CreateTeamSettings
Trigger
Trigger
IncrementPointTrigger
CreateTeamSettings
Trigger
Output
Output
Queue
Table
Trigger
Trigger
Input
GetTeamSettings
IncrementPointUpdate
Output
Table
Input
GetCurrentScore