Beyond Hello World:

Getting Deeper into Azure Functions

Sponsors


accenture


NORTHFIELD


Johnston
group


online
business systems


GLITCHSECURE


ERIC LEGAULT
CONSULTING INC.

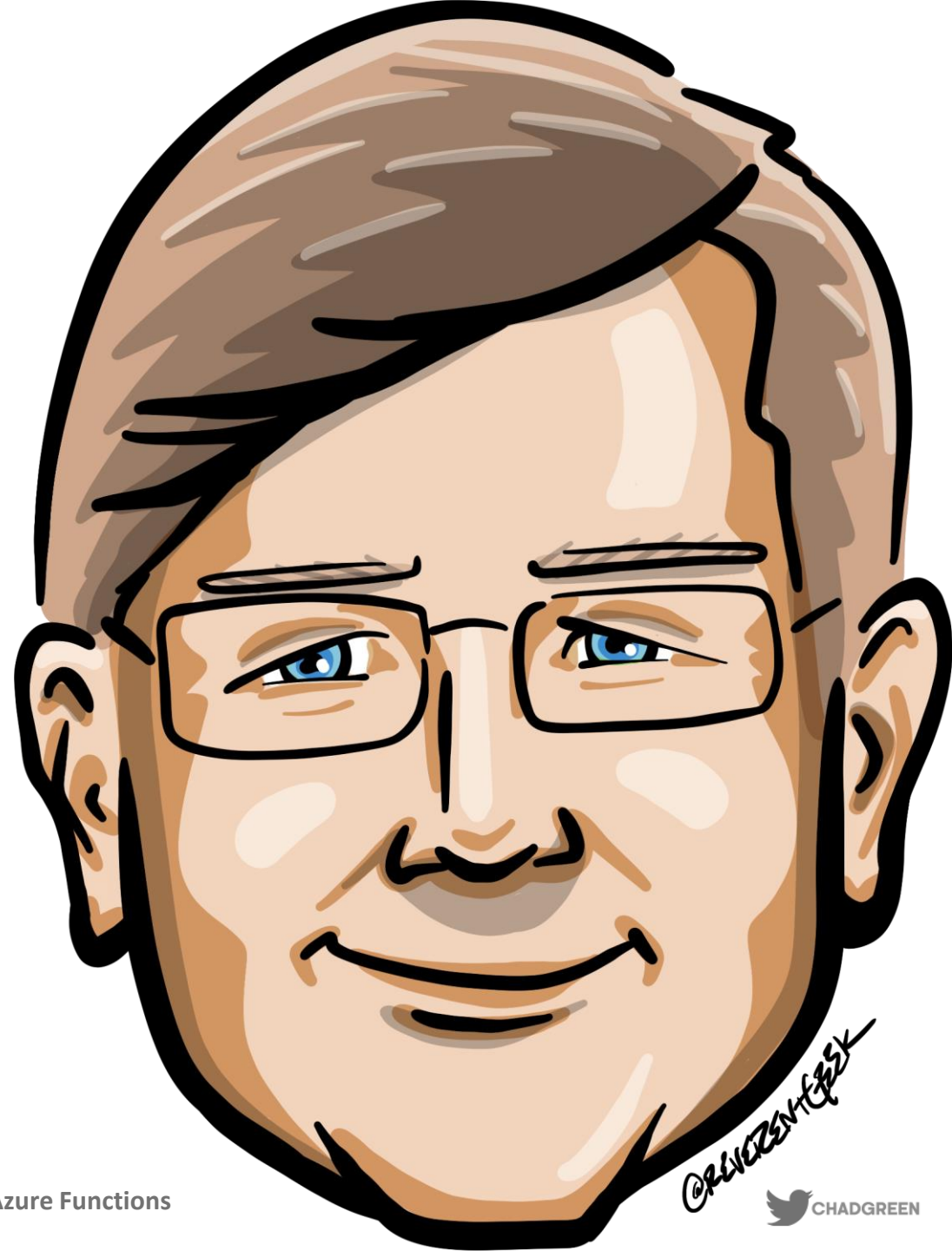

LAMBERT
NEMEC
GROUP
EXCELLENCE IN RECRUITMENT


Lotlinx

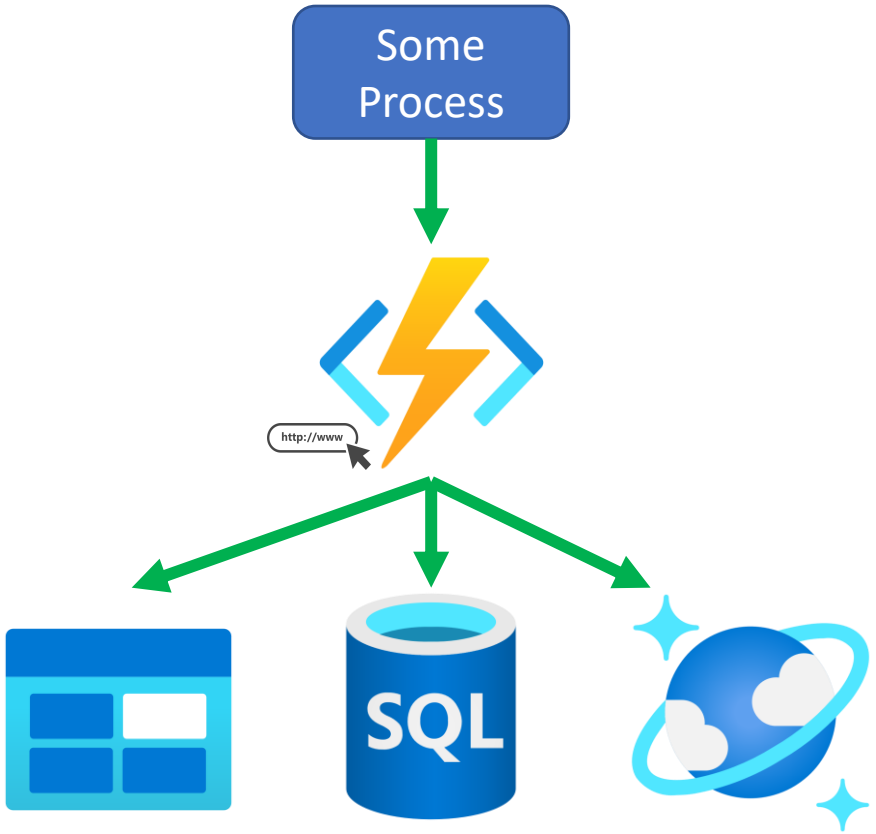
Who is Chad Green?

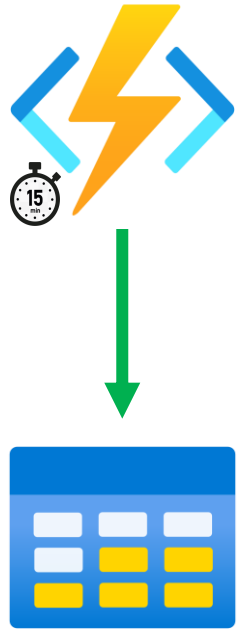
- chadgreen@chadgreen.com
- TaleLearnCode
- ChadGreen.com
- ChadGreen & TaleLearnCode
- ChadwickEGreen

Microsoft® MVP Most Valuable Professional



Most Common Azure Function Patterns

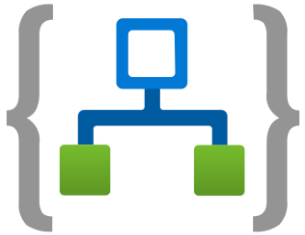




Microsoft Azure Serverless Offerings & Tools

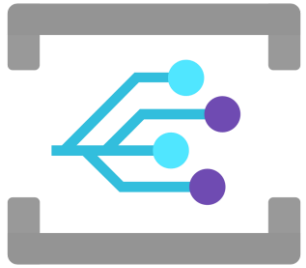
Beyond Hello World: Getting Deeper into Azure Functions

Azure Serverless Offerings & Tools



Azure Logic Apps

API Management



Azure Event Grid

Workflows and Integration

Azure Serverless Offerings & Tools

Azure Cognitive Services

Azure Bot Services

Azure Machine Learning

AI and Machine Learning

Azure Serverless Offerings & Tools

Azure SQL Database

Azure Cosmos DB

Database

Azure Serverless Offerings & Tools

Azure Blob Storage

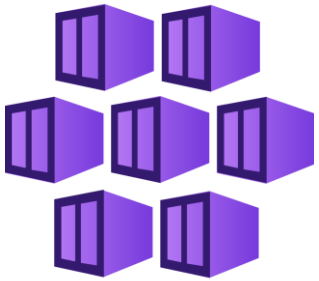
Storage

Azure Serverless Offerings & Tools

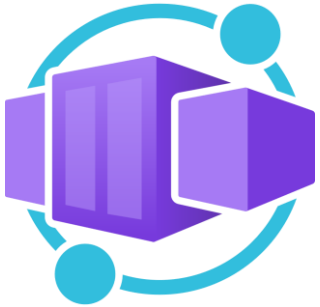
Azure Monitor

Monitoring

Azure Serverless Offerings & Tools



Azure Kubernetes Service



Azure Container Apps

Azure App Service

Azure Functions

Compute

Azure Serverless Offerings & Tools

Azure Stream Analytics

Analytics

Azure Functions Basics

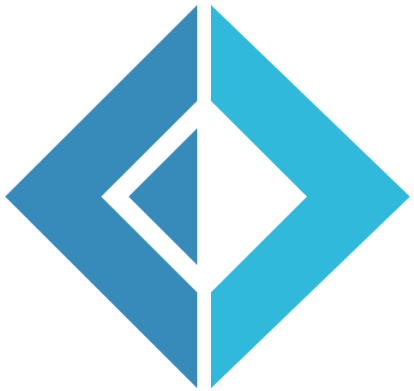
Beyond Hello World: Getting Deeper into Azure Functions

Azure Functions

Code

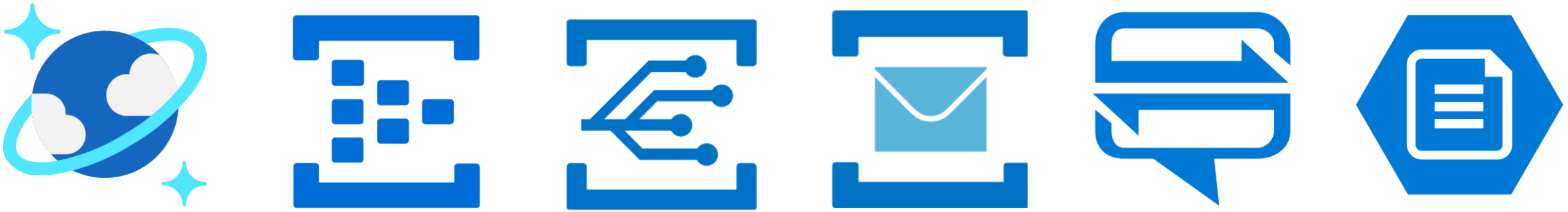
Events + data

Choice of Language



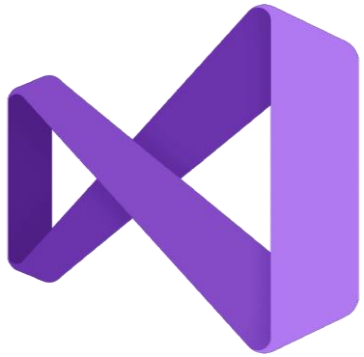
Bring your own dependencies

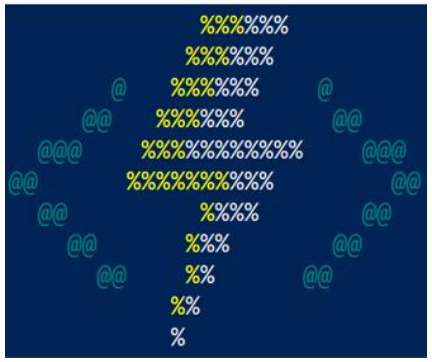
Simplified Integration



RabbitMQ

Flexible Development





Maven™

Many Deployment Options

Consumption

Serverless

Many Deployment Options

Consumption

Serverless

App Service Plan

Free, Basic, Standard, Premium

Many Deployment Options

Consumption

Serverless

App Service Plan

Free, Basic, Standard, Premium

App Service Environment

Network Isolation

Many Deployment Options

Consumption

Serverless

App Service Plan

Free, Basic, Standard, Premium

App Service Environment

Network Isolation

Azure Stack

On Premises

Many Deployment Options

Consumption

Serverless

App Service Plan

Free, Basic, Standard, Premium

App Service Environment

Network Isolation

Azure Stack

On Premises

Azure Functions Runtime

Functions on Your Server

Many Deployment Options

Consumption

Serverless

App Service Plan

Free, Basic, Standard, Premium

App Service Environment

Network Isolation

Azure Stack

On Premises

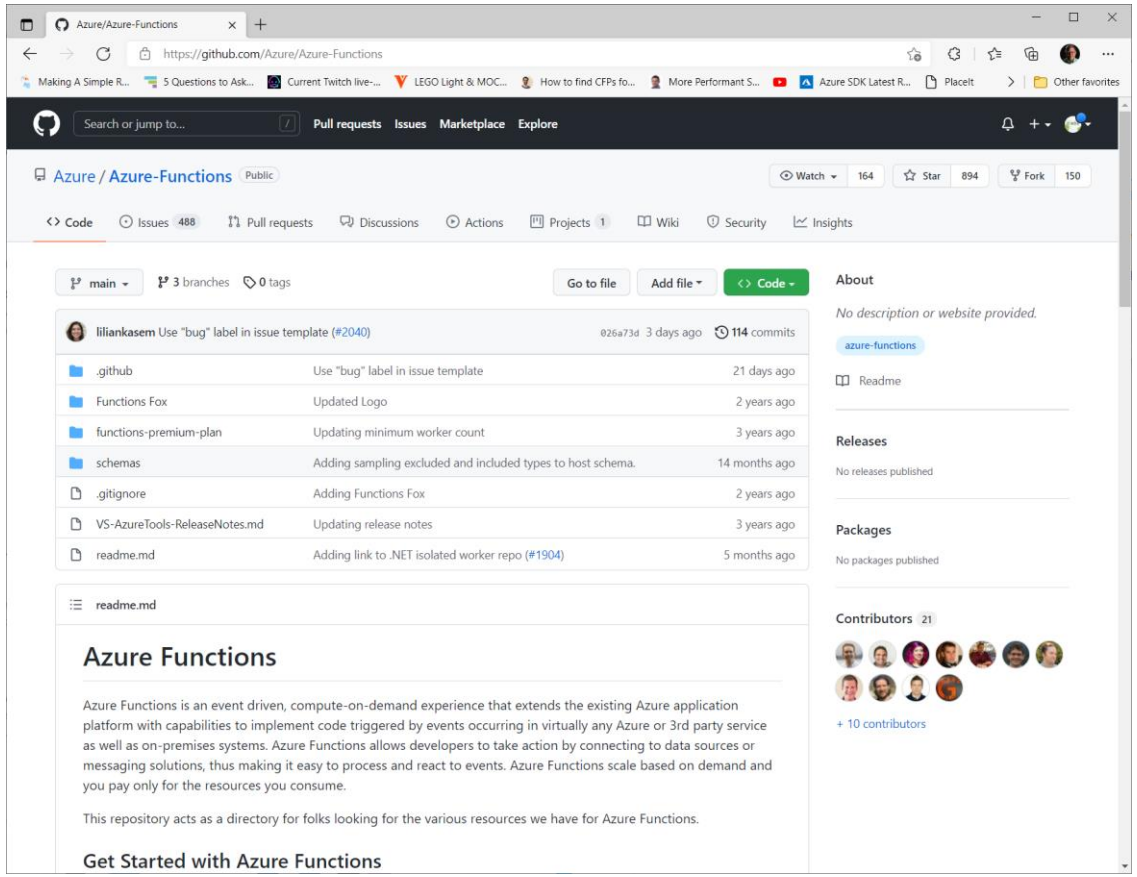
Azure Functions Runtime

Functions on Your Server

Azure IoT Edge

On Devices

Open Source

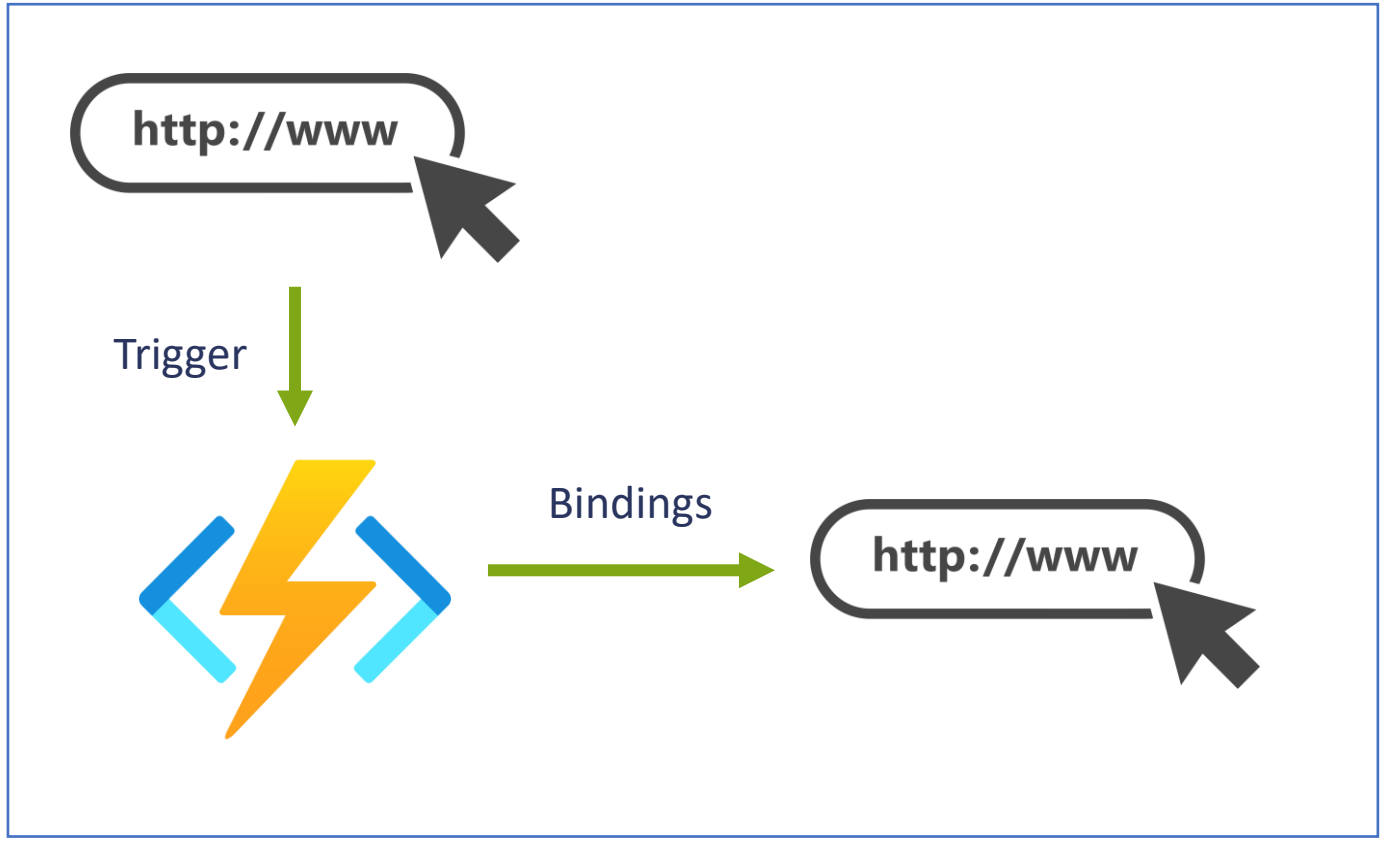

Azure/Azure-Functions
https://github.com/Azure/Azure-Functions
Search or jump to...
Pull requests
Issues
Marketplace
Explore
Azure / Azure-Functions
Public
Watch 164
Star 894
Fork 150
Code
Issues 488
Pull requests
Discussions
Actions
Projects 1
Wiki
Security
Insights
main
3 branches
0 tags
Go to file
Add file
Code
liliankasem Use "bug" label in issue template (#2040)
026a73d 3 days ago
114 commits
.github Use "bug" label in issue template 21 days ago
Functions Fox Updated Logo 2 years ago
functions-premium-plan Updating minimum worker count 3 years ago
schemas Adding sampling excluded and included types to host schema. 14 months ago
.gitignore Adding Functions Fox 2 years ago
VS-AzureTools-ReleaseNotes.md Updating release notes 3 years ago
readme.md Adding link to .NET isolated worker repo (#1904) 5 months ago
readme.md
Azure Functions
Azure Functions is an event driven, compute-on-demand experience that extends the existing Azure application platform with capabilities to implement code triggered by events occurring in virtually any Azure or 3rd party service as well as on-premises systems. Azure Functions allows developers to take action by connecting to data sources or messaging solutions, thus making it easy to process and react to events. Azure Functions scale based on demand and you pay only for the resources you consume.
This repository acts as a directory for folks looking for the various resources we have for Azure Functions.
Get Started with Azure Functions
About
No description or website provided.
azure-functions
Readme
Releases
No releases published
Packages
No packages published
Contributors 21
+ 10 contributors

Supported Triggers and Bindings

Beyond Hello World: Getting Deeper into Azure Functions

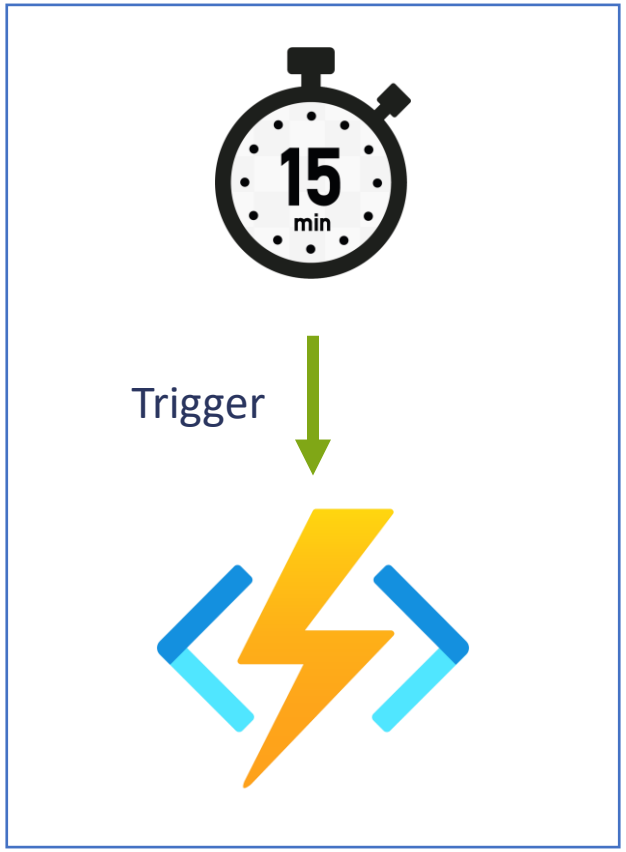
HTTP

Tigger	✓
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



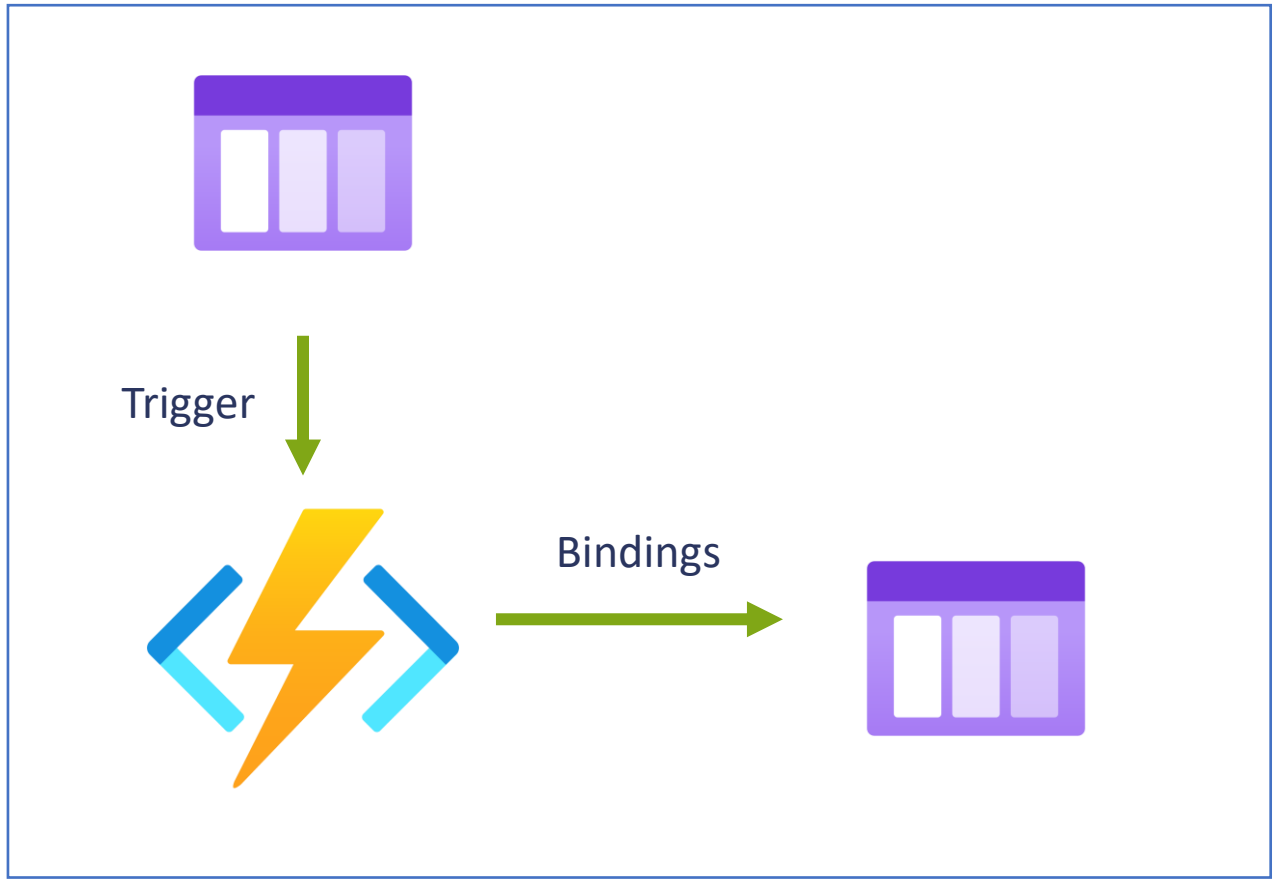
Timer

Tigger	✓
Input	✗
Output	✗
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



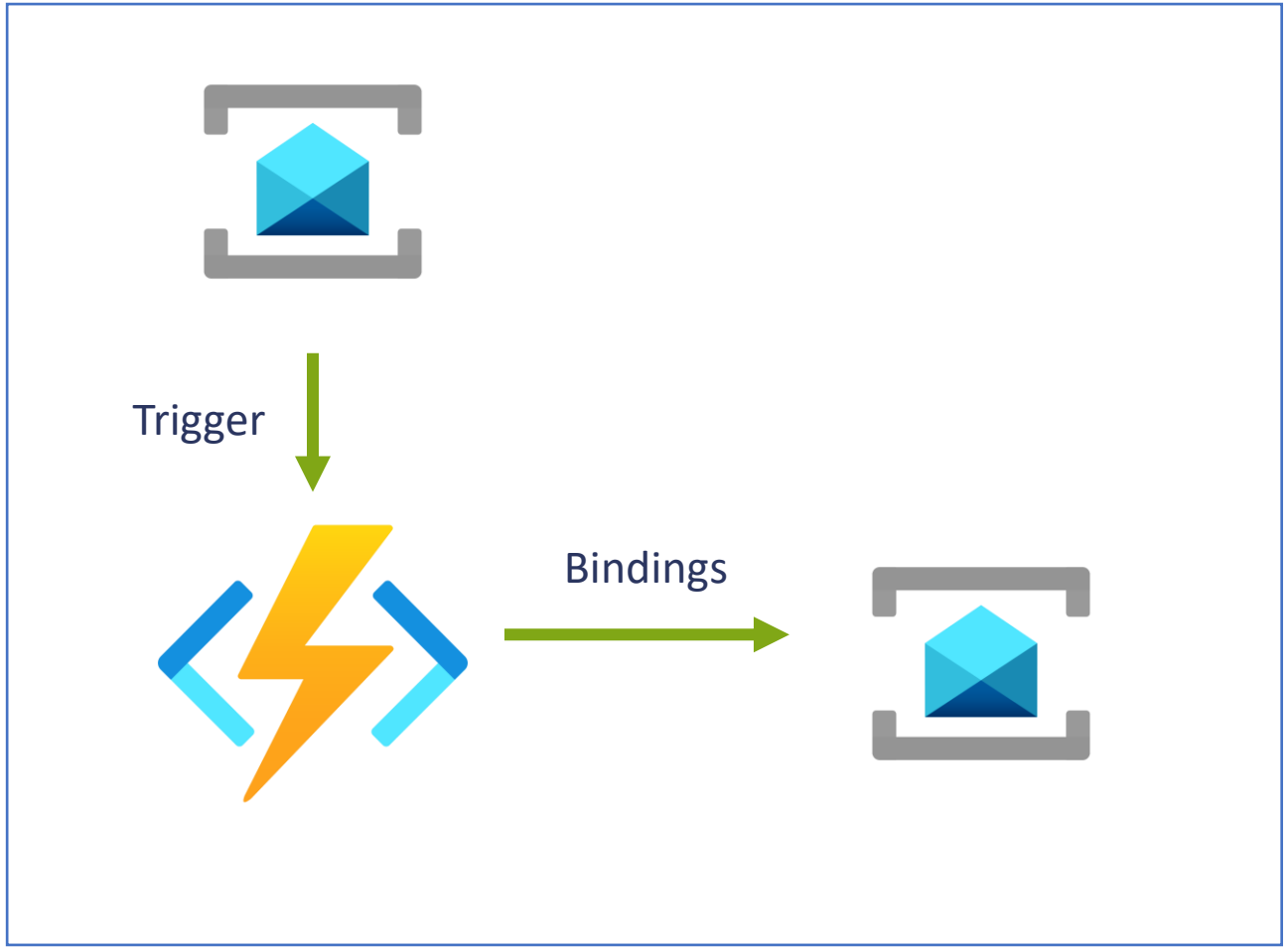
Queue Storage

Tigger	✓
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



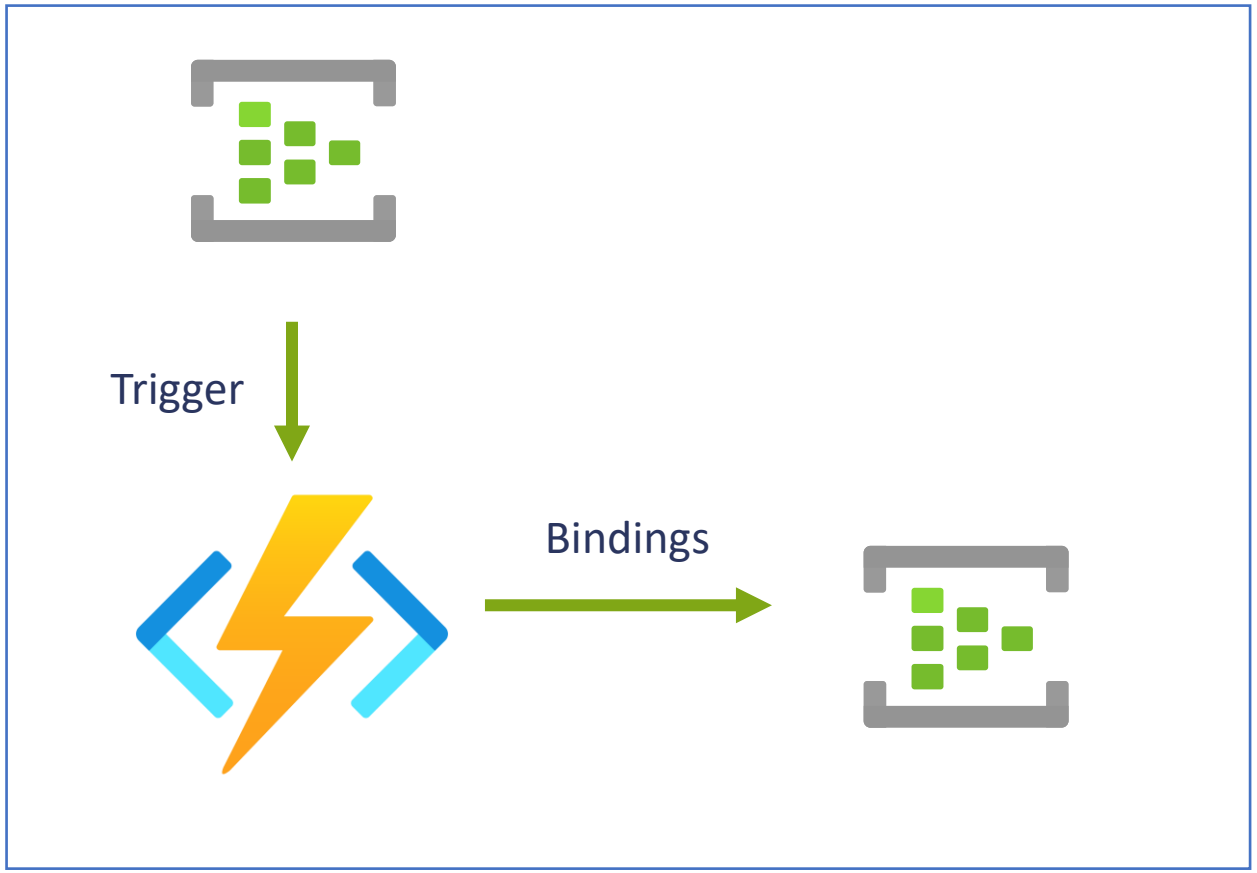
Service Bus

Tigger	✓
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



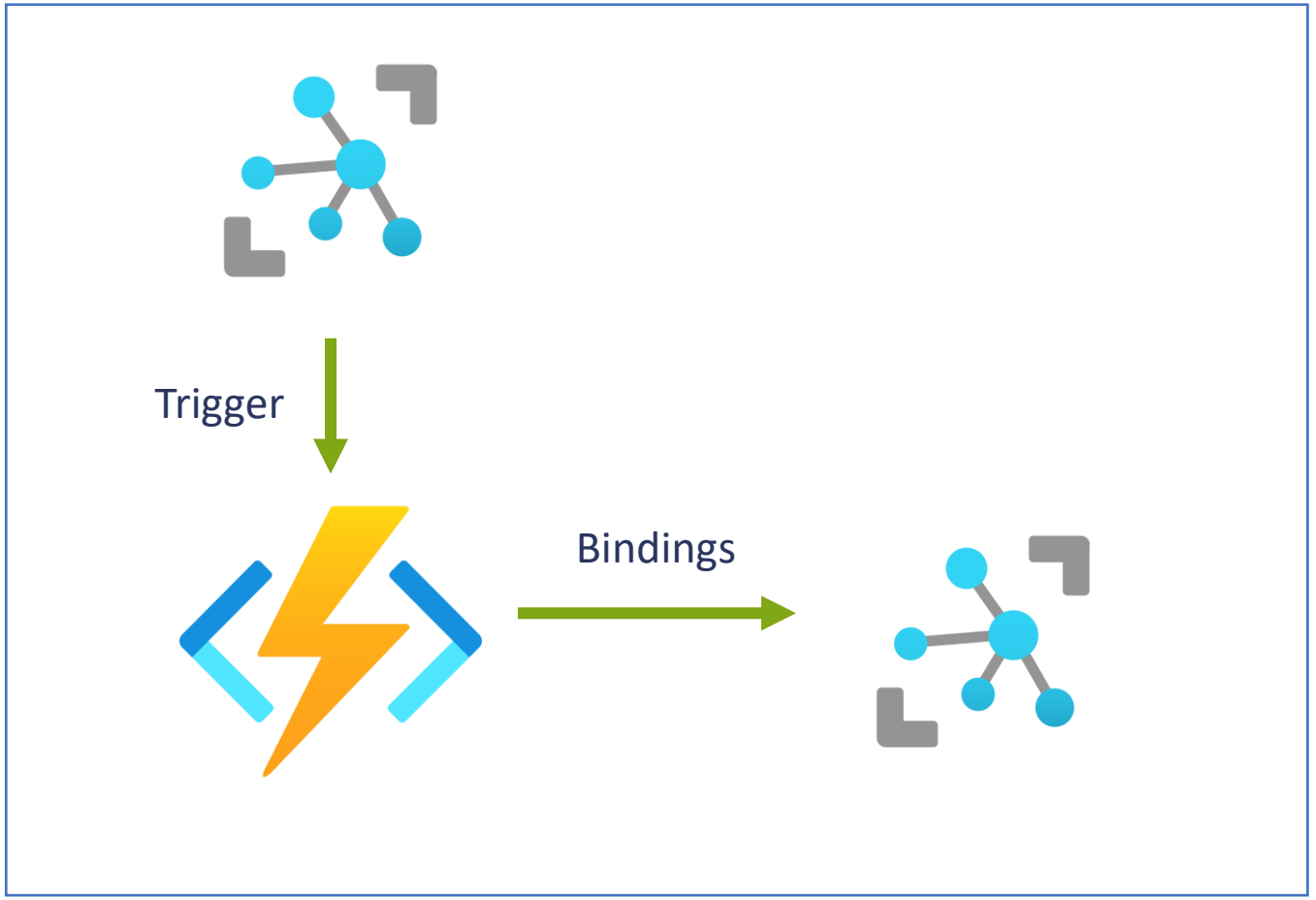
Event Hub

Tigger	✓
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



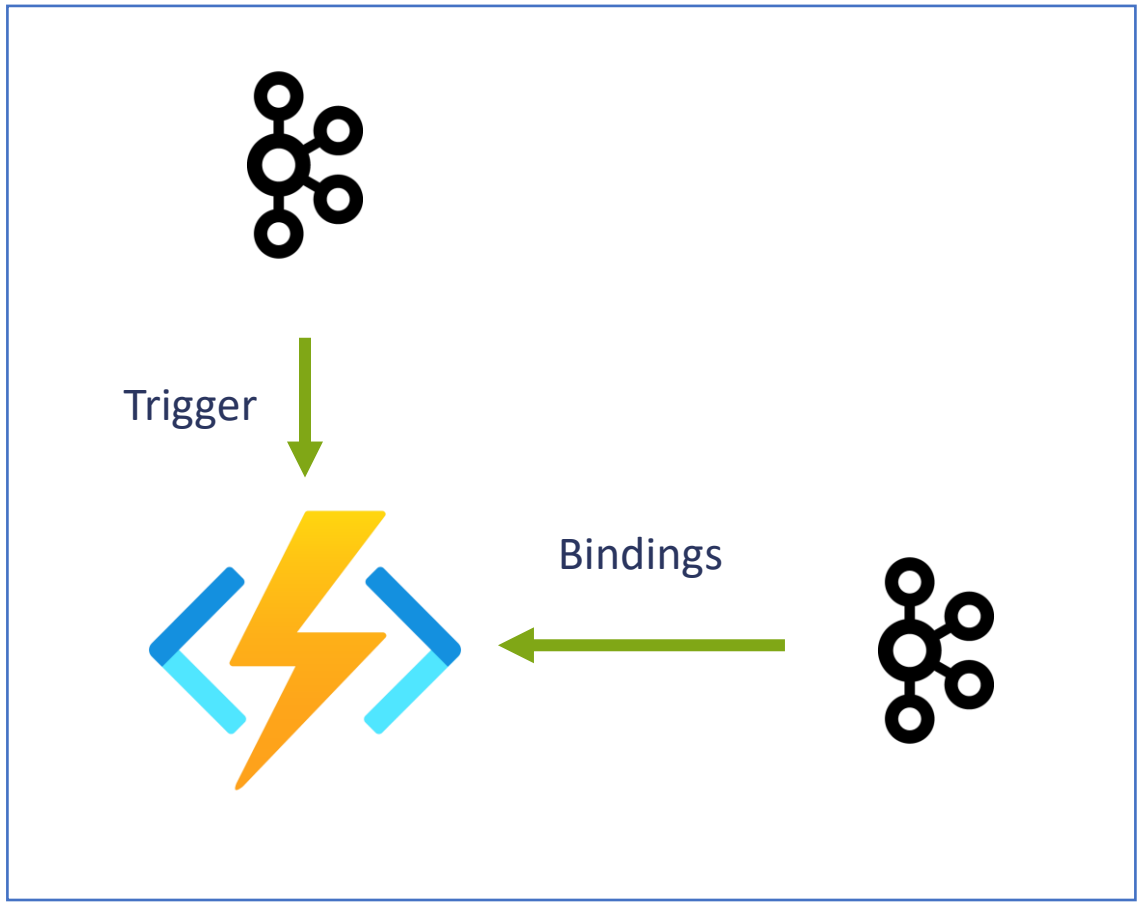
IoT Hub

Tigger	✓
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



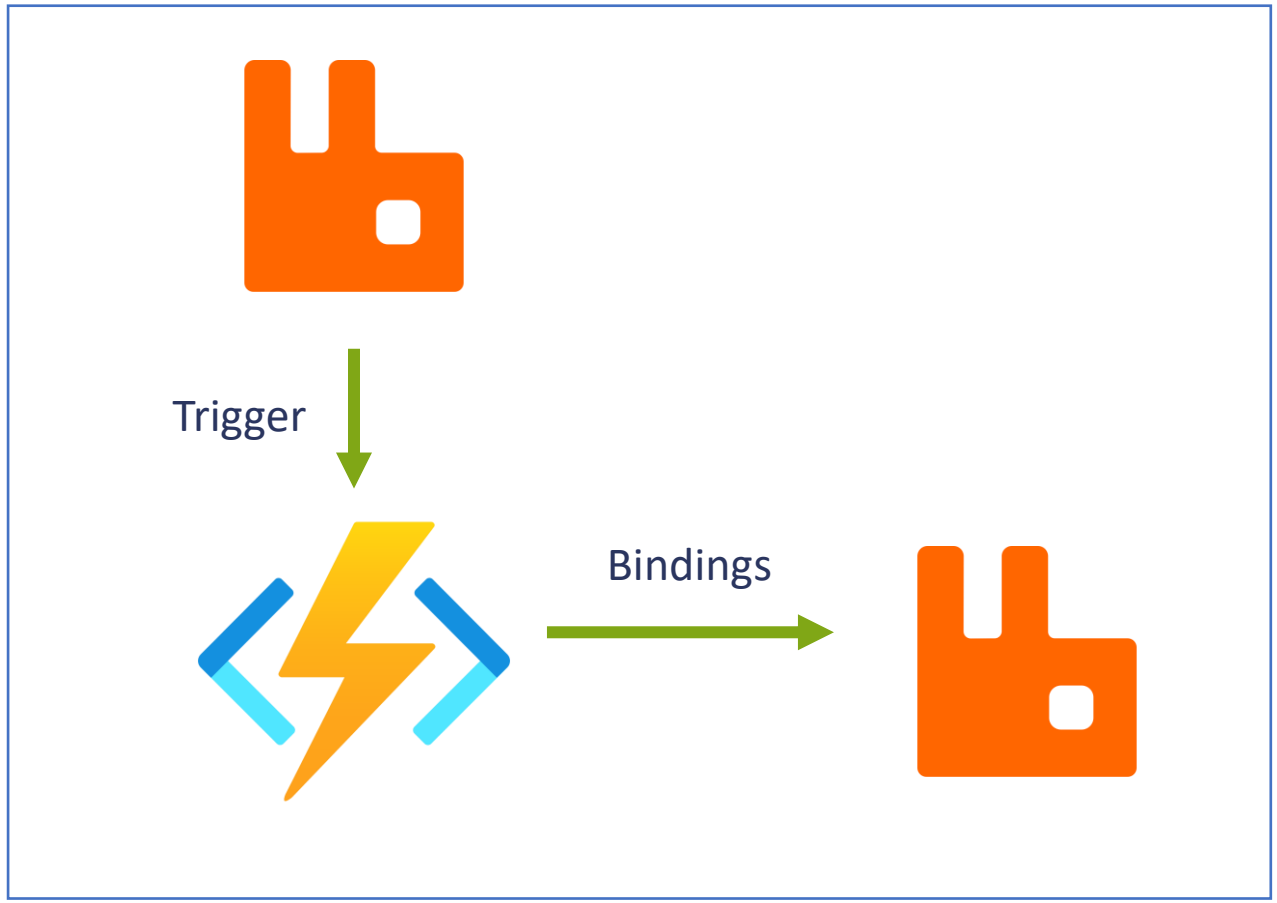
Kafka

Tigger	✓
Input	✗
Output	✓
Consumption	✗
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



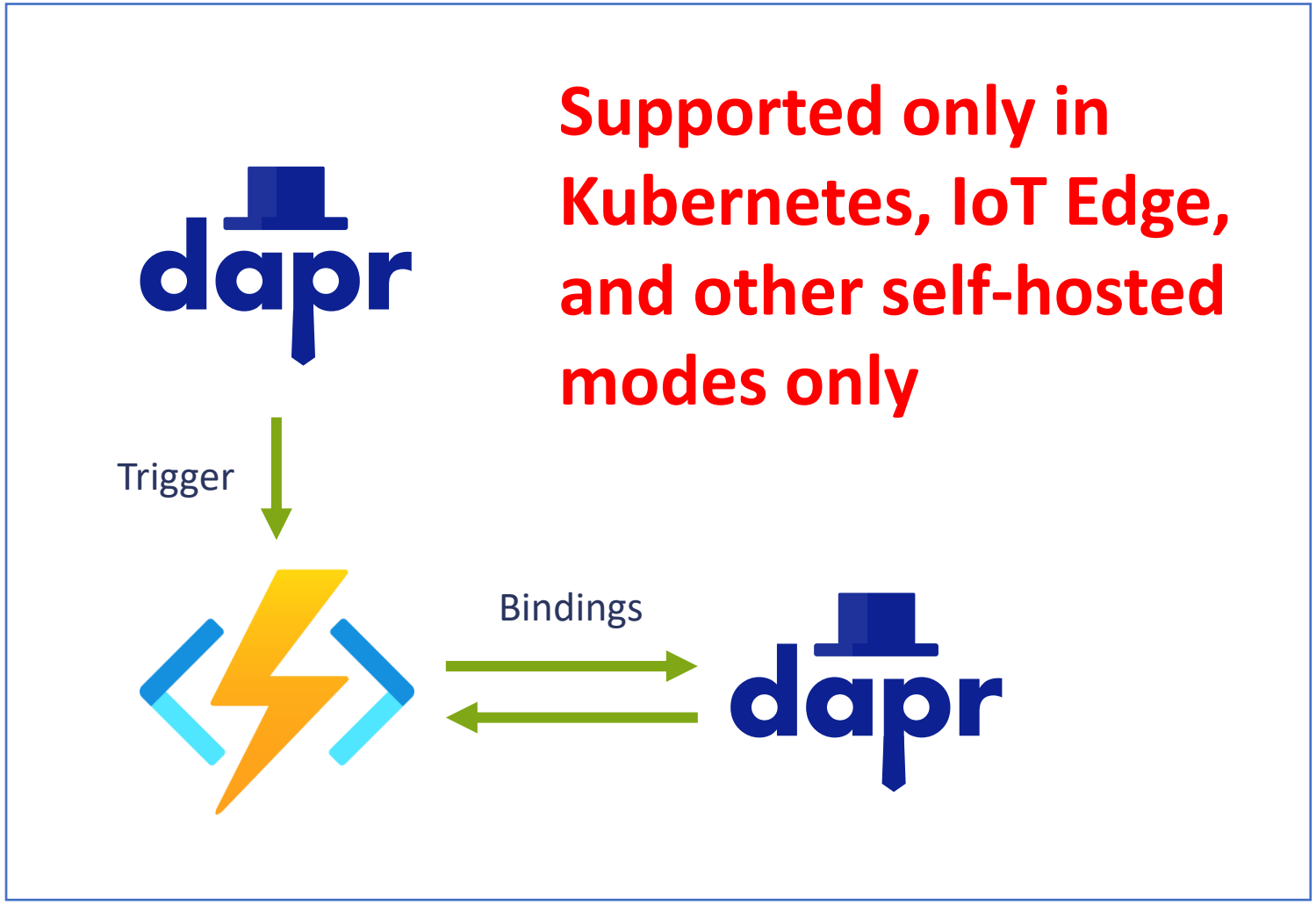
RabbitMQ

Tigger	✓
Input	✗
Output	✓
Consumption	✗
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



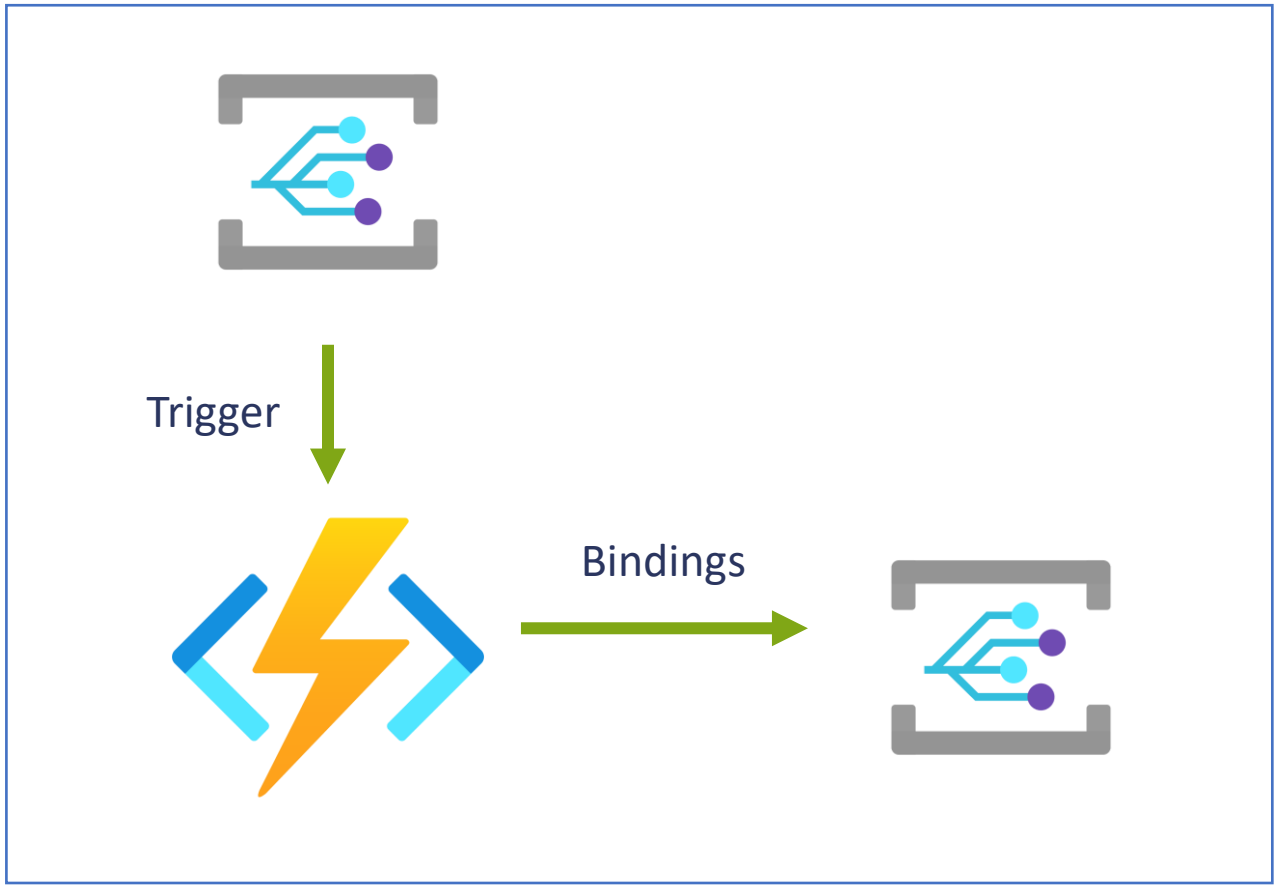
Dapr

Tigger	✓
Input	✓
Output	✓
Consumption	✗
Premium	✗
Dedicated	✓
C# In-Process	✓
C# Isolated	✗
Java	✗
JavaScript	✓
PowerShell	✗
Python	✓



Event Grid

Tigger	✓
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



Blob

Tigger	✓
Input	✓
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓

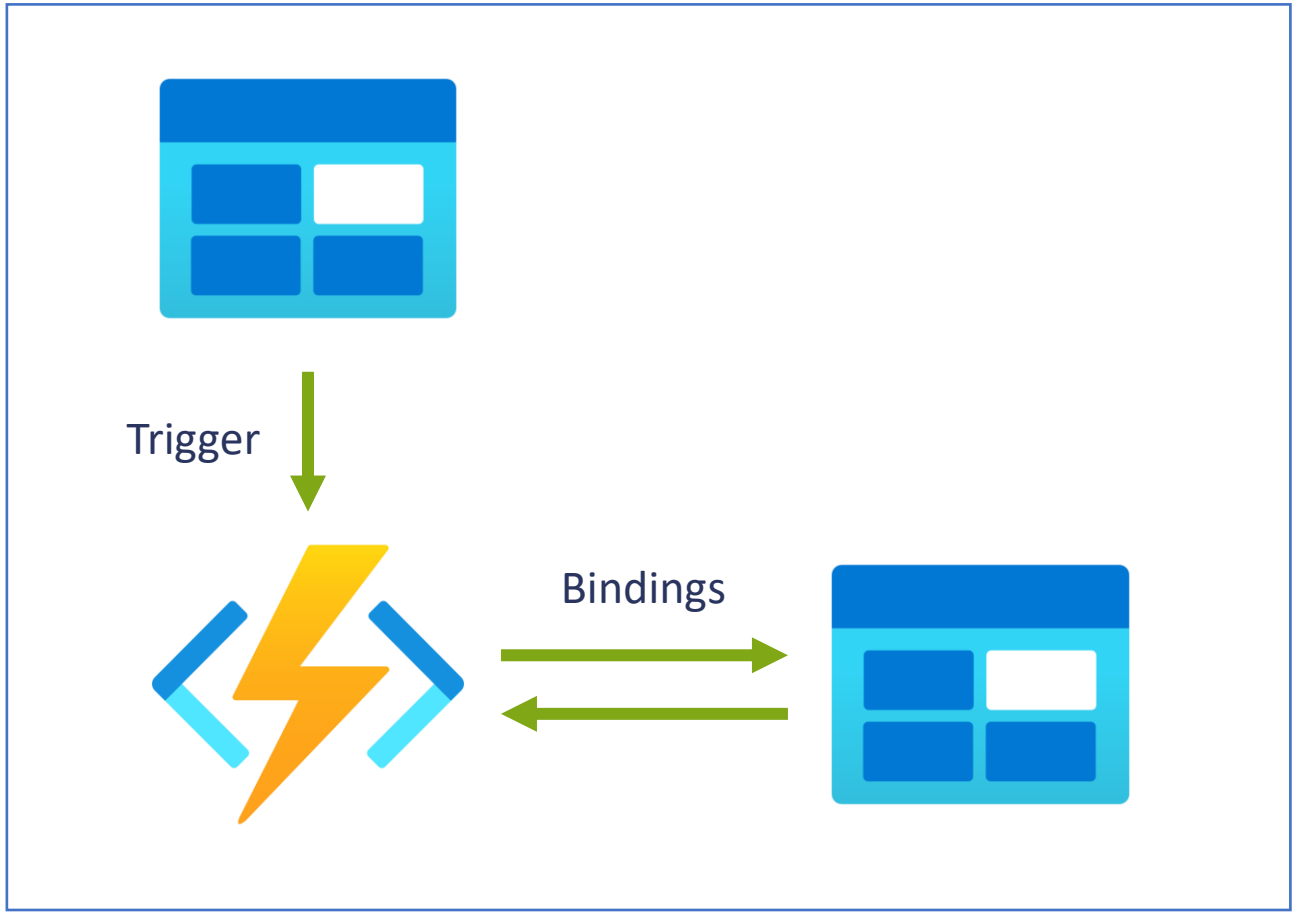
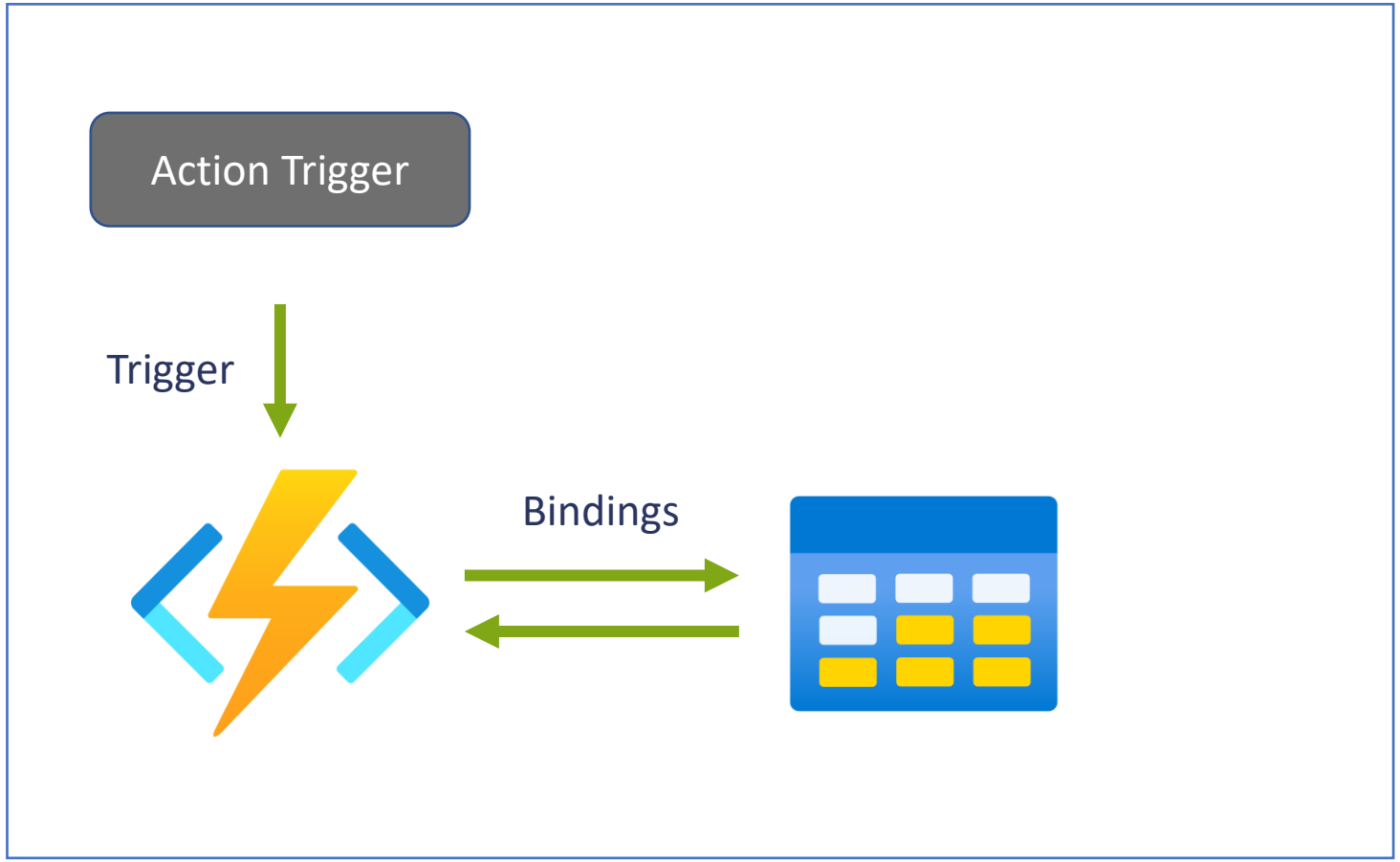


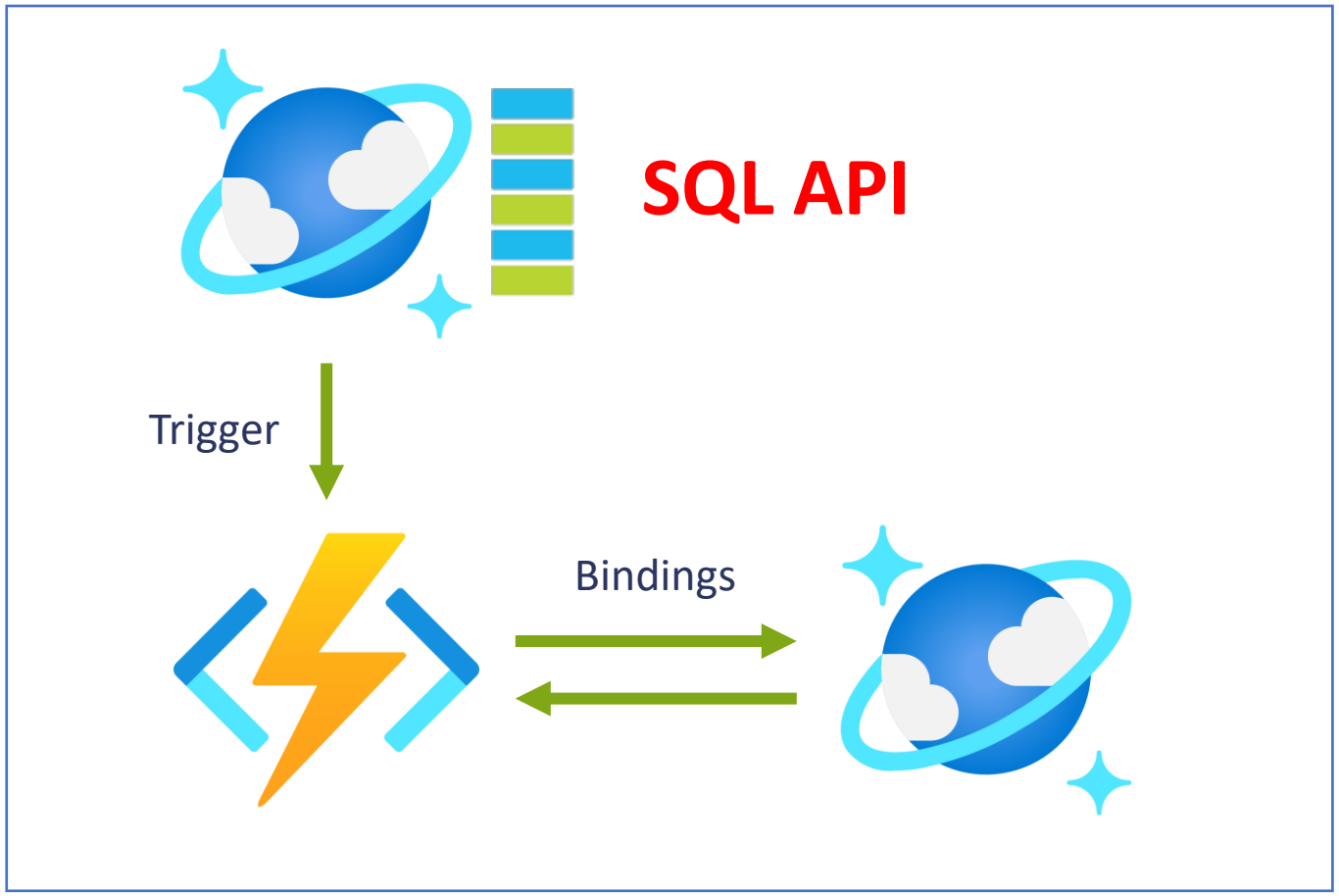
Table Storage

Tigger	✗
Input	✓
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



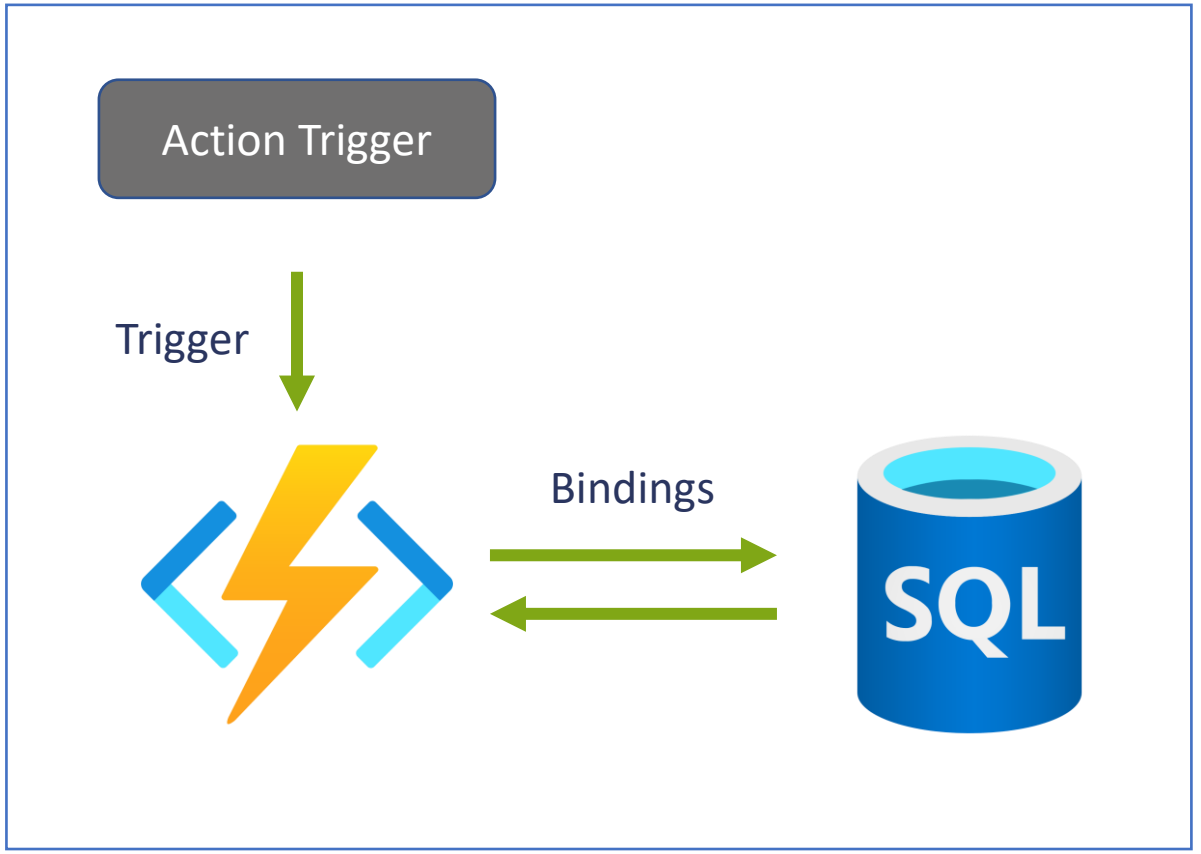
Cosmos DB

Tigger	✓
Input	✓
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



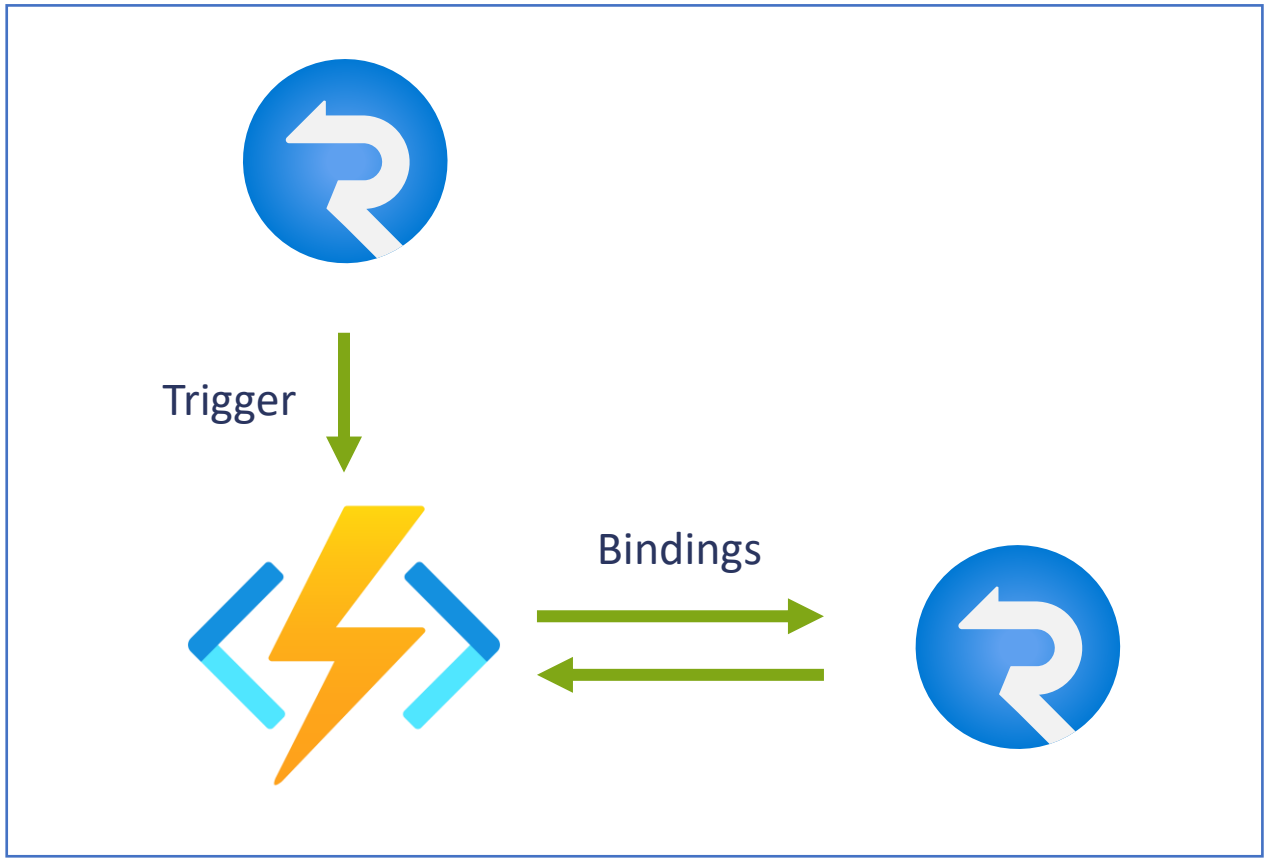
Azure SQL

Tigger	✗
Input	✓
Output	✓
Consumption	✗
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✗
JavaScript	✓
PowerShell	✓
Python	✓



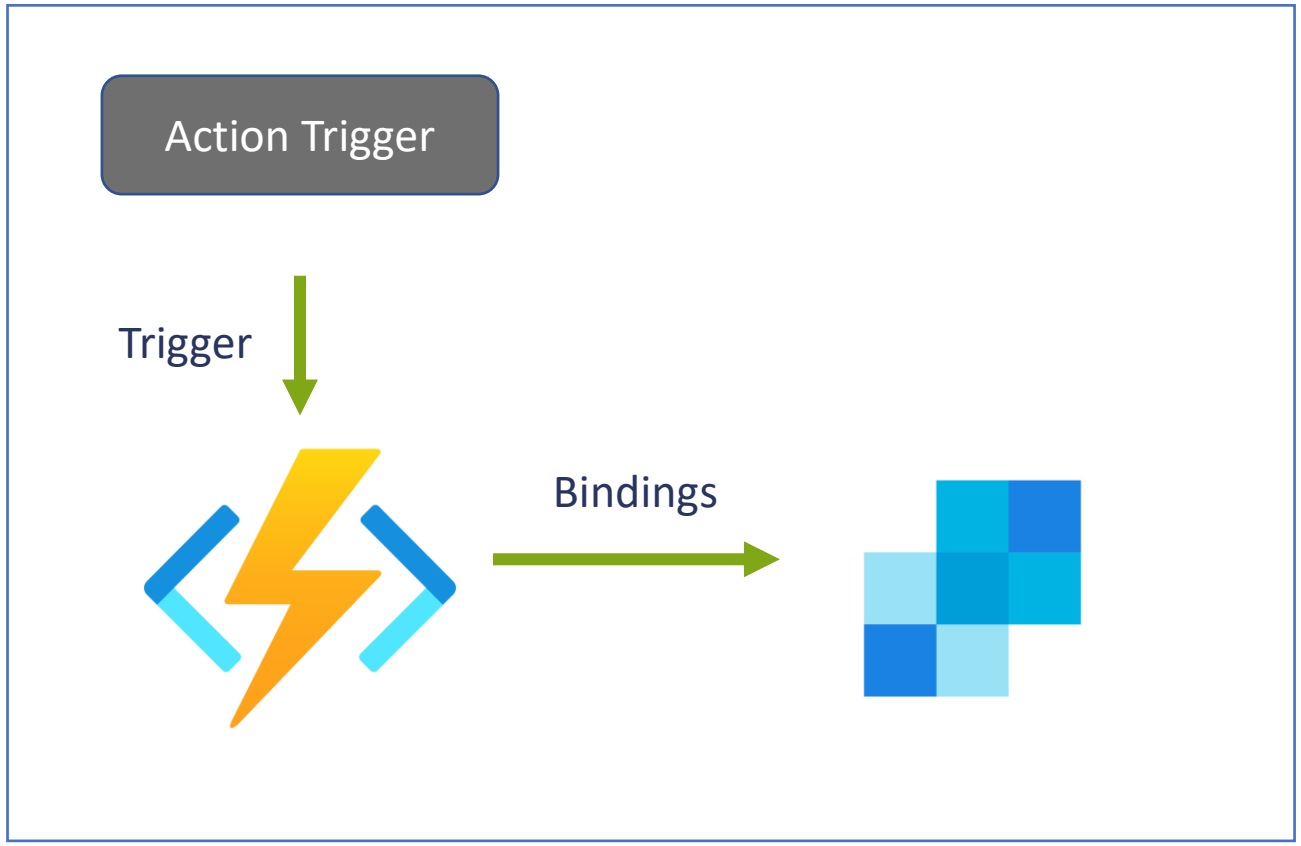
SignalR

Tigger	✓
Input	✓
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



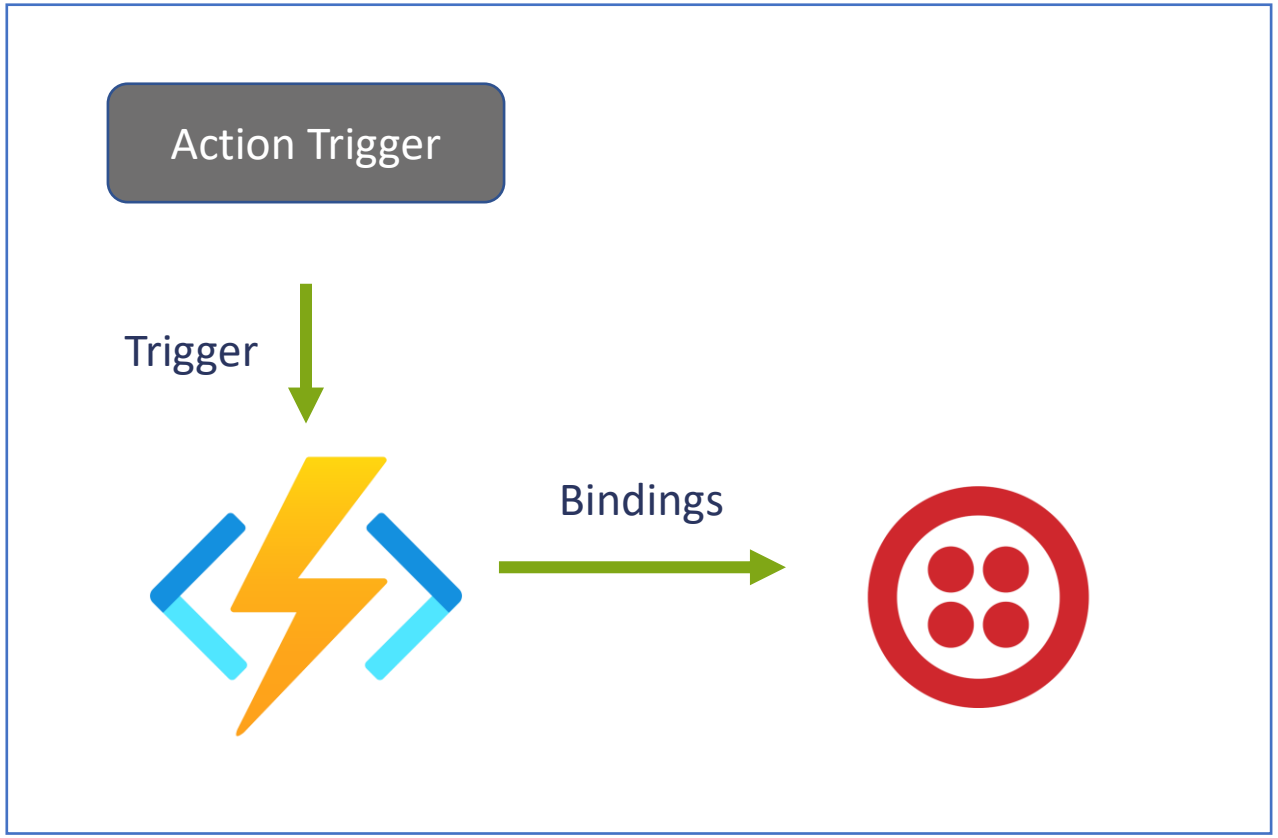
SendGrid

Tigger	✗
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



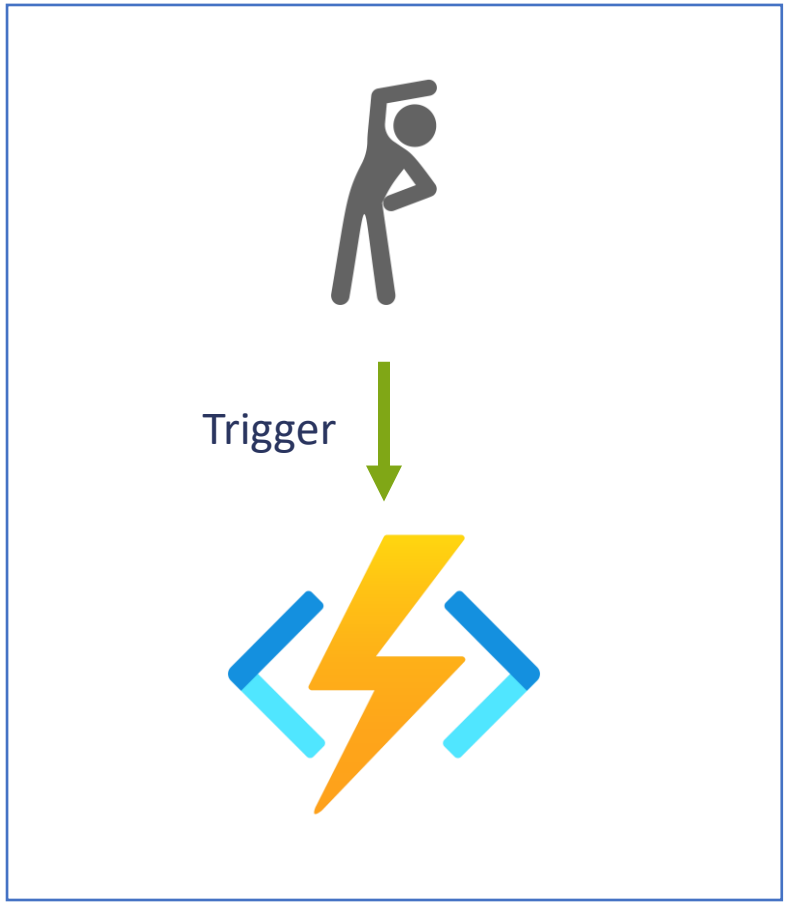
Twilio

Tigger	✗
Input	✗
Output	✓
Consumption	✓
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



Warmup

Tigger	✓
Input	✗
Output	✗
Consumption	✗
Premium	✓
Dedicated	✓
C# In-Process	✓
C# Isolated	✓
Java	✓
JavaScript	✓
PowerShell	✓
Python	✓



Supported Bindings

Third Party Bindings

Custom Bindings

Durable Functions

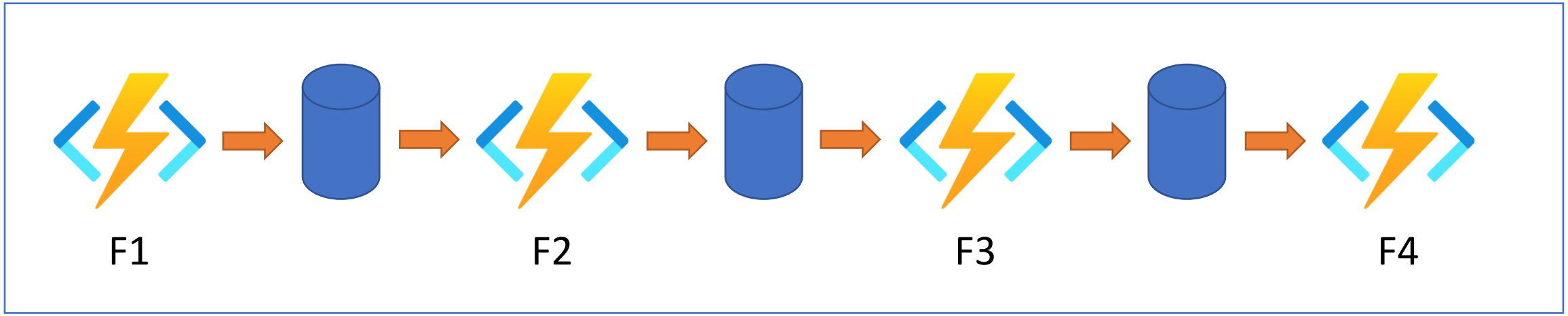
Beyond Hello World: Getting Deeper into Azure Functions

Durable Functions

Stateful Functions?

Durable Functions

Patterns – Function Chaining



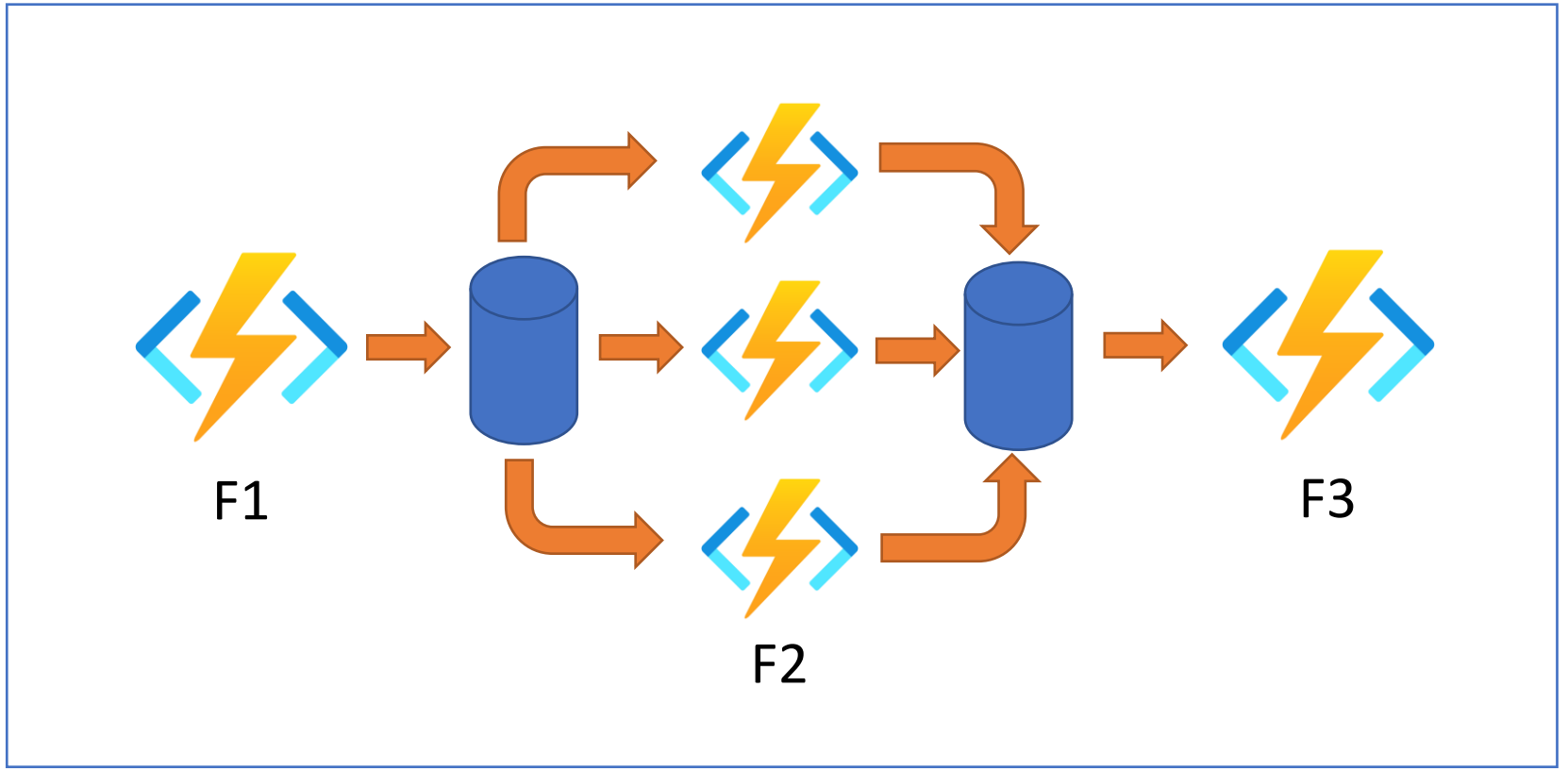
Durable Functions

Patterns – Function Chaining

```
[FunctionName("Chaining")]
public static async Task<object> Run(
    [OrchestrationTrigger] IDurableOrchestrationContext context)
{
    try
    {
        var x = await context.CallActivityAsync<object>("F1", null);
        var y = await context.CallActivityAsync<object>("F2", x);
        var z = await context.CallActivityAsync<object>("F3", y);
        return  await context.CallActivityAsync<object>("F4", z);
    }
    catch (Exception)
    {
        // Error handling or compensation goes here.
    }
}
```

Durable Functions

Patterns – Fan out/fan in



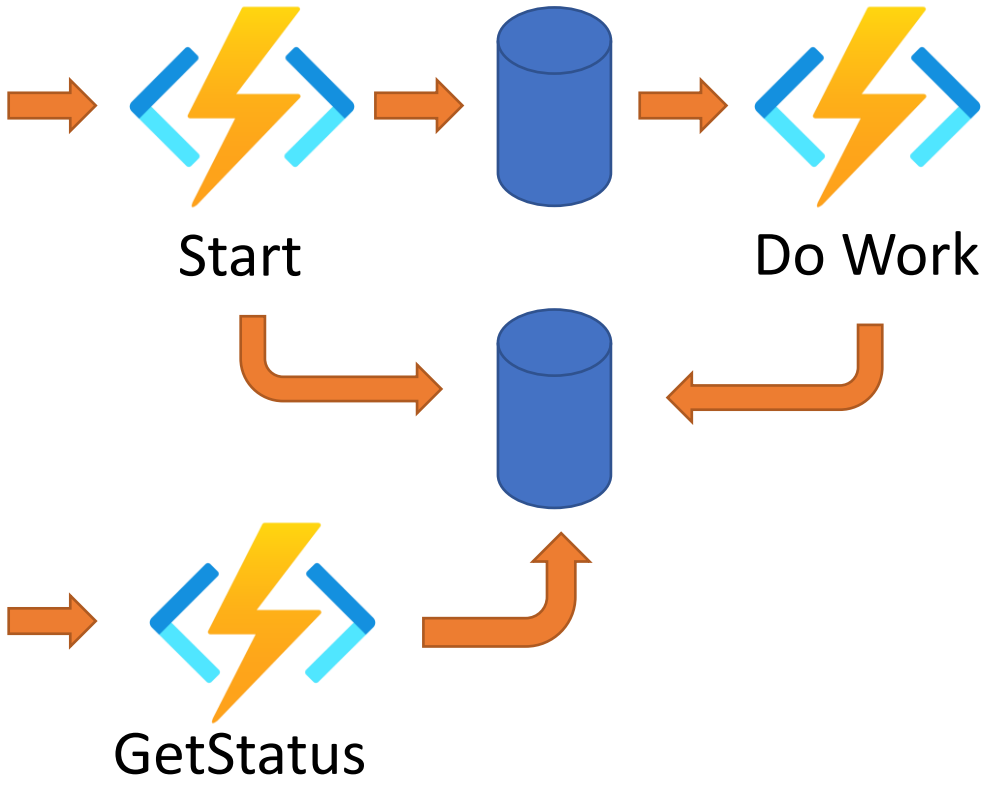
Durable Functions

Patterns – Fan out/fan in

```
[FunctionName("FanOutFanIn")]
public static async Task Run(
    [OrchestrationTrigger] IDurableOrchestrationContext context)
{
    var parallelTasks = new List<Task<int>>();

    // Get a list of N work items to process in parallel.
    object[] workBatch = await context.CallActivityAsync<object[]>("F1", null);
    for (int i = 0; i < workBatch.Length; i++)
    {
        Task<int> task = context.CallActivityAsync<int>("F2", workBatch[i]);
        parallelTasks.Add(task);
    }

    await Task.WhenAll(parallelTasks);

    // Aggregate all N outputs and send the result to F3.
    int sum = parallelTasks.Sum(t => t.Result);
    await context.CallActivityAsync("F3", sum);
}
```

Durable Functions

Patterns – Async HTTP APIs



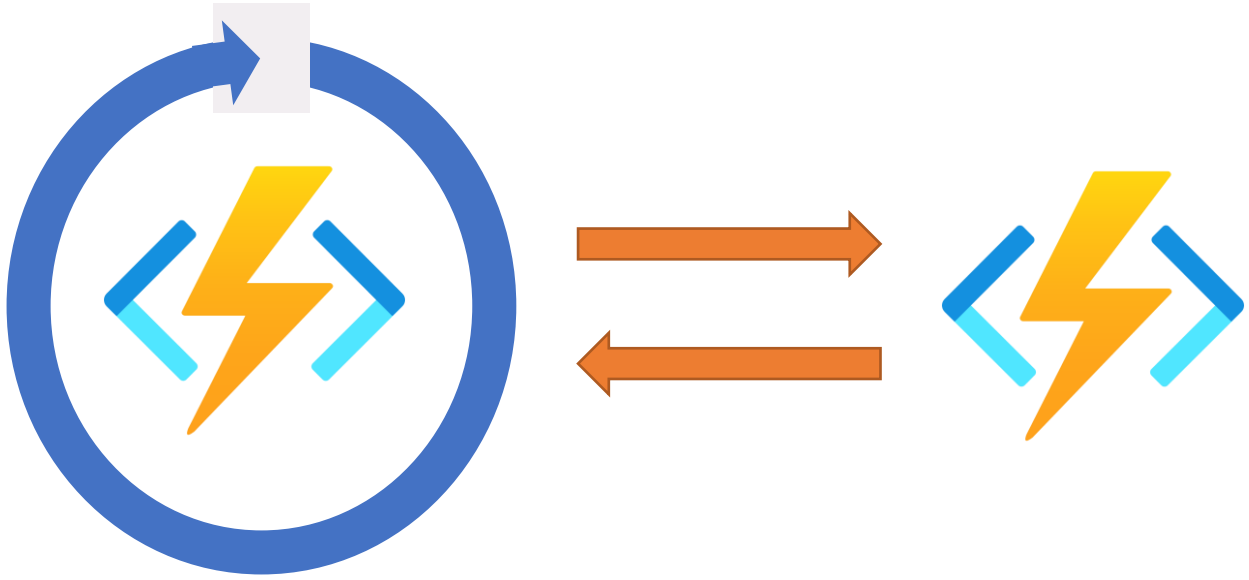
Durable Functions

Patterns – Async HTTP APIs

```
> curl -X POST https://myfunc.azurewebsites.net/api/orchestrators/DoWork -H "Content-Length: 0" -i
HTTP/1.1 202 Accepted
Content-Type: application/json
Location: https://myfunc.azurewebsites.net/runtime/webhooks/durabletask/instances/b79baf67f717453ca9e86c5da21e

{"id":"b79baf67f717453ca9e86c5da21e03ec", ...}

> curl https://myfunc.azurewebsites.net/runtime/webhooks/durabletask/instances/b79baf67f717453ca9e86c5da21e03e
HTTP/1.1 202 Accepted
Content-Type: application/json
Location: https://myfunc.azurewebsites.net/runtime/webhooks/durabletask/instances/b79baf67f717453ca9e86c5da21e

{"runtimeStatus":"Running","lastUpdatedTime":"2019-03-16T21:20:47Z", ...}

> curl https://myfunc.azurewebsites.net/runtime/webhooks/durabletask/instances/b79baf67f717453ca9e86c5da21e03e
HTTP/1.1 200 OK
Content-Length: 175
Content-Type: application/json

{"runtimeStatus":"Completed","lastUpdatedTime":"2019-03-16T21:20:57Z", ...}
```

Durable Functions

Patterns – Monitor



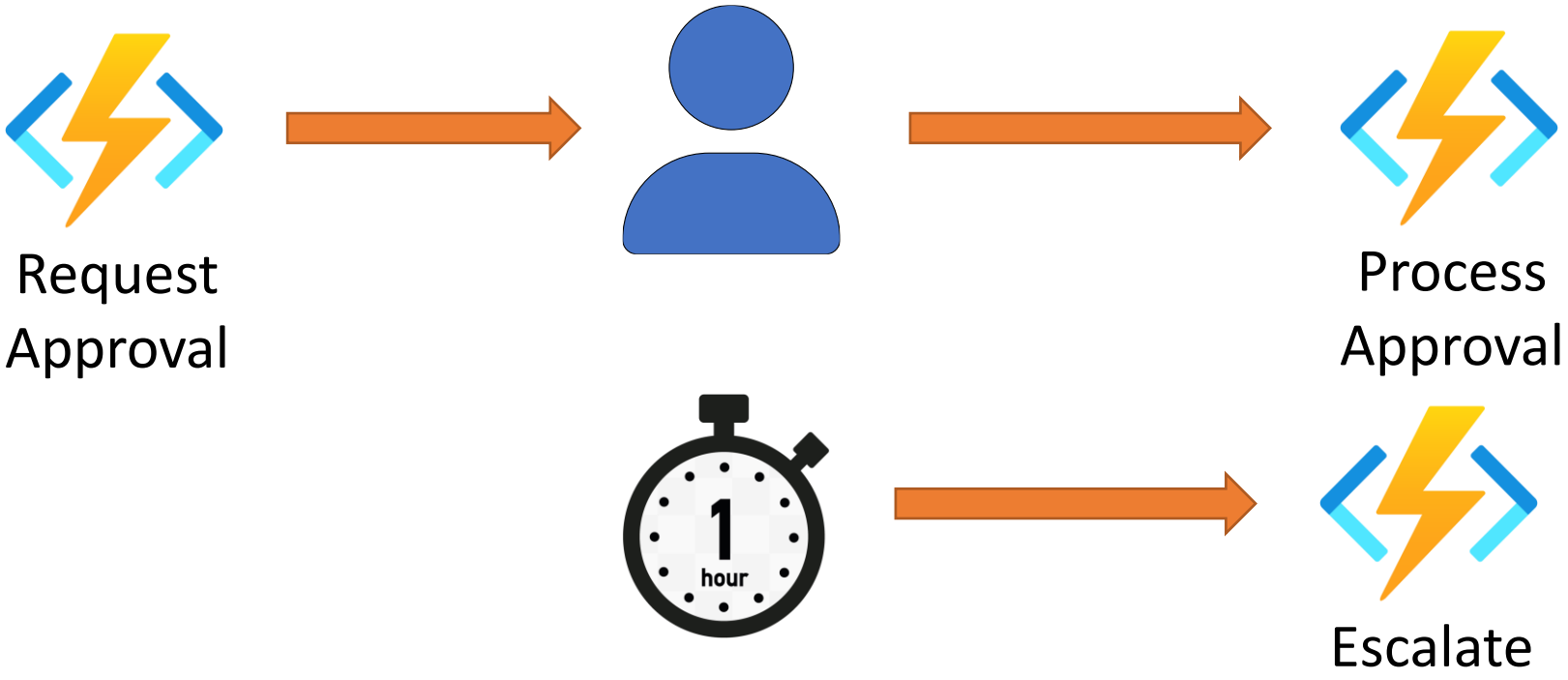
Durable Functions

Patterns – Monitor

```
[FunctionName("MonitorJobStatus")]
public static async Task Run(
    [OrchestrationTrigger] IDurableOrchestrationContext context)
{
    int jobId = context.GetInput<int>();
    int pollingInterval = GetPollingInterval();
    DateTime expiryTime = GetExpiryTime();

    while (context.CurrentUtcDateTime < expiryTime)
    {
        var jobStatus = await context.CallActivityAsync<string>("GetJobStatus", jobId);
        if (jobStatus == "Completed")
        {
            // Perform an action when a condition is met.
            await context.CallActivityAsync("SendAlert", machineId);
            break;
        }

        // Orchestration sleeps until this time.
        var nextCheck = context.CurrentUtcDateTime.AddSeconds(pollingInterval);
        await context.CreateTimer(nextCheck, CancellationToken.None);
    }

    // Perform more work here, or let the orchestration end.
}
```

Durable Functions

Patterns – Human Interaction



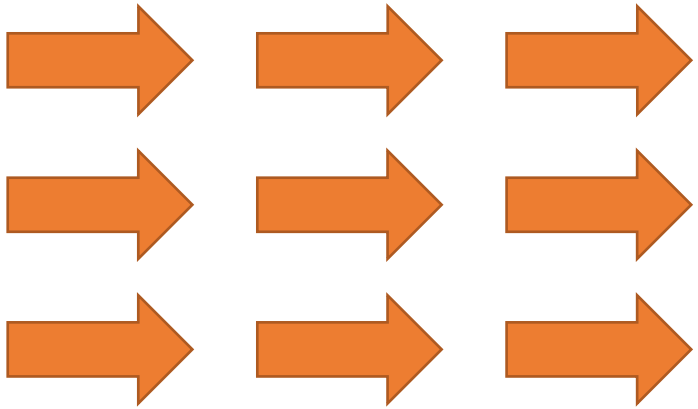
Durable Functions

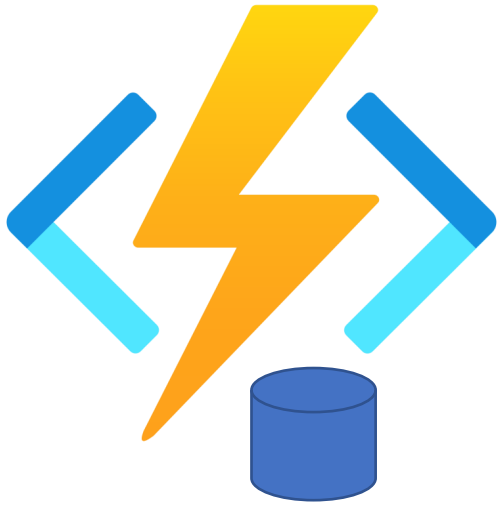
Patterns – Human Interaction

```
[FunctionName("ApprovalWorkflow")]
public static async Task Run(
    [OrchestrationTrigger] IDurableOrchestrationContext context)
{
    await context.CallActivityAsync("RequestApproval", null);
    using (var timeoutCts = new CancellationTokenSource())
    {
        DateTime dueTime = context.CurrentUtcDateTime.AddHours(72);
        Task durableTimeout = context.CreateTimer(dueTime, timeoutCts.Token);

        Task<bool> approvalEvent = context.WaitForExternalEvent<bool>("ApprovalEvent");
        if (approvalEvent == await Task.WhenAny(approvalEvent, durableTimeout))
        {
            timeoutCts.Cancel();
            await context.CallActivityAsync("ProcessApproval", approvalEvent.Result);
        }
        else
        {
            await context.CallActivityAsync("Escalate", null);
        }
    }
}
```

Durable Functions

Patterns – Aggregator (stateful entities)





Durable Functions

Patterns – Aggregator (stateful entities)

```
[FunctionName("Counter")]
public static void Counter([EntityTrigger] IDurableEntityContext ctx)
{
    int currentValue = ctx.GetState<int>();
    switch (ctx.OperationName.ToLowerInvariant())
    {
        case "add":
            int amount = ctx.GetInput<int>();
            ctx.SetState(currentValue + amount);
            break;
        case "reset":
            ctx.SetState(0);
            break;
        case "get":
            ctx.Return(currentValue);
            break;
    }
}
```

Durable Functions

Patterns – Aggregator (stateful entities)

```
public class Counter
{
    [JsonProperty("value")]
    public int CurrentValue { get; set; }

    public void Add(int amount) => this.CurrentValue += amount;

    public void Reset() => this.CurrentValue = 0;

    public int Get() => this.CurrentValue;

    [FunctionName(nameof(Counter))]
    public static Task Run([EntityTrigger] IDurableEntityContext ctx)
        => ctx.DispatchAsync<Counter>();
}
```

Durable Functions

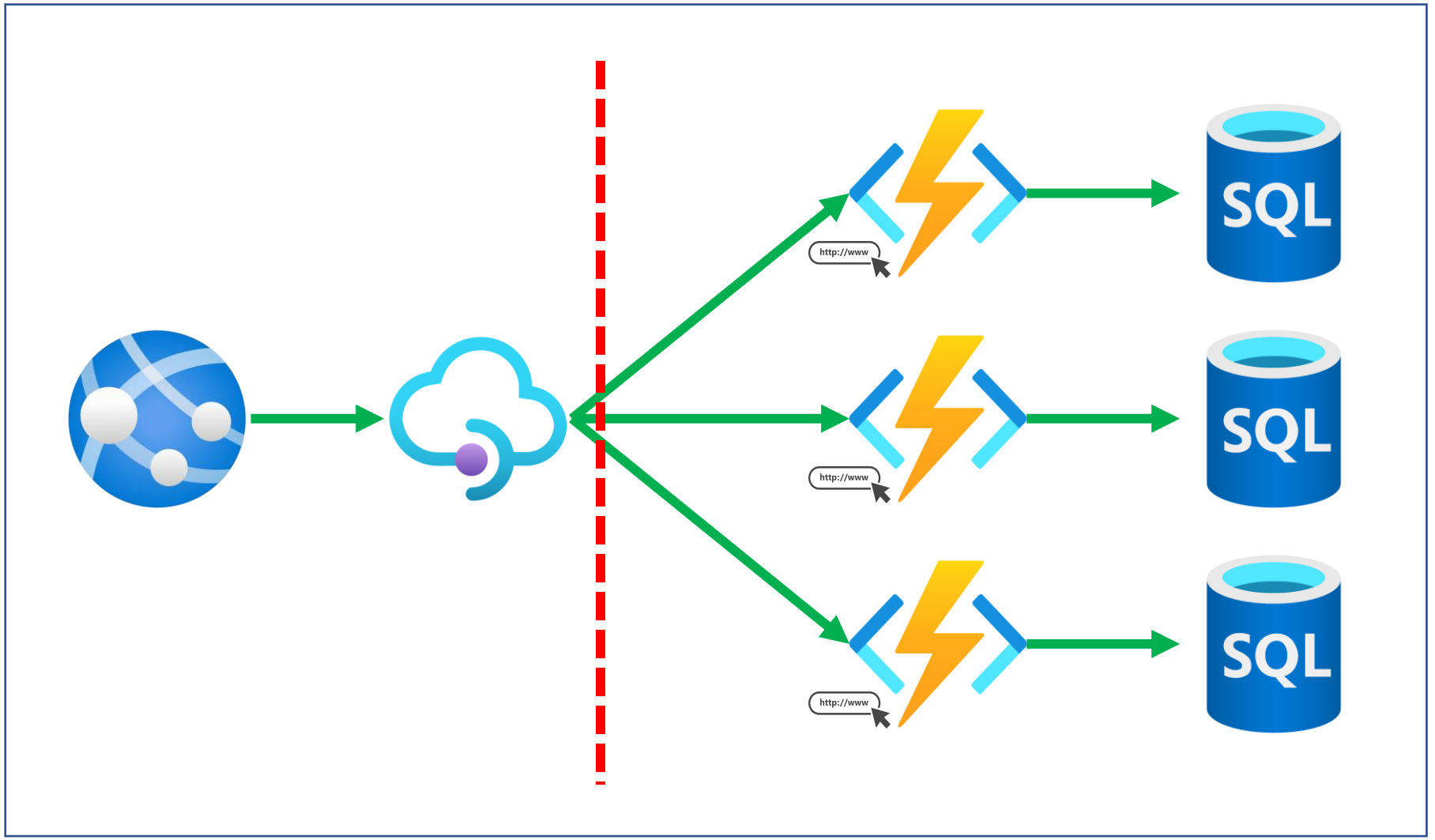
Patterns – Aggregator (stateful entities)

```
[FunctionName("EventHubTriggerCSharp")]
public static async Task Run(
    [EventHubTrigger("device-sensor-events")] EventData eventData,
    [DurableClient] IDurableEntityClient entityClient)
{
    var metricType = (string)eventData.Properties["metric"];
    var delta = BitConverter.ToInt32(eventData.Body, eventData.Body.Offset);

    // The "Counter/{metricType}" entity is created on-demand.
    var entityId = new EntityId("Counter", metricType);
    await entityClient.SignalEntityAsync(entityId, "add", delta);
}
```

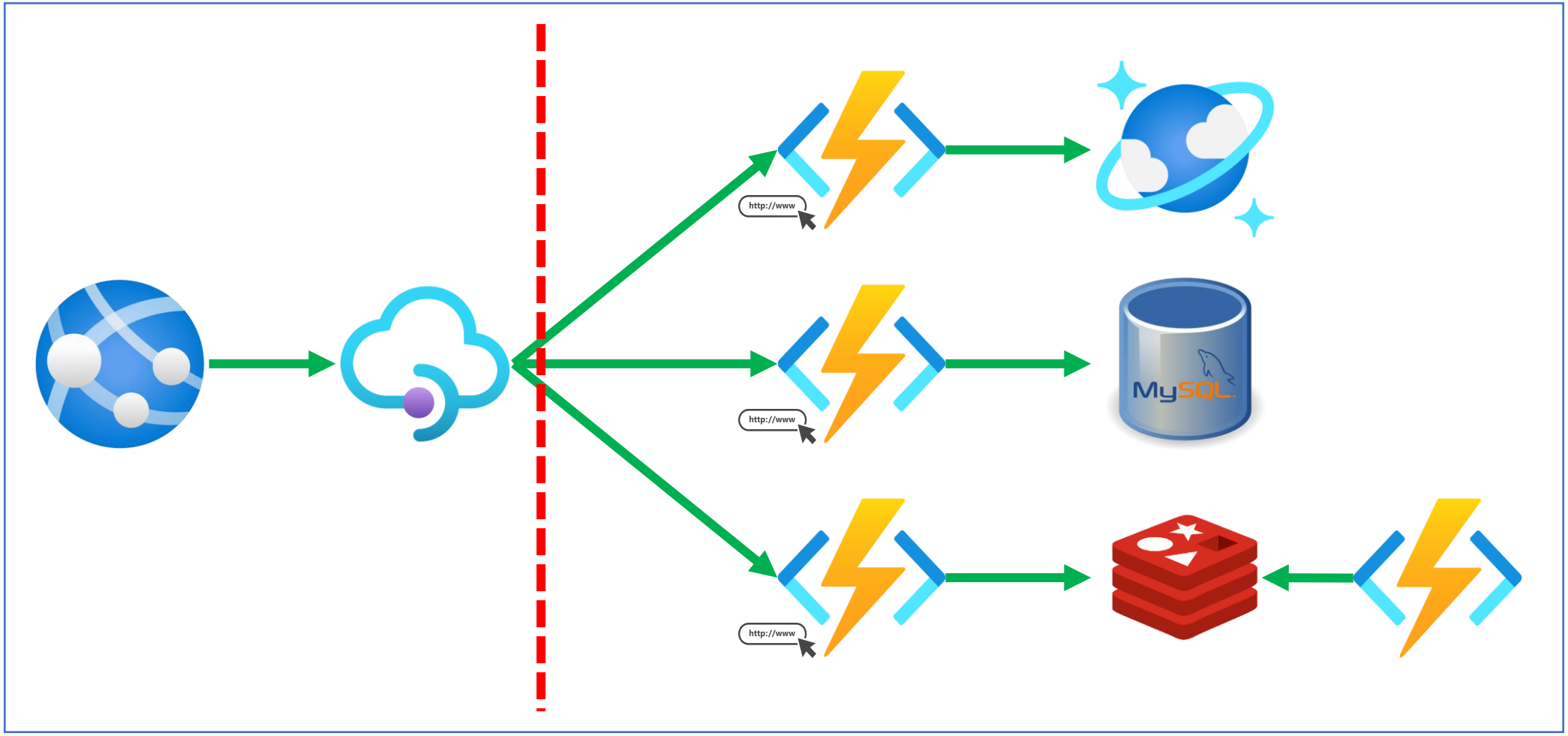
Real World Scenarios

Beyond Hello World: Getting Deeper into Azure Functions

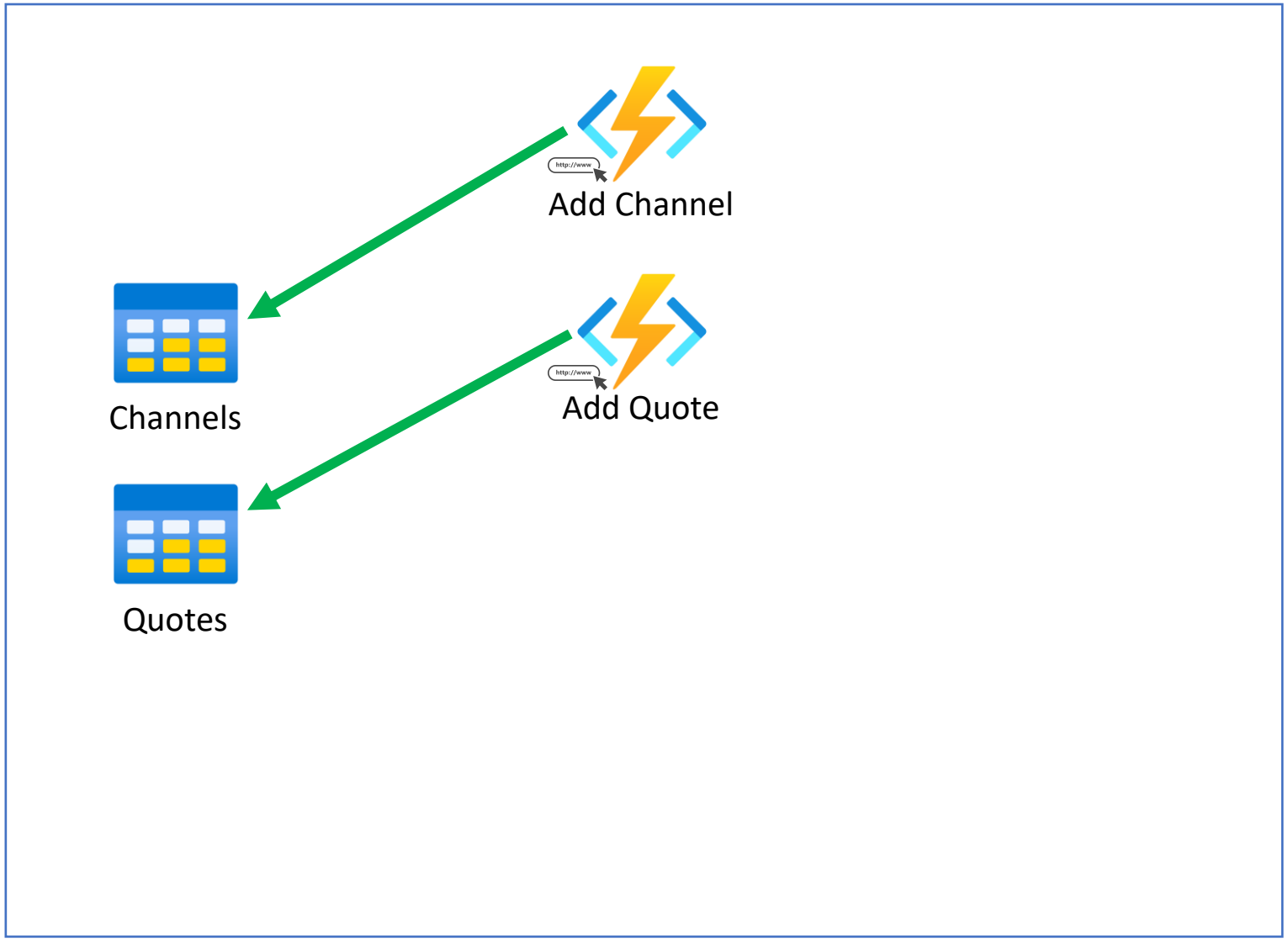
CRUD Microservice



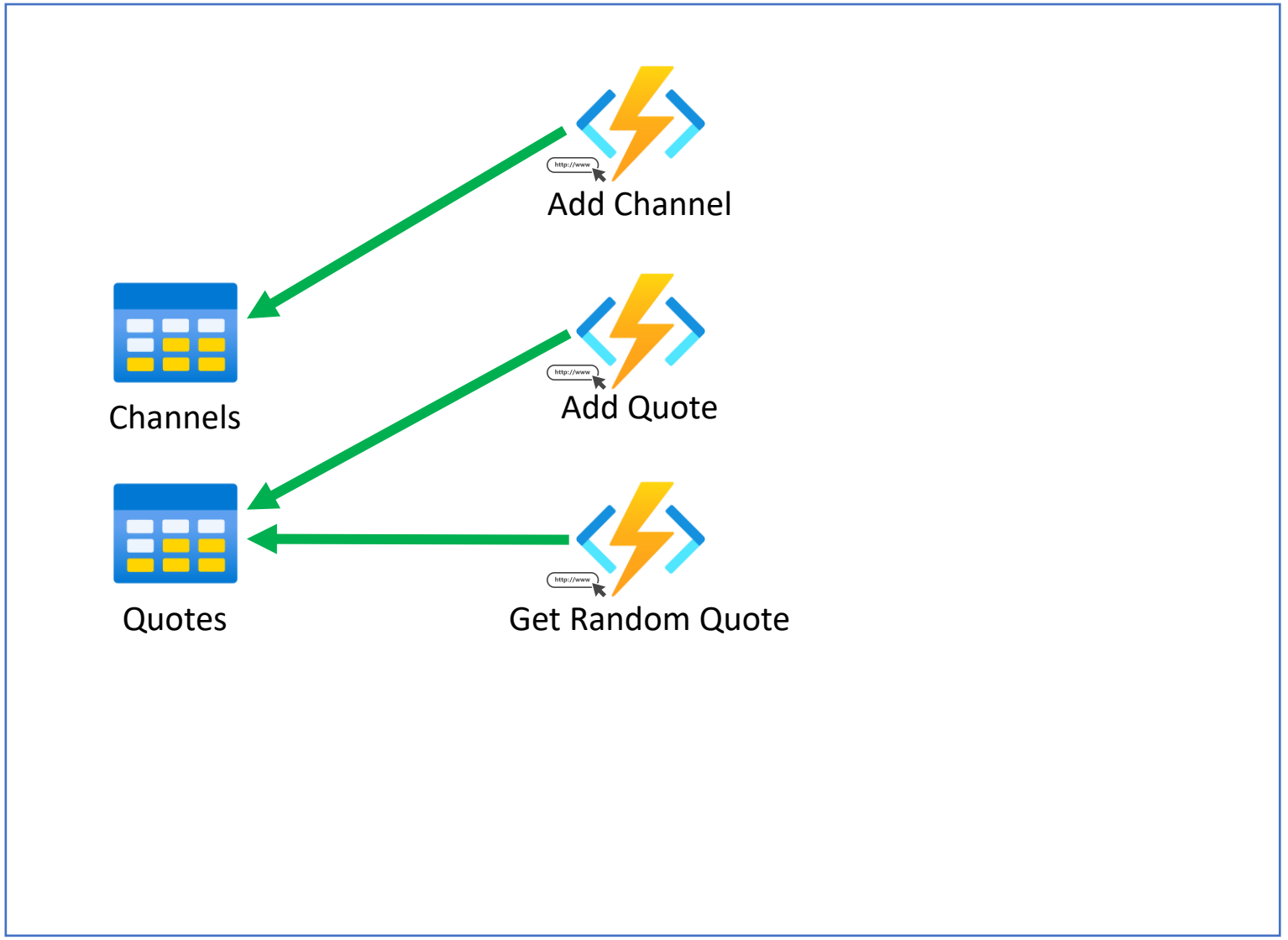
CRUD Microservice



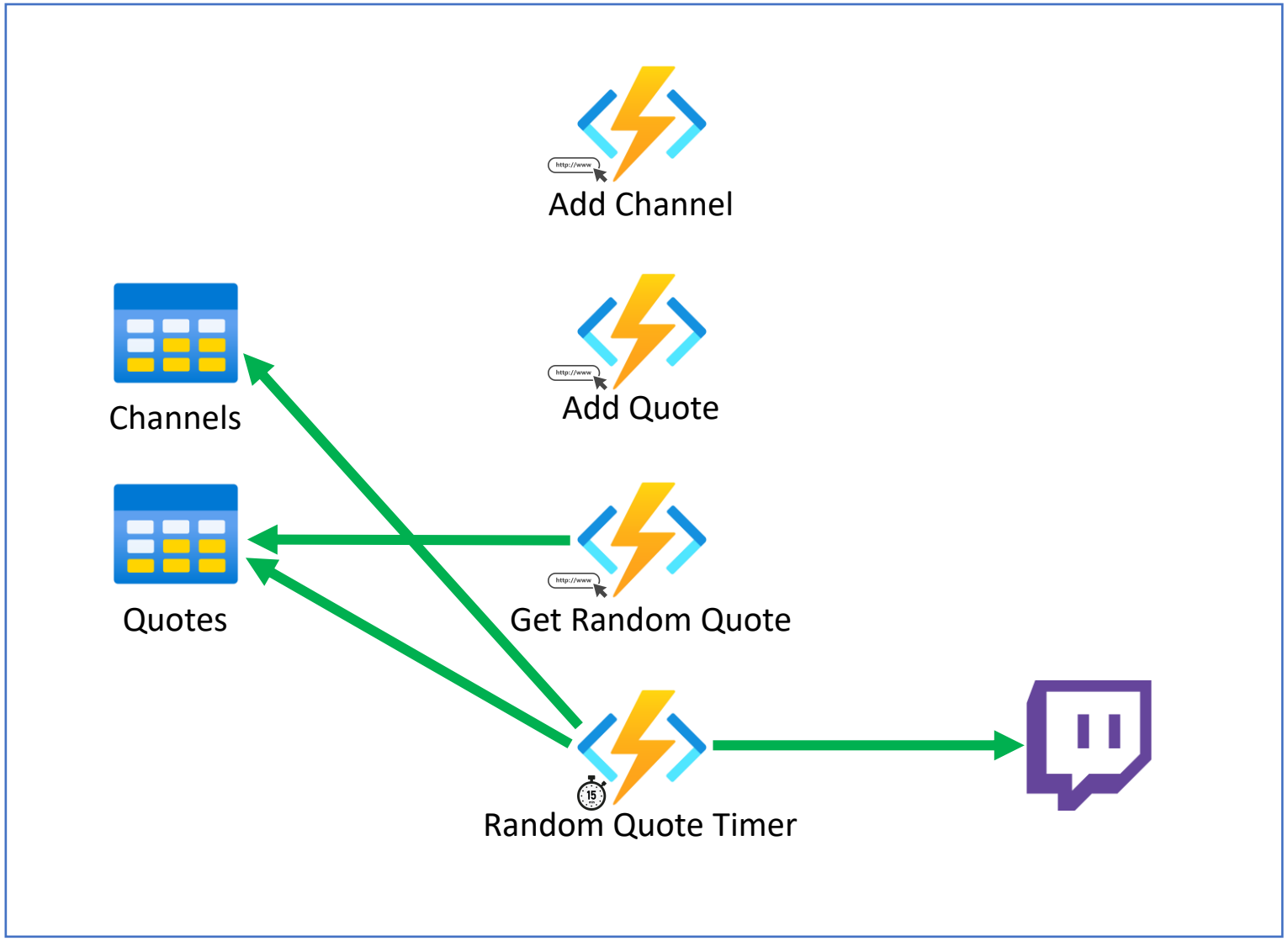
Random Quote Generator



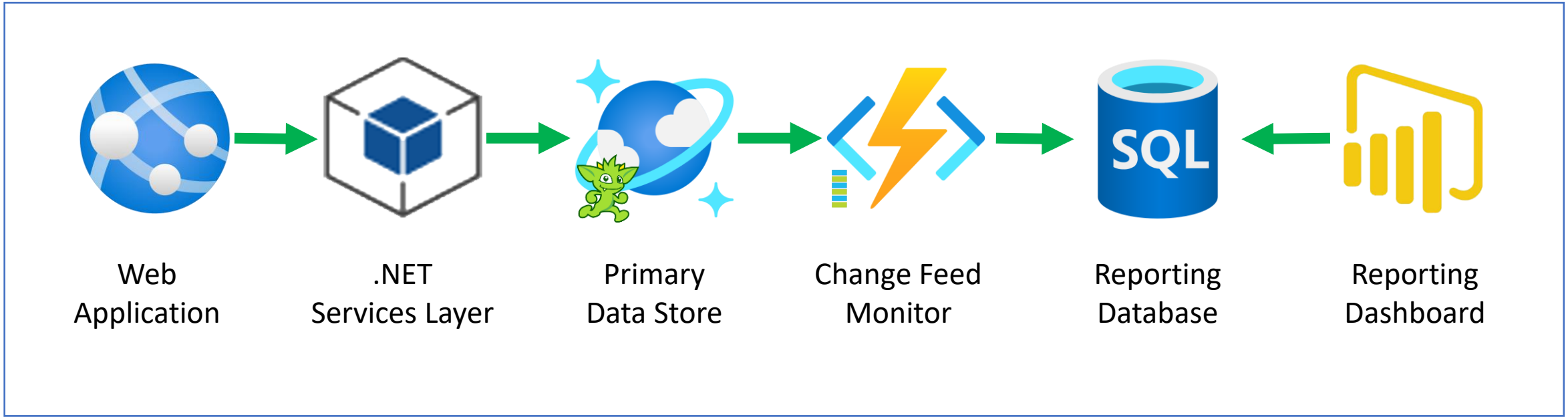
Random Quote Generator



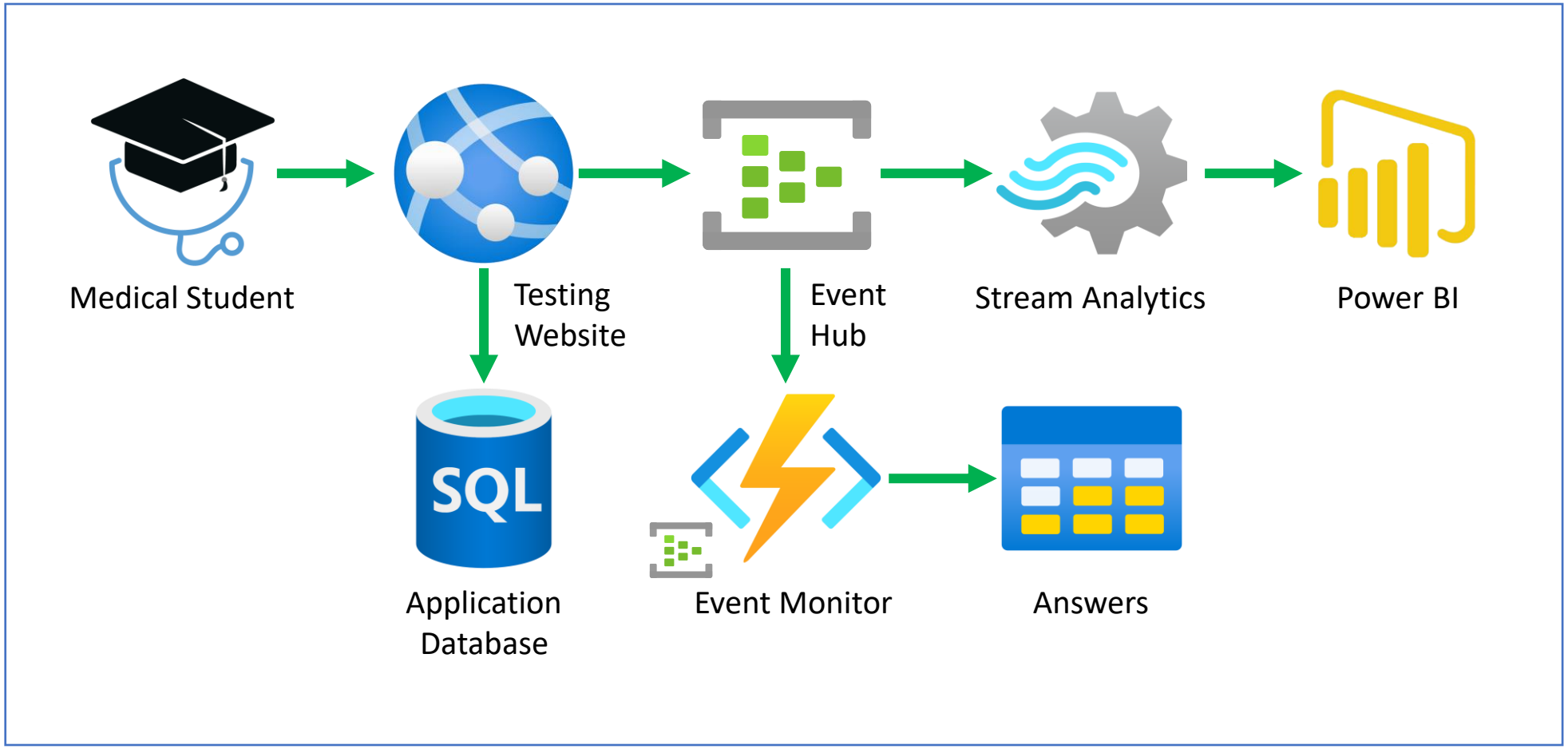
Random Quote Generator



Replicating Data



Real-Time Reporting

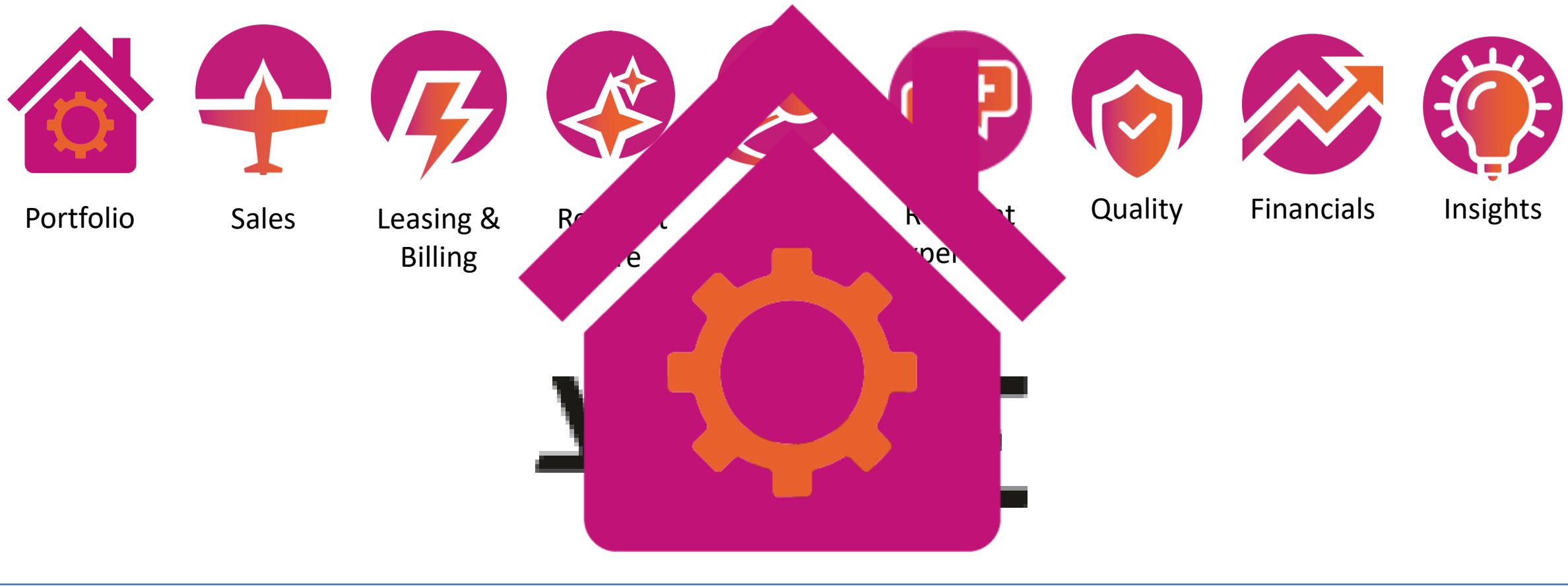


Glennis Platform

Portfolio | Sales | Leasing & Billing | Resident Care | eMAR | Resident Experience | Quality | Financials | Insights

LINE

Glennis Platform



Glennis Platform

Glennis Portfolio

- Portfolio Management
- Care and Services Management
- Pricing Management
- Marketing Data Management
- Marketing APIs

Glennis Platform

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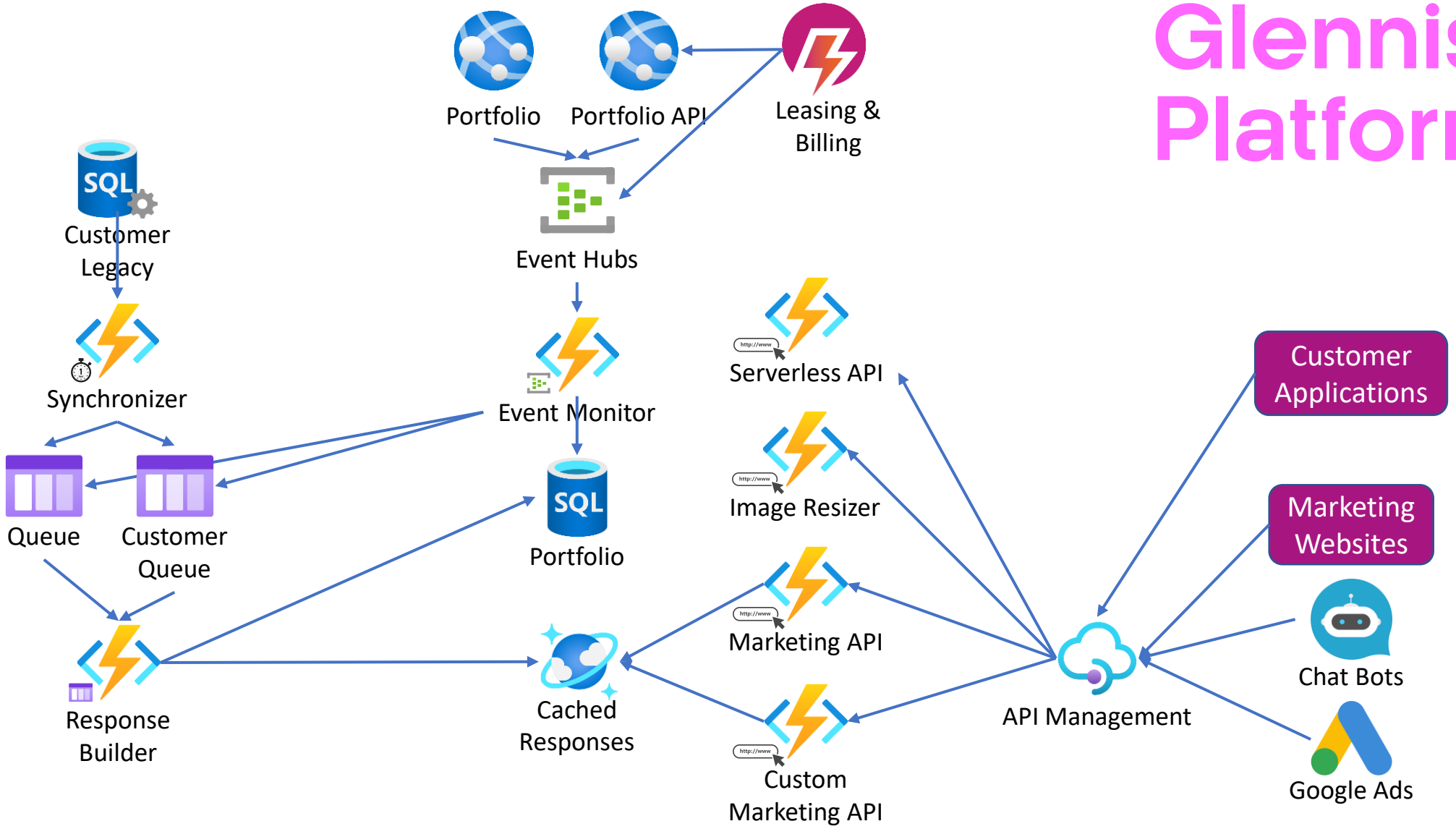

Thank You!

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