AZURE FUNCTIONS

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https://www.youtube.com/@learnsmartcoding

AZ-204 Implement Azure Functions Skills

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Implement function triggers by using data operations, timers, and webhooks

Implement input and output bindings for a function

Implement Azure Durable Functions

Getting Started

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What are Azure Functions ?

Key terminology

- *Serverless*
- *Function App*

Creating Function App in Portal, Azure CLI & PowerShell

Getting Started

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What are Azure Functions ?

- *Azure Functions is a serverless solution that allows you to write less code (“functions”) in the cloud*
- *It is a “Serverless application platform”*
- *A “Function as a Service” (FaaS) platform*

Getting Started

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Key terminologies

Serverless

- *Delegate server management responsibility to the cloud provider*
- *Automatic scaling to meet demand*
- *Billed only while your code is running*

Getting Started

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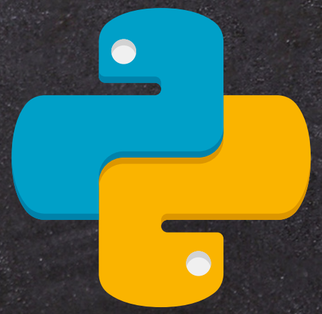
What is a Azure Function App?

One or more related Azure Functions, that are developed, deployed and hosted as a group

Choice of Programming Languages



Choice of Programming Languages

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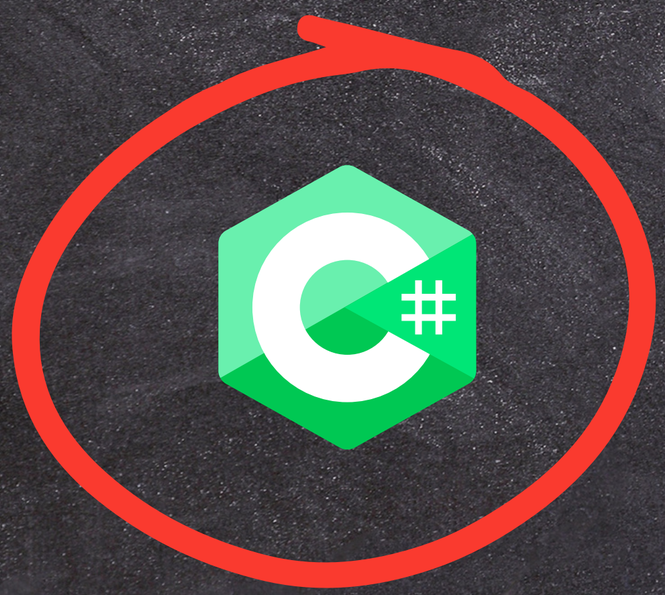
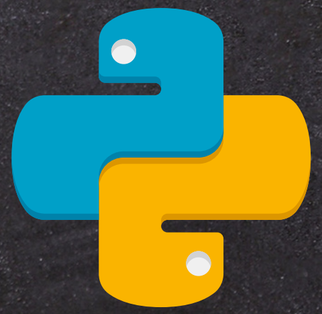




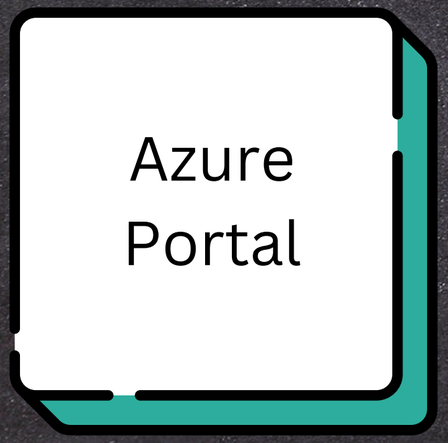
Hosting Choices

Azure Functions usually run in a "Service plan" on Azure App Service

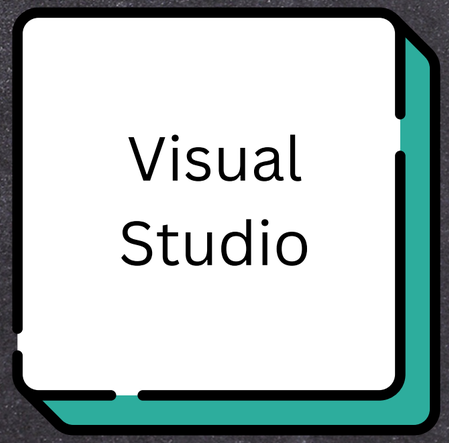
Consumption Plan	App Service Plan	Premium Plan
Serverless **Automatic scale** **5 min limit**	**Traditional pricing model**	**Speed** **Security** **Reserved instances**

Docker container	Locally
On premises **In any cloud**	**Development and testing**

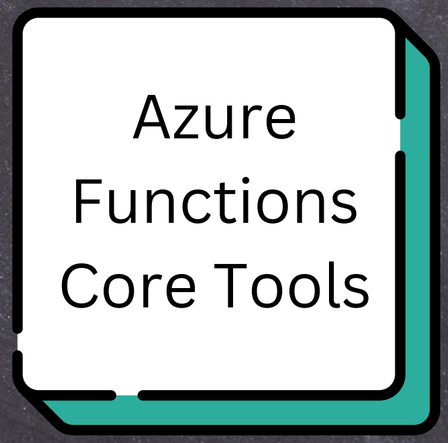
Development Environment Choices



Learning & experiments



Windows and C#



Cross-platform CLI Visual Studio Code

Tips

Benefit from serverless computing by hosting Azure Functions in the consumption plan

Azure Function Triggers

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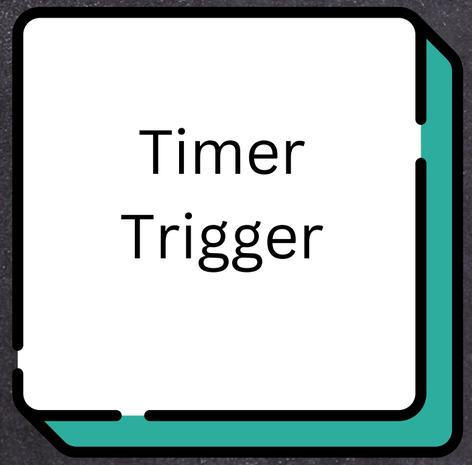
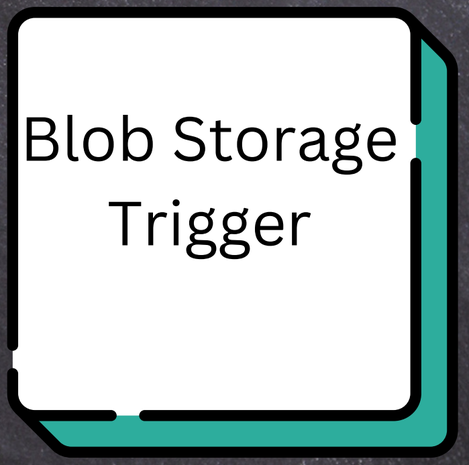
objective: “implement function triggers by using data operations, timers, and webhooks”

(webhooks)



(Scheduled tasks)



(data operation)

Azure Function Triggers

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- Every Azure Function has exactly one trigger
- The trigger is the event that causes the function to run

Azure Function Trigger Types

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HTTP Request Trigger – use for APIs and webhooks

Timer Trigger – use for scheduled tasks

Queue Trigger – run in response to a message on a queue

Cosmos DB Trigger – run when a document is created or updated

Blob Trigger – run when a new file is uploaded to Blob Storage

Azure Function Trigger Types

There are many other Azure Function triggers available

e.g. Event Grid, Microsoft Graph

HTTP Request Trigger

Implement APIs or respond to webhooks

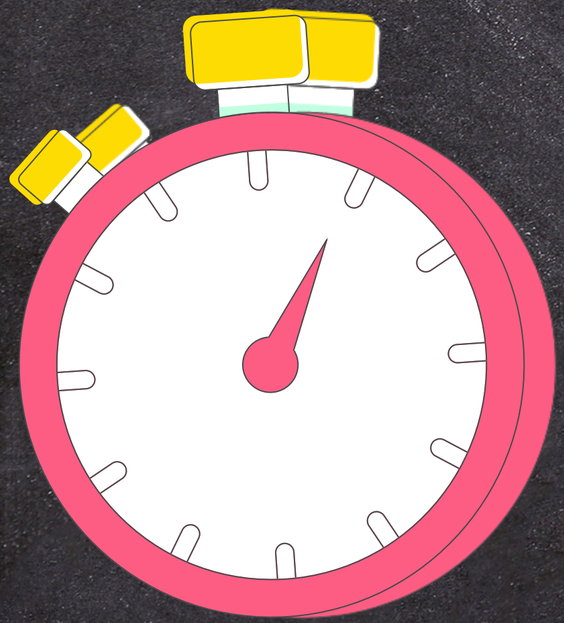
Customization

- HTTP methods – e.g. GET or POST
- Route

Secured via authorization key

- Anonymous: no key required
- Function: key per function
- Admin: key per function app

Timer Trigger

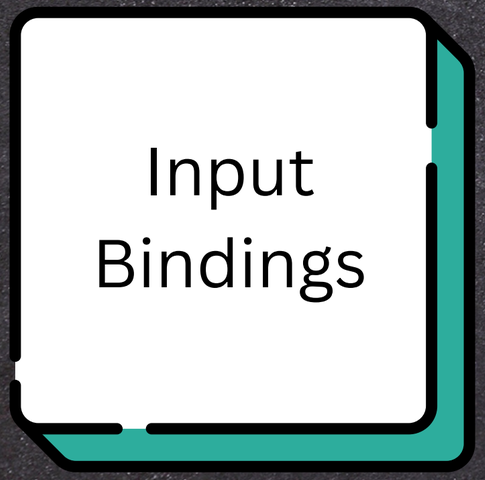


Run scheduled tasks

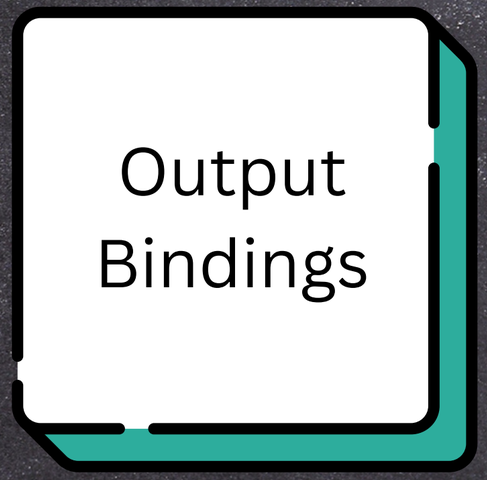
CRON expression

- Determines when your function should run

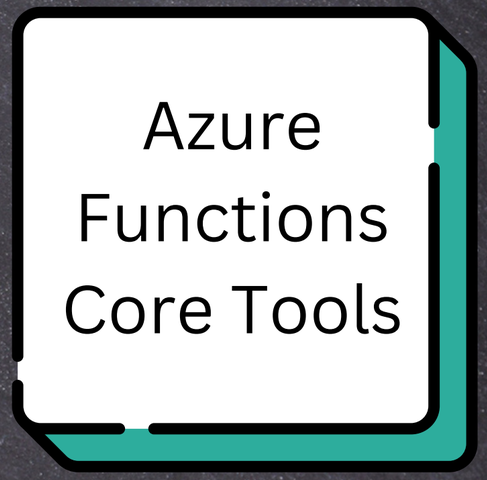
Implementing Input and Output Bindings



Get data into our functions



Send messages, add document to a database



Develop locally

Azure Function Bindings

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What are Azure Function Bindings ?

- *A binding is a connection to data*
- ***Input** bindings provide read-access to data*
- ***Output** bindings let us write to an external system*
- *Functions can have multiple input and output bindings*

Azure Function Input Binding Types

Blob Storage binding – read contents of a file in Blob Storage

Cosmos DB binding – look up a document in a Cosmos DB database

Microsoft Graph binding – access OneDrive

Azure Functions Output Bindings

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Blob Storage binding – Create a new file in Blob Storage

Queue Storage binding – Post a message to a queue

Cosmos DB binding – Create a new document in a database

Many others – Event Hub, Service Bus, SendGrid, Twilio, etc

Development Environment

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- Visual Studio Code
- Azure Functions Core Tools
- Azure Functions VS Code Extension
- Azure Storage Emulator
- Azure Cosmos DB Emulator

Tips

Input and output bindings are defined in function.json

Azure Durable Functions

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What are Azure Durable Functions ?

- *Azure Durable Functions is an extension of Azure Functions that enables you to write stateful serverless workflows.*
- *It simplifies the development of complex orchestrations, allowing you to build scalable and reliable applications.*

Key Concepts

Durable Orchestration: *Represents a stateful workflow composed of multiple function invocations.*

Durable Entities: *Stateful objects managed by Durable Functions that can be accessed and updated from multiple function invocations.*

Durable Client: *Provides APIs for starting and managing orchestrations or accessing durable entities.*

Three Types of Function

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Client ("Starter") Function

- *Initiate a new orchestration*
- *Use any trigger*

Orchestrator Function

- *Defines the steps in the workflow*
- *Handle errors*

Activity Function

- *Implements a step in the workflow*
- *Use any bindings*

Use C# or JavaScript for Durable Functions

Orchestration Patterns

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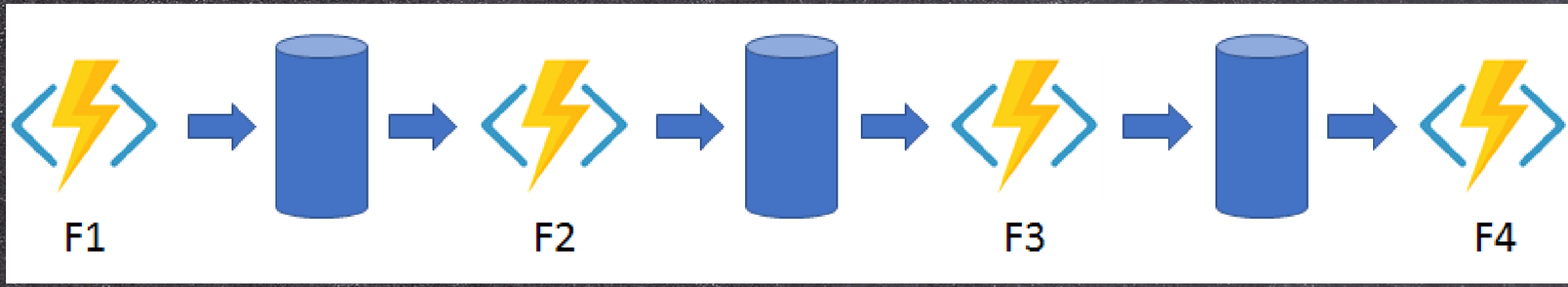
Function Chaining



- Function chaining refers to invoking multiple functions sequentially in a predefined order.
- Each function's output serves as input to the next function in the chain.
- Useful for creating workflows where each step depends on the output of the previous step.

Orchestration Patterns

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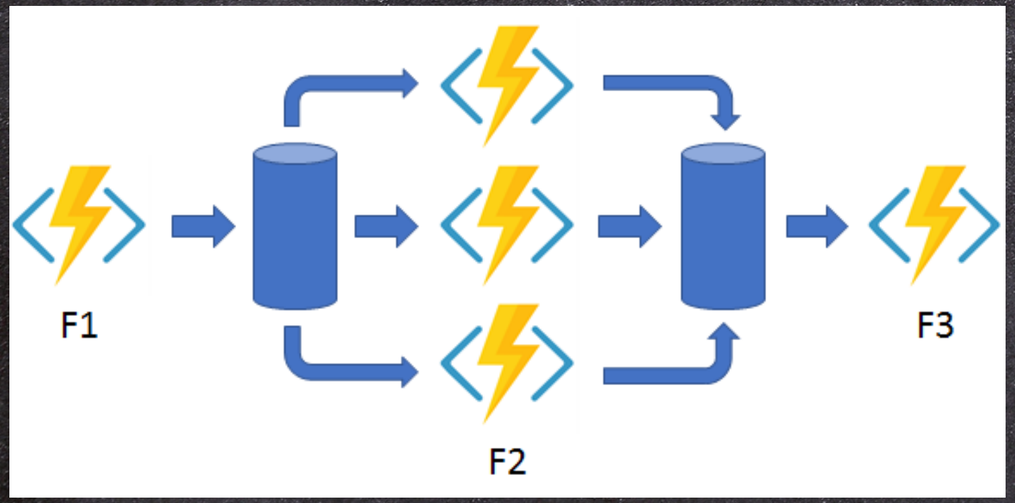
Fan-out/Fan-in



- Fan-out/fan-in pattern involves parallel execution of multiple functions followed by aggregating their results.
- In the fan-out phase, multiple functions are executed concurrently to perform independent tasks.
- In the fan-in phase, the results from all functions are collected and combined into a single result.
- Enables parallel processing and improves throughput for tasks that can be executed independently.

Orchestration Patterns

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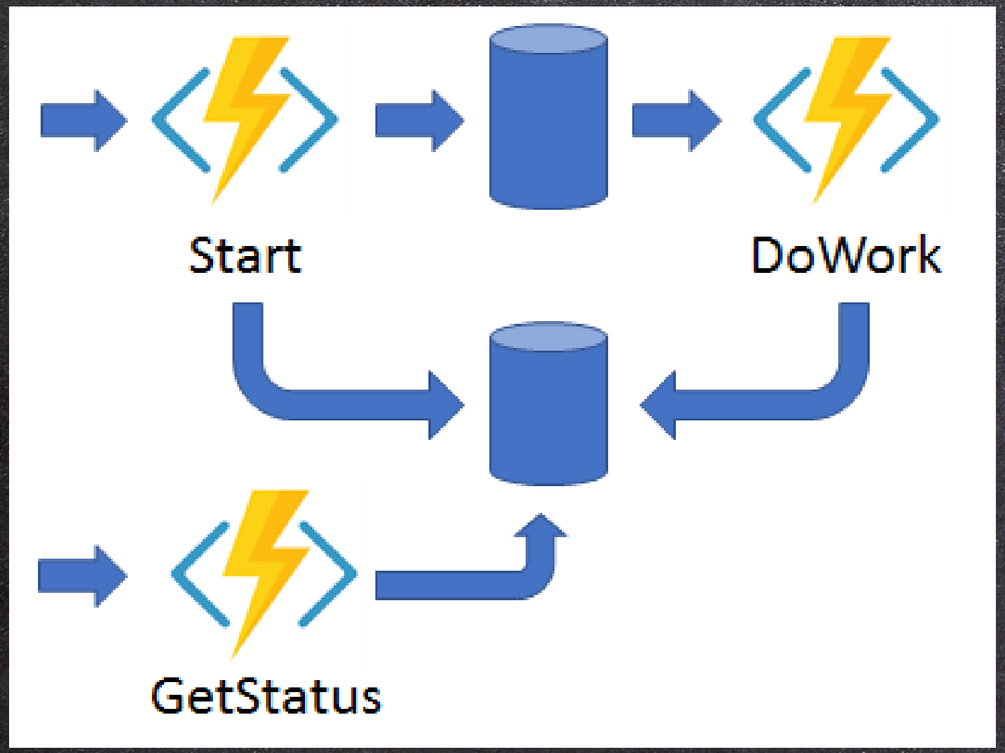
Async HTTP APIs



- Async HTTP APIs allow invoking Azure Functions asynchronously over HTTP.
- Requests are processed asynchronously, and a response is returned immediately without waiting for the function to complete.
- Useful for scenarios requiring asynchronous processing, such as long-running tasks or background processing.

Orchestration Patterns

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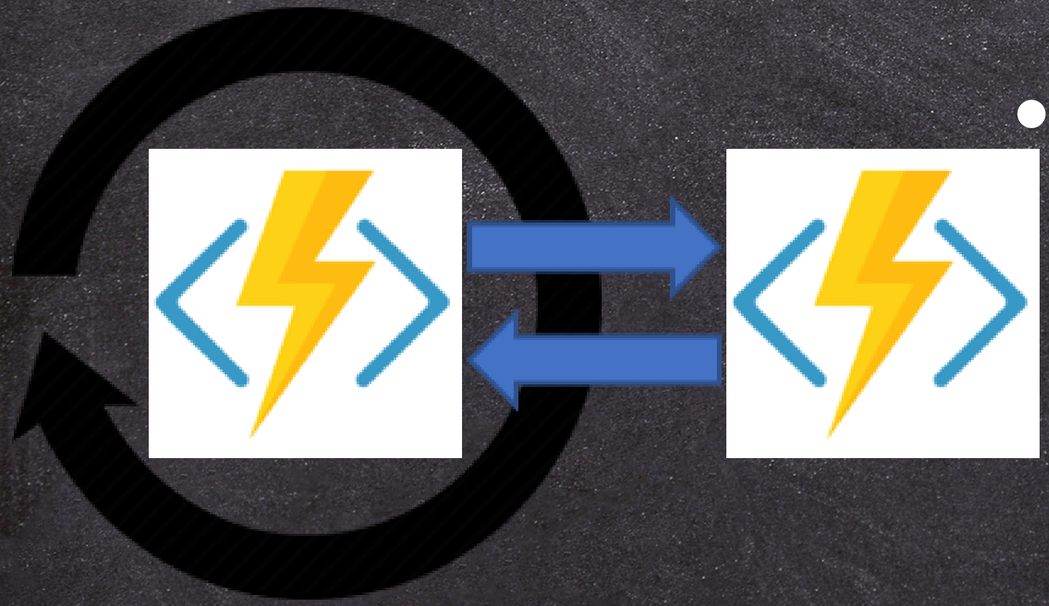
Monitor



- Monitoring involves tracking and analyzing the performance, health, and behavior of Azure Functions.
- Monitoring tools like Azure Monitor, Application Insights, and logging libraries provide insights into function execution, errors, and resource usage.
- Helps identify performance bottlenecks, troubleshoot issues, and optimize function performance.

Orchestration Patterns

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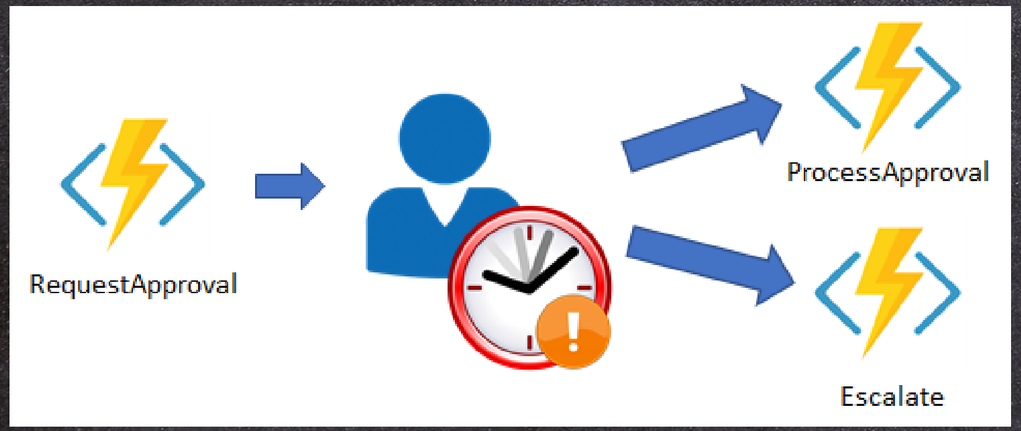
Human interaction



- Human interaction enables integrating user input or interaction with Azure Functions.
- Functions can trigger based on user actions such as submitting a form, clicking a button, or sending a message.
- Allows building interactive applications, chatbots, or workflows that involve human input.

Orchestration Patterns

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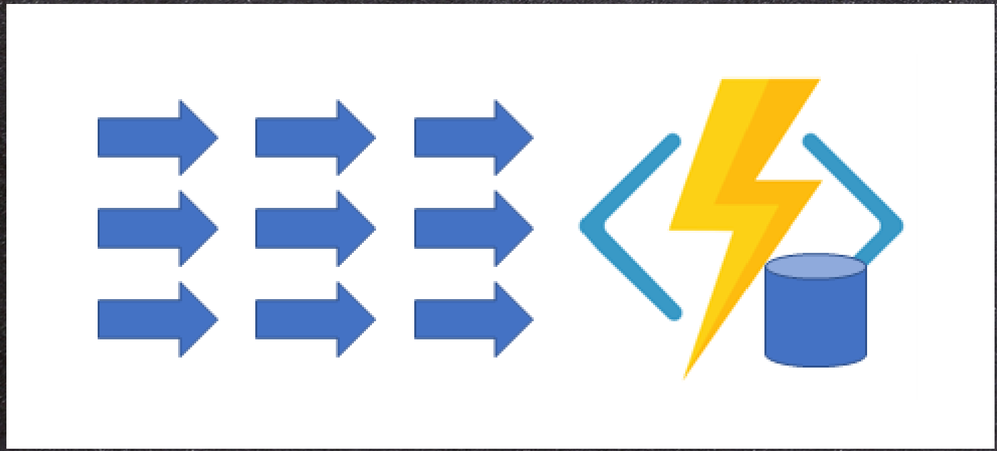
Aggregator (stateful entities)



- Aggregator pattern involves maintaining stateful entities to aggregate data or coordinate activities across multiple function invocations.
- Stateful entities store and manage state across function executions, allowing functions to interact with shared state.
- Enables scenarios like distributed counters, session management, or complex orchestration involving state management.

Tips

Durable Functions are a great way to implement serverless workflows

Sub-orchestrations allow one orchestration to trigger another orchestration

Documents to refer

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Azure CLI & Powershell commands for KeyVault

https://learn.microsoft.com/en-us/azure/azure-functions/create-resources-azure-powershell

https://learn.microsoft.com/en-us/azure/azure-functions/scripts/functions-cli-create-serverless

HANDS ON PRACTICE

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VISIT HTTPS://GITHUB.COM/LEARNSMARTCODING

COMPLETE CODE FOR AZ-204 EXAM RELATED AZURE FUNCTIONS ARE AVAILABLE IN THE BELOW LINK

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