CST8917 – Serverless Applications

Lab 2: Azure Function Chaining using Durable Functions

Objective

In this lab, you will learn how to create a sequence of Azure Functions that execute in a specific order — a pattern known as function chaining. You will use Azure Durable Functions to orchestrate these functions.

Scenario

You are tasked with developing a cloud-based image processing pipeline. This pipeline will take an image, apply a series of transformations, and store the result. The pipeline will consist of three stages:

1. **Image Resize Function:** Resizes the image to a standard dimension.
2. **Image Grayscale Function:** Converts the image to grayscale.
3. **Image Watermark Function:** Applies a watermark to the image.

Instructions

Part 1: Environment Setup

1. Install Azure Functions Core Tools: If not already installed, install the Azure Functions Core Tools.

2. Create an Azure Function App Project: In Visual Studio, create a new project using the Azure Functions template. Choose the Durable Functions Orchestration template.

Part 2: Implementing the Functions

1. Implement the Image Resize Function:

    - Create a new activity function named ResizeImage.

    - Add logic to resize the input image to a standard size (e.g., 1024x768 pixels).

2. Implement the Image Grayscale Function:

    - Create a new activity function named GrayscaleImage.

    - Add logic to convert the input image to grayscale.

3. Implement the Image Watermark Function:
    - Create a new activity function named WatermarkImage.
    - Add logic to apply a watermark text to the input image.

Part 3: Implementing the Orchestrator

1. Implement the Orchestrator Function:
    - Modify the pre-created orchestrator function.
    - Call the ResizeImage, GrayscaleImage, and WatermarkImage functions in sequence.
    - Pass the result of one function as the input to the next.

Part 4: Testing

1. Test the Function Locally:
    - Run your function app locally.
    - Use Postman or a similar tool to send a request to the starter function's endpoint.
    - Verify that the entire workflow (resize → grayscale → watermark) executes in sequence and the final image is as expected.

Part 5: Deployment

1. Deploy the Function App to Azure:
    - Use Visual Studio to publish your function app to Azure.
    - Test the deployed function to ensure it works the same as the local version.

Deliverables:

- Source code for the three activity functions and the orchestrator function.
- A screenshot of the final watermarked image.
- A short report describing the function chaining process, challenges faced, and how those challenges were overcome.

Additional Challenges (Optional):

- Add Error Handling: Implement retry policies and error handling in your orchestrator function.
- Performance Optimization: Modify your functions to process images in parallel (where applicable) and compare the performance.