Intro to PACT for .NET Core: Integration with PactFlow

Ajay kumar
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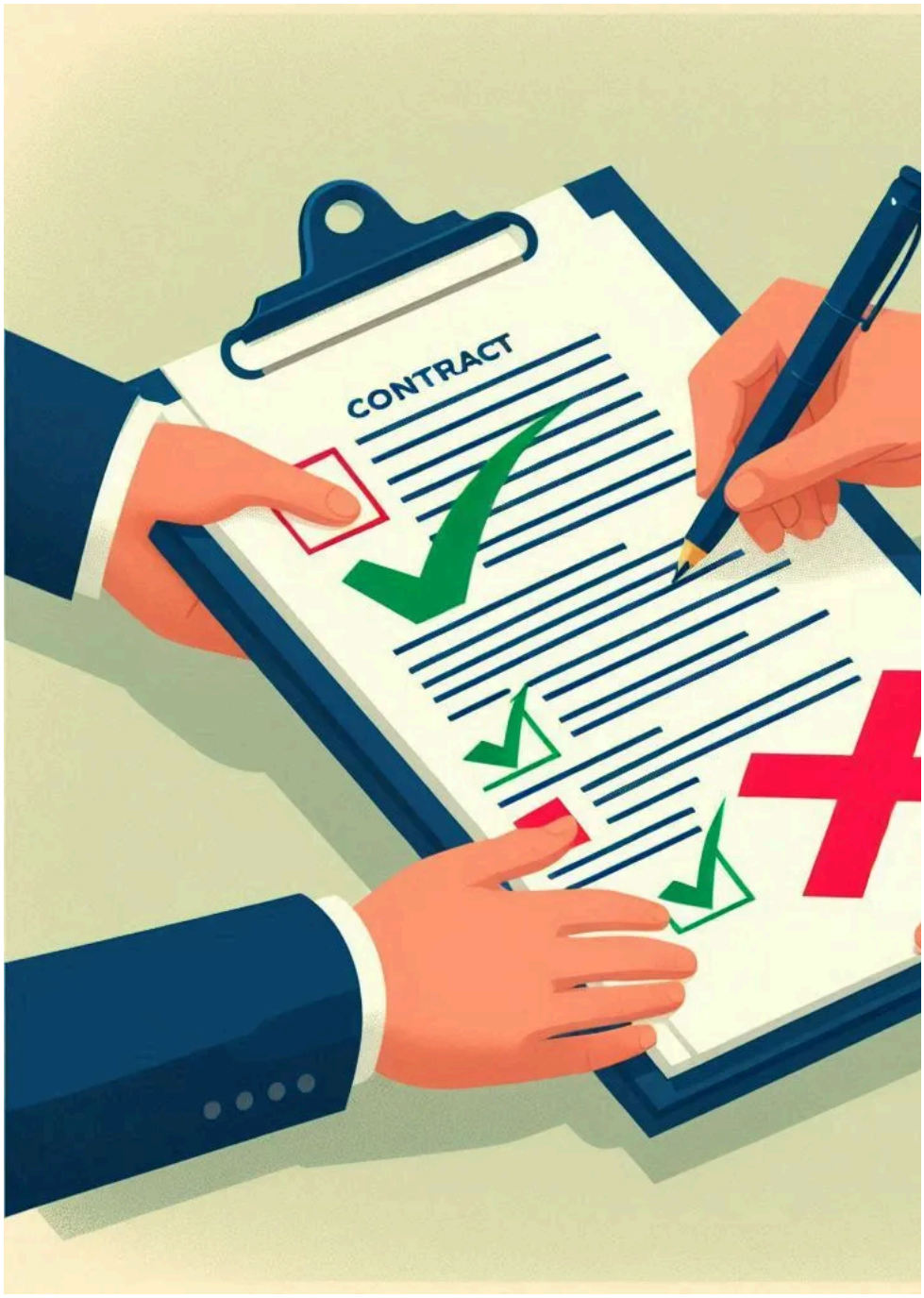

This is in continuation of PACT for .NET series where we will be looking into one of the ways to integrate our APIs with PactFlow.

For a short introduction, PactFlow is a platform that can act as a broker between consumers and providers services/systems. Consum the same contracts and try to verify them.

In PactFlow one can visualise failing/passing contracts, total contract integrations, dependency graph and much more. For a better re

You need to register into pact for for a limited free or paid account. For this demo i am using free account that can support up to 2 co

Now, for this article we will be following the same Student and Result API scenario, where student is the Provider service and Result s

To learn more about demo repo that we will be using in this article, please follow previous articles in this series:

Contract testing for APIs: Intro to PACT for .NET Core

Recently i came a across a situation where i had to explore contract testing using PACT framework.

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Intro to PACT for .NET Core: Events based systems

This is continuation of PACT for .NET series where I am going to cover usage of pact in event-based systems.

medium.com

Consumer Side

Once the PACT contract file is generated by the consumer there are several ways we can push or upload the contract to pact flow. You https://docs.pact.io/getting_started/sharing_pacts.

For this post i have used a combination of their REST APIs and PactNet library.

The below utility code uploads the contract file to the pact broker. Among all the parameters, it requires pact broker base URI and rea information by logging into your pact flow account and reaching out to settings section.

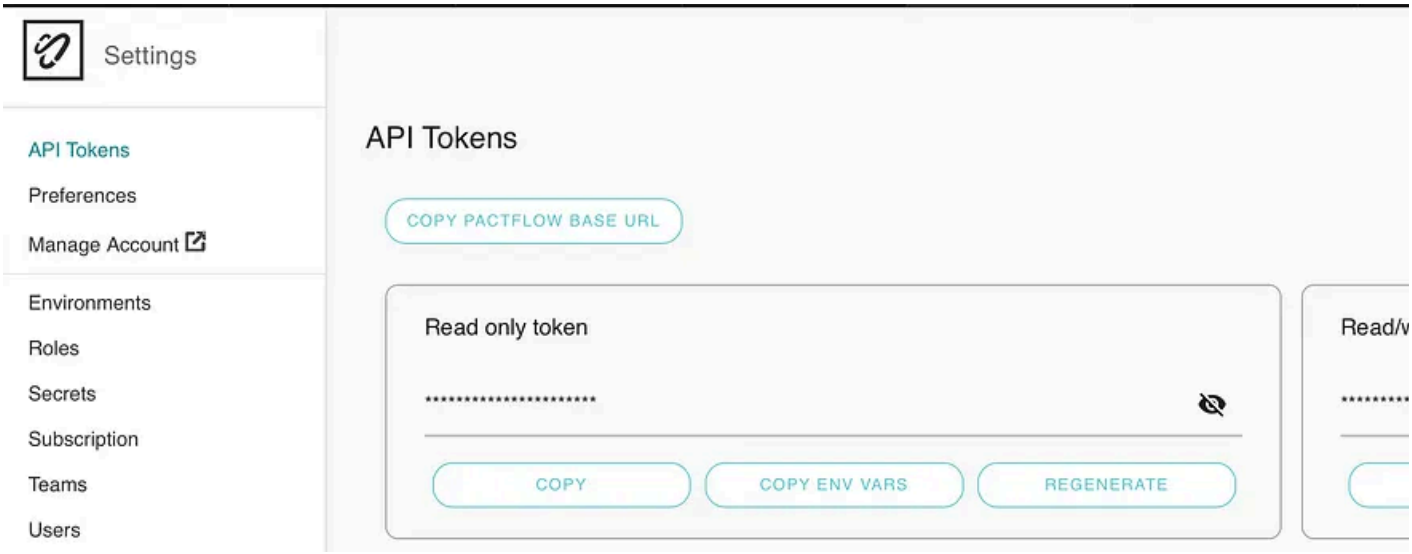

Image 1: PactFlow settings section

```
// Code to push pact contract file to pact flow
using System.Net;
using System.Net.Http.Headers;
using System.Text;

namespace PactNet.ConsumerOne.UnitTest.Utilities;

public abstract class PactBrokerUtiliy
{
    private const string PactSubUrl = "{0}/pacts/provider/{1}/consumer/{2}/version/{3}";

    /// <summary>
```

```
    /// Utility method to upload pact contract file to pact flow
    /// </summary>
    /// <param name="pactFlowBaseUri">Can be obtained from pact flow settings</param>
    /// <param name="consumerName">Consumer service name</param>
    /// <param name="providerName">provider service name</param>
    /// <param name="contractJson">Contract JSON in string format</param>
    /// <param name="accessToken">Access token obtained from pact flow settings</param>
    /// <param name="consumerVersion">This needs to be something unique version number or string. Should not be repeated.</par
    /// <returns>Status code to the http response</returns>
    public static async Task<HttpStatusCode> PublishPactContract(string pactFlowBaseUri,string consumerName, string providerNa
    {
        var httpClient = new HttpClient();
        httpClient.DefaultRequestHeaders.Authorization = new AuthenticationHeaderValue("bearer", accessToken);
        var fullUrl = string.Format(PactSubUrl, pactFlowBaseUri, providerName, consumerName, string.IsNullOrEmpty(consumerVers

        var response =
            await httpClient.PutAsync(fullUrl, new StringContent(contractJson, Encoding.UTF8, "application/json"));
        var responseContent = await response.Content.ReadAsStringAsync();
        return response.StatusCode;
    }
}
```

Now we can use this utility method after the pact contract file is generated by the consumer. Some thing like below

```
// Code excerpt from ReportCardApiPactFlowTest.cs class
[Fact]
public async Task Get_Student_When_The_StudentId_Is_Invalid()
{
    // Arrange
    _pactBuilder
    .UponReceiving("A GET request to retrieve the student with invalid student id")
    .Given("There is student is at least one valid student present")
    .WithRequest(HttpMethod.Get, "/students/some-invalid-id")
    .WithHeader("Accept", "application/json")
    .WillRespond()
    .WithStatus(HttpStatusCode.NoContent);

     _pactBuilder.Verify(ctx =>
     {
         // Act
         var client = new StudentClient(ctx.MockServerUri);
         Assert.ThrowsAsync<Exception>(async () => await client.GetStudentById("some-invalid-id"));
     });

     await UploadPactContract();
}

private static async Task UploadPactContract()
{
    var pactPath = Path.Combine("..",
        "..",
        "..",
        "..",
        "pacts",
        "ConsumerOne-Student API.json");

        var contractJson = File.ReadAllText(pactPath);
        var pactFlowBaseUri = Environment.GetEnvironmentVariable("PACT_FLOW_BASE_URL"); // For testing purposes, you may even
        var pactFlowToken = Environment.GetEnvironmentVariable("PACT_FLOW_TOKEN"); // For testing purposes, you may even hardc
        var statusCode = await PactBrokerUtiliy.PublishPactContract(
            pactFlowBaseUri,
            "ConsumerOne",
            "Student API",
            contractJson,
            pactFlowToken,
            Guid.NewGuid().ToString());
        }
```

You may notice that i have used environment variables at few places. This is to avoid mentioning account details that i have used.

```
Environment.GetEnvironmentVariable("PACT_FLOW_BASE_URL");
// It will translate to something like https://your_account_name.pactflow.io

Environment.GetEnvironmentVariable("PACT_FLOW_TOKEN");
// It will translate to some random string
```

If you are using it for demo purpose or learning you may also choose to hardcode these to the ones you obtained from pact flow settir mention these environment variables before you run tests.

After all these code changes and settings are in place, we can run the test and should expect a success. Following things will happen v

- Our request verification and assertion will happen
- Pact contract file will be generated at specified location
- The same pact file content will be read and passed on to utility method to be sent as payload to HTTP request to pact flow

Once the test is green, we can head to pact flow home page to see if any integrations (consumer-provider)/contracts have been uploac below screenshot.

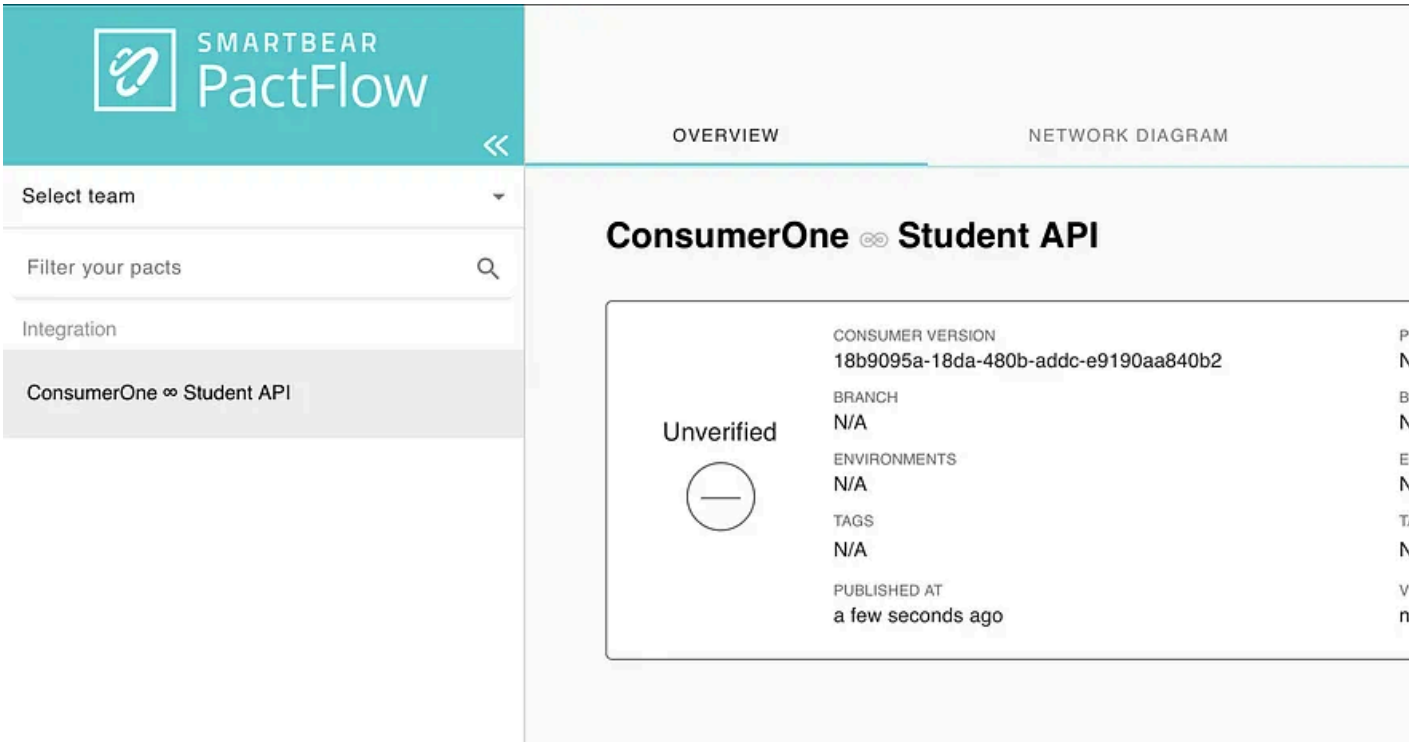

Image 2: Student API and its consumer integration in pact flow

If you observe the above image, we can see the contract is there, but its in unverified mode. It is because this pact has not been verifi

Provider side pact verification

Provider side is relatively straight forward. I have written another unit test in the same unit test class, which will take the pact file sou

```
[Fact]
public void Ensure_StudentApi_Honours_Pact_With_ConsumerOne_Using_PactFlow()
{
     // Arrange
     var config = new PactVerifierConfig
     {
        Outputters = new List<IOutput>
        {
            new XunitOutput(_output),
        },
        LogLevel = PactLogLevel.Information
     };
```

```
        var pactFlowBaseUri = Environment.GetEnvironmentVariable("PACT_FLOW_BASE_URL"); // For testing purposes, you may even har
        var pactFlowToken = Environment.GetEnvironmentVariable("PACT_FLOW_TOKEN"); // For testing purposes, you may even hardcode

        // Act // Assert
        IPactVerifier pactVerifier = new PactVerifier(config);
        pactVerifier
            .ServiceProvider("Student API", _fixture.ServerUri)
            .WithPactBrokerSource(new Uri(pactFlowBaseUri), configure =>
            {
                configure.TokenAuthentication(pactFlowToken);
                configure.PublishResults(true, "1.0.0"); // Any version
            })
            .WithProviderStateUrl(new Uri(_fixture.ServerUri, "/provider-states"))
            .Verify();
    }
```

```
// The below piece of code is the key in verification with pact flow as source
.WithPactBrokerSource(new Uri(pactFlowBaseUri), configure =>
{
     configure.TokenAuthentication(pactFlowToken);
     configure.PublishResults(true, "1.0.0"); // Any version
})
```

Now finally after all this setup in place. If we run the pact provider test we should see the test being success, if we run it locally. Some

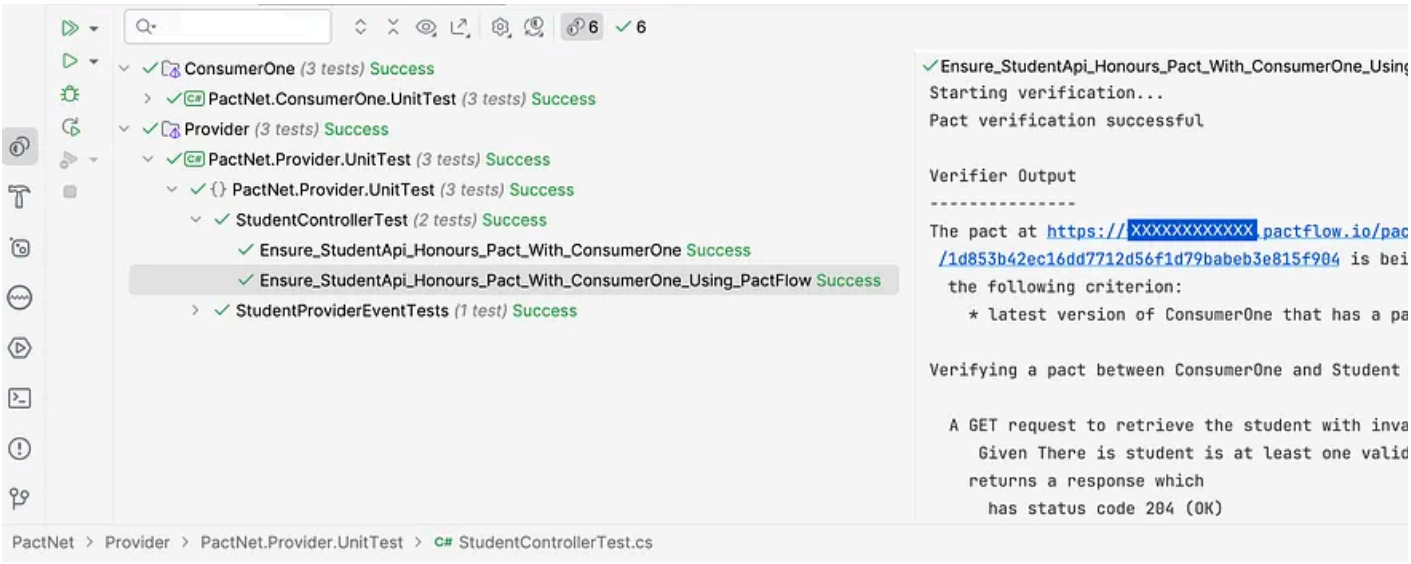

Image 3: Pact flow success console logs

As a result of this we should also be able to see that the pact integration that was showing as unverified earlier has changed to verifie

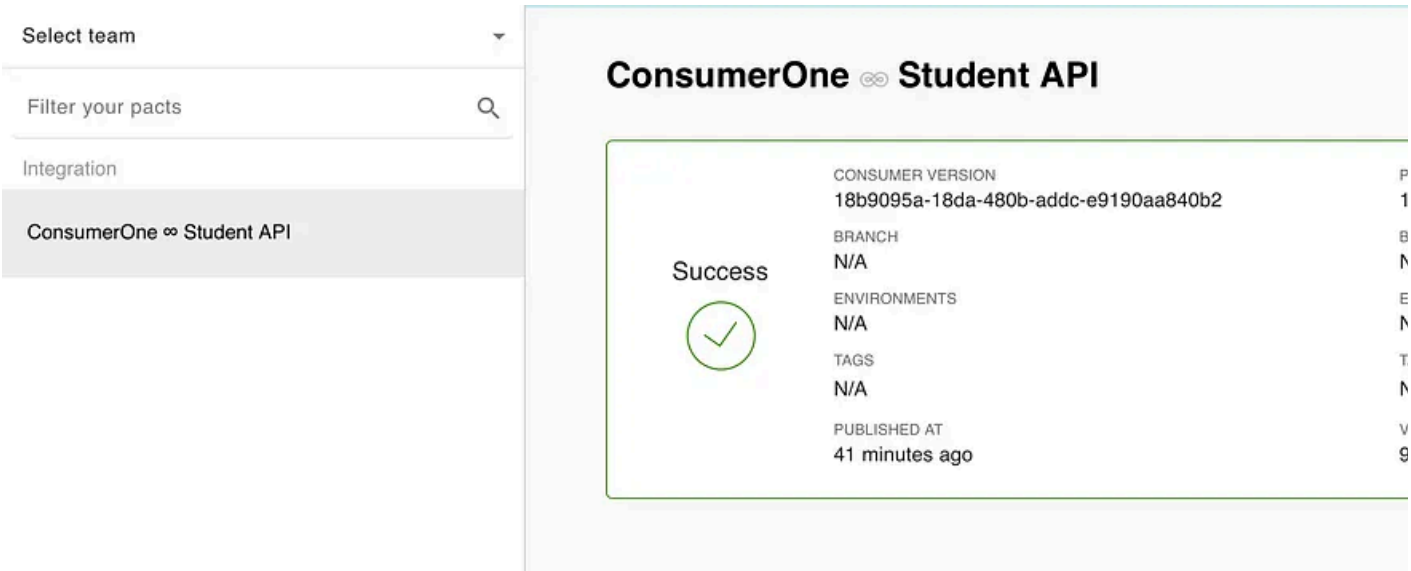

Image 4: Pact verification success in pact flow

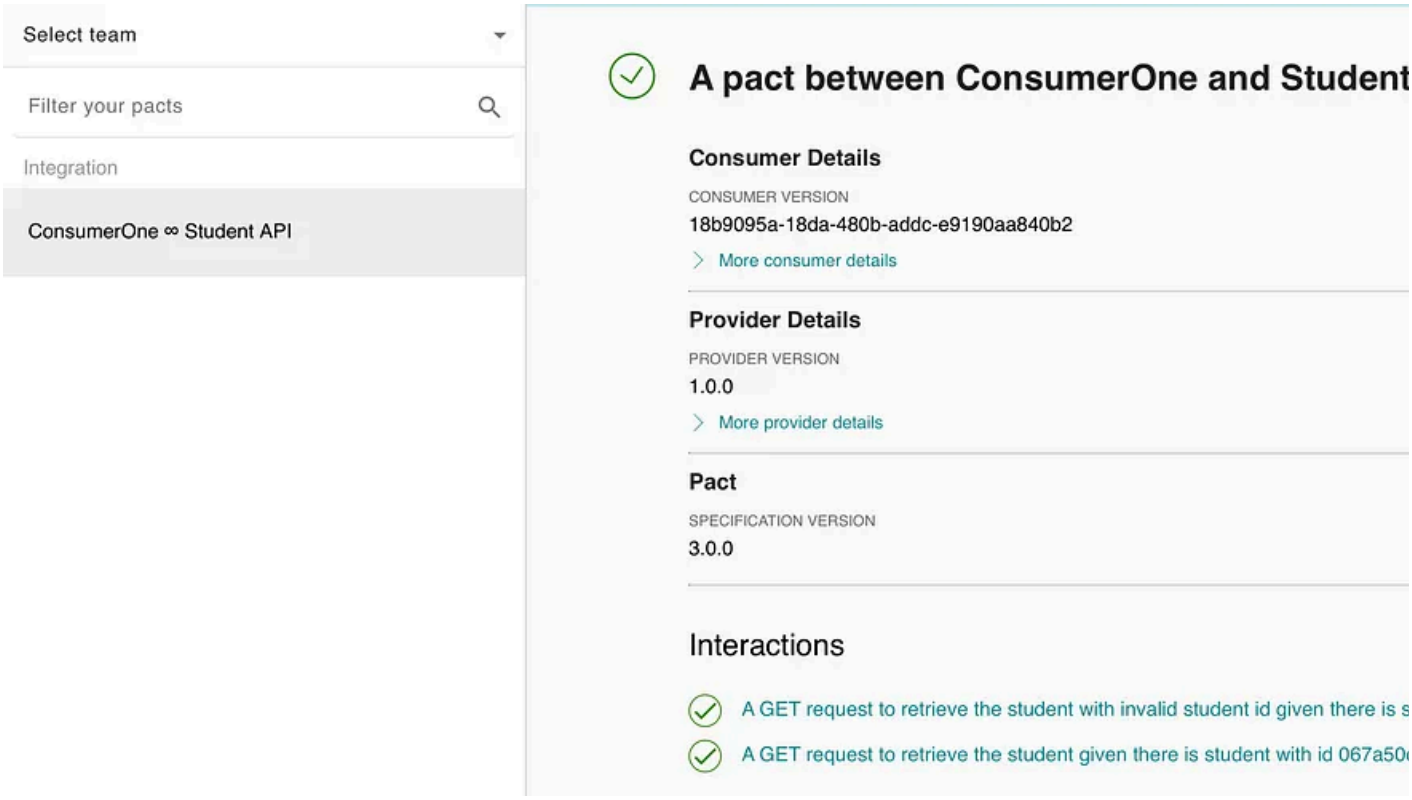

Image 5: Image mentioning that the interactions have been passed

Failure scenario!

Lets make some changes in our code to deliberately make the code fail. For demo we can change the student service to return `firstN` service. After making this change, when the unit test is run, we can see the below result in pact verification.

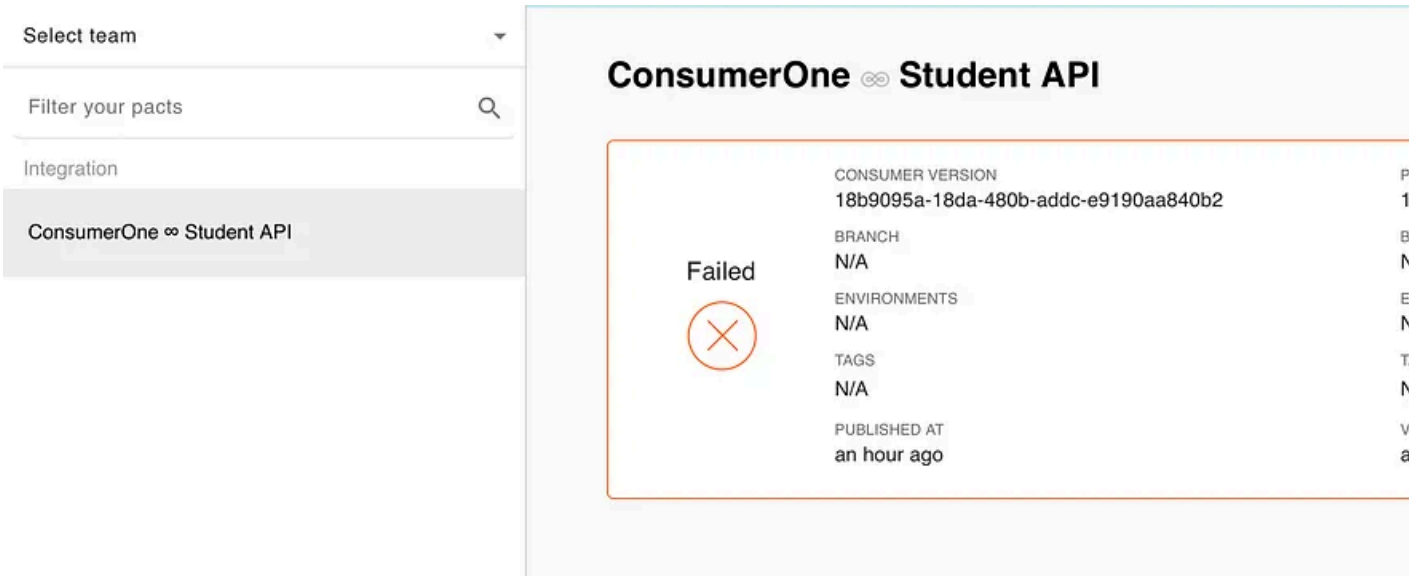

Image 6: Pact flow failure

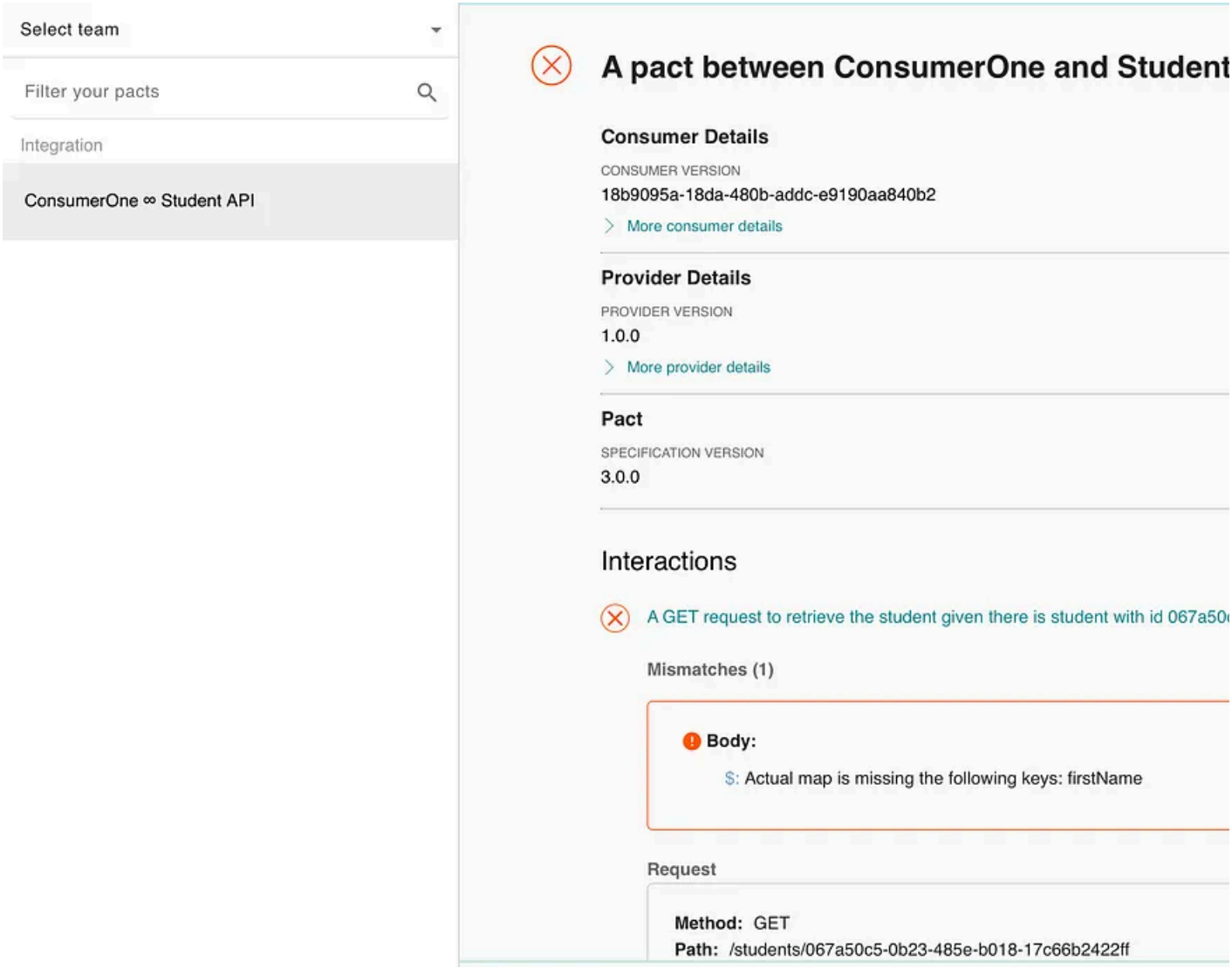

Image 7: Pact flow failure details

For reference, the code repository being discussed is available on github link: https://github.com/ajaysskumar/pact-net-example

Thanks for reading through. Please share feedback, if any, in comments or on my email ajay.a338@gmail.com.

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Written by Ajay kumar

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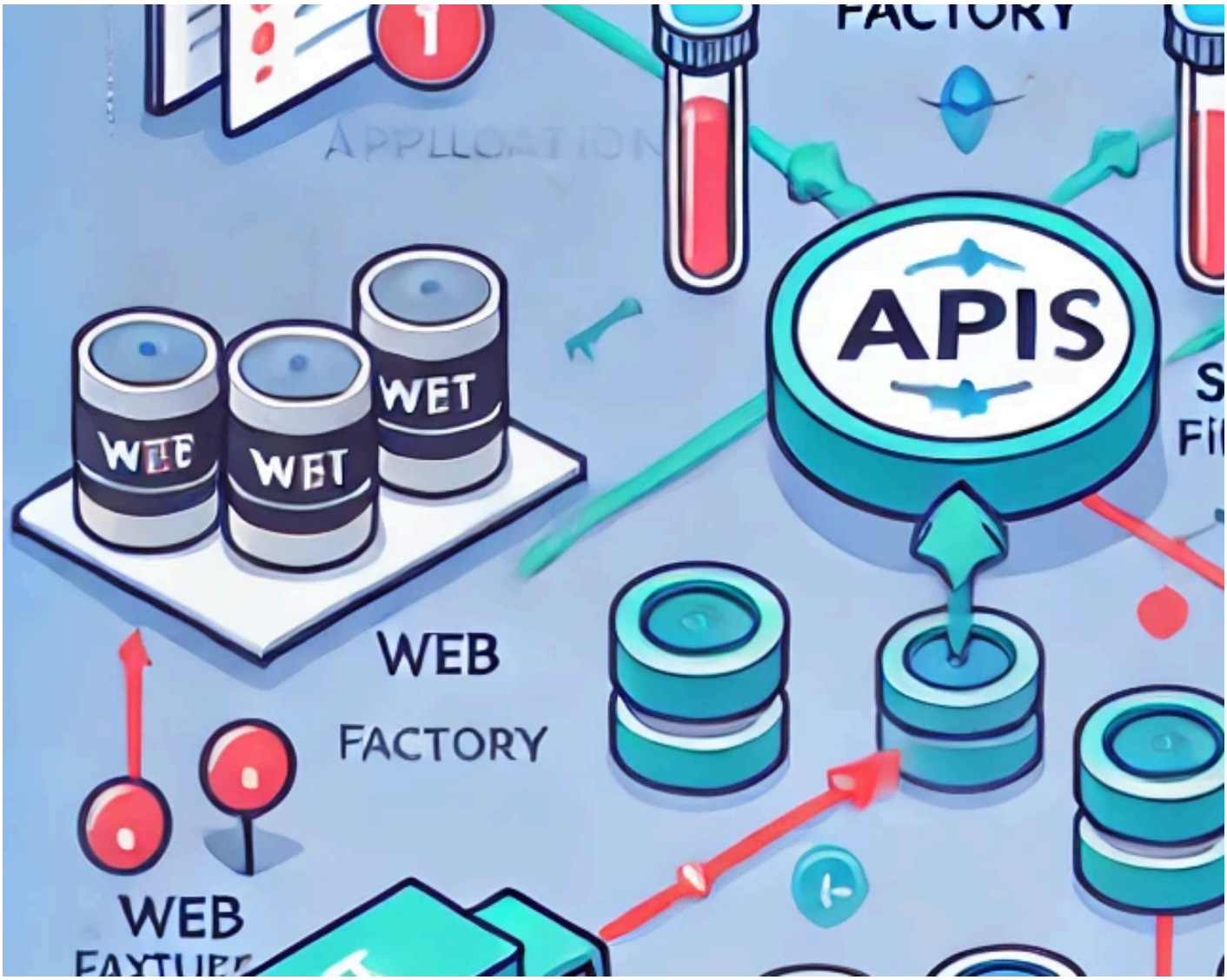

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Welcome to the 2nd post in our Integration testing series. You may check out the previous post that is about Introduces with the concept of...

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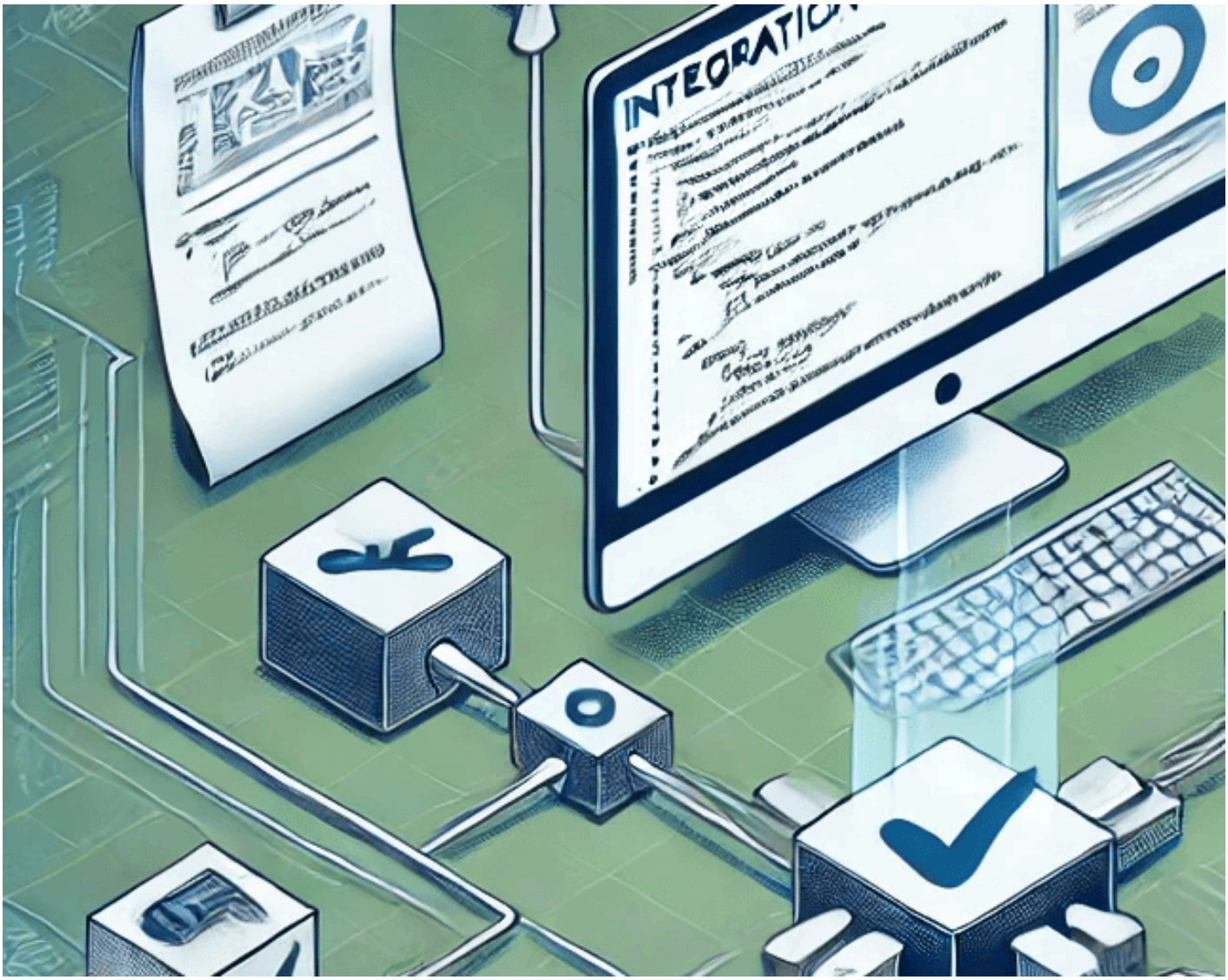

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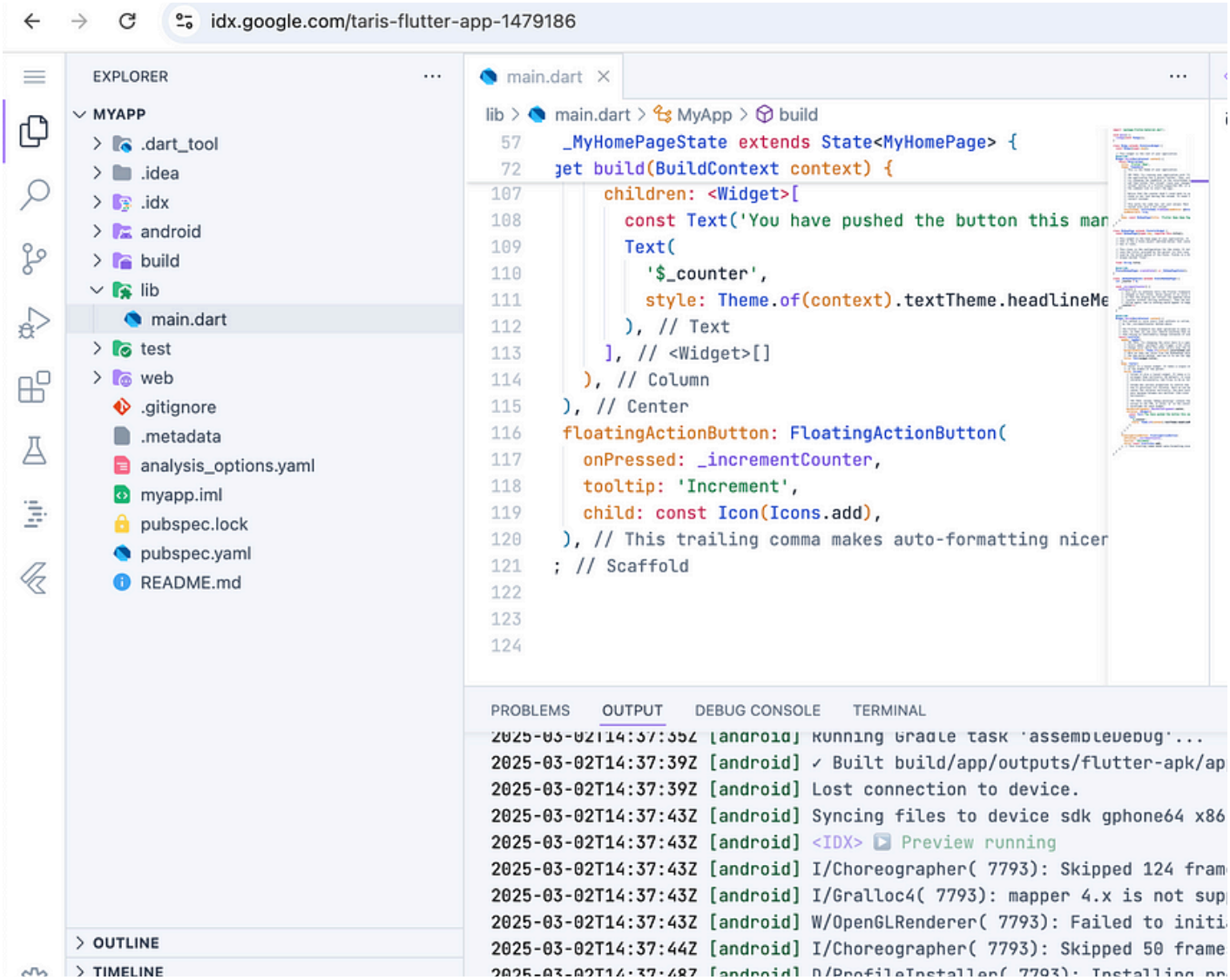

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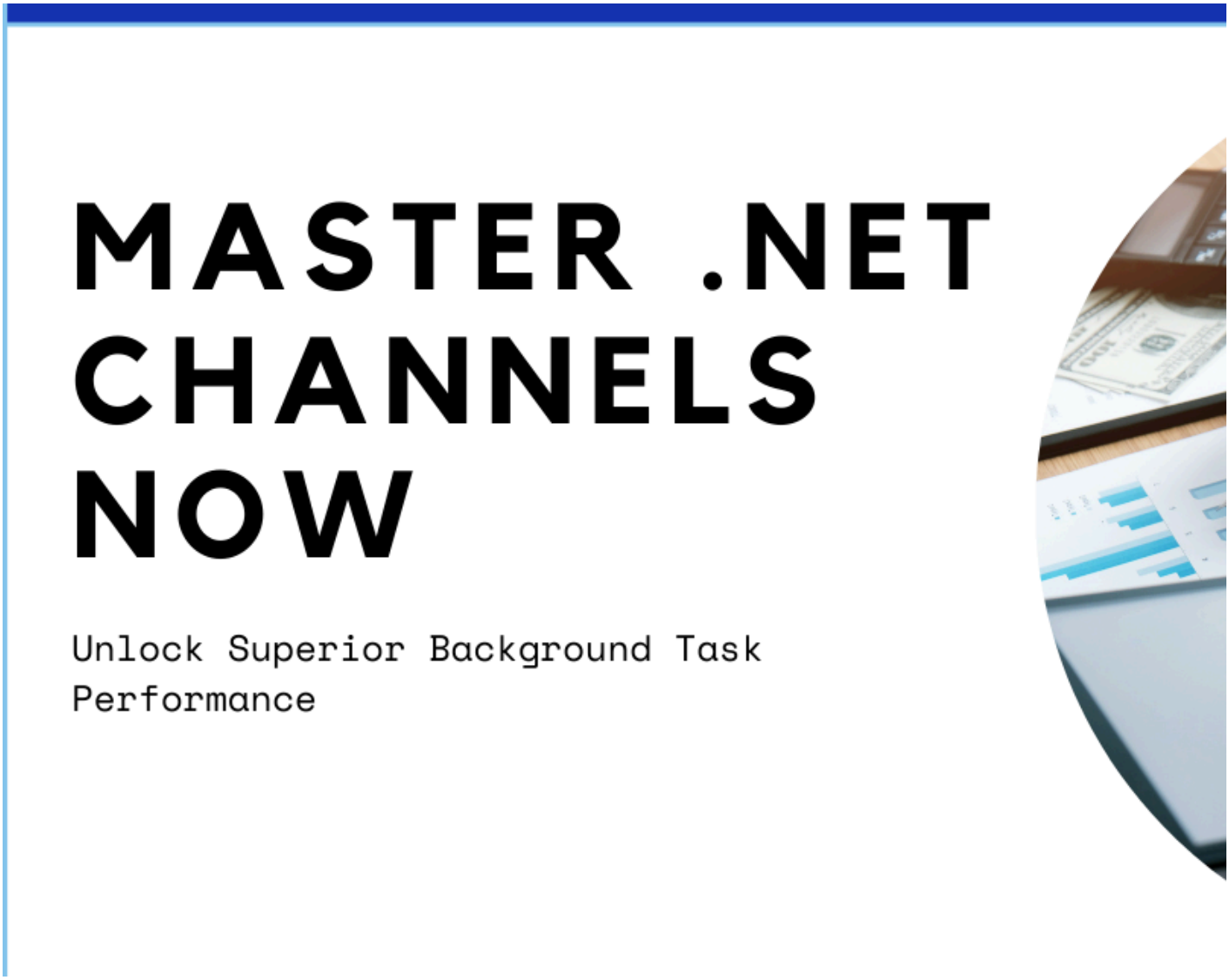

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