dreamforce 20 Years

GROUNDSWELL CLOUD SOLUTIONS
a GyanSys company

GS Apex Mocking Framework

Improving Your Apex Unit Tests

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Why Did We Build This?

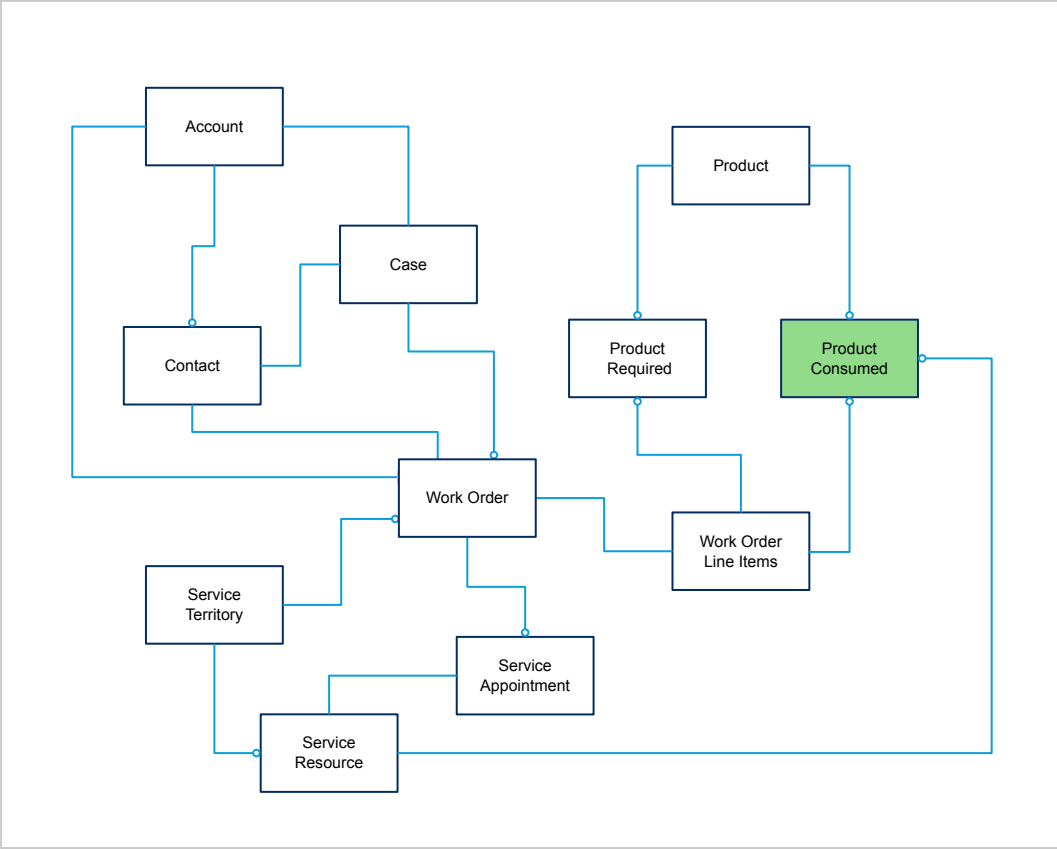
Common Issues with Apex Unit Testing

Long Deployment Cycles!!

Common Issues with Apex Unit Testing

Complex Test Setup

- Complex Data Models
- Every Test Seems To Be An Integration Test



Integration Tests

For integrated modules and functional testing.

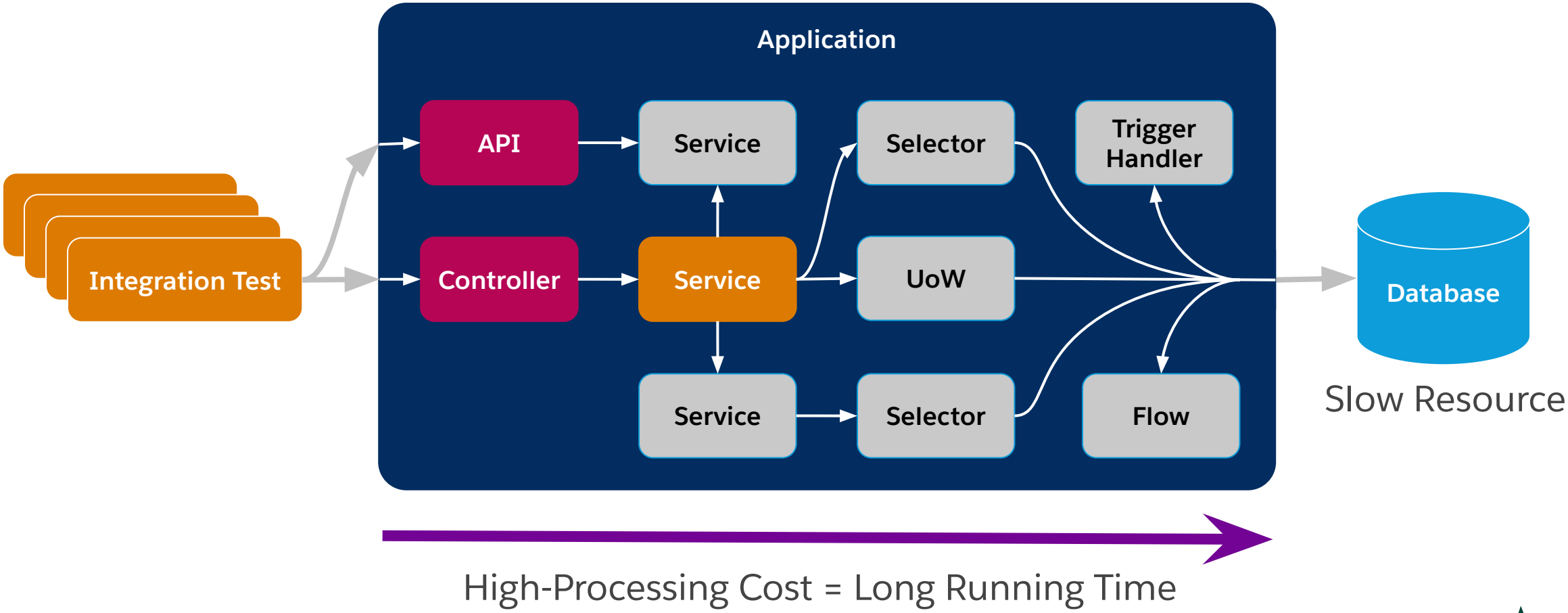
Integration Tests

What Are They?

- The integration tests are responsible for assessing if different modules from the application work well together.
- And for evaluating the system's compliance with the functional requirements.

Integration Tests

What Do They Test?



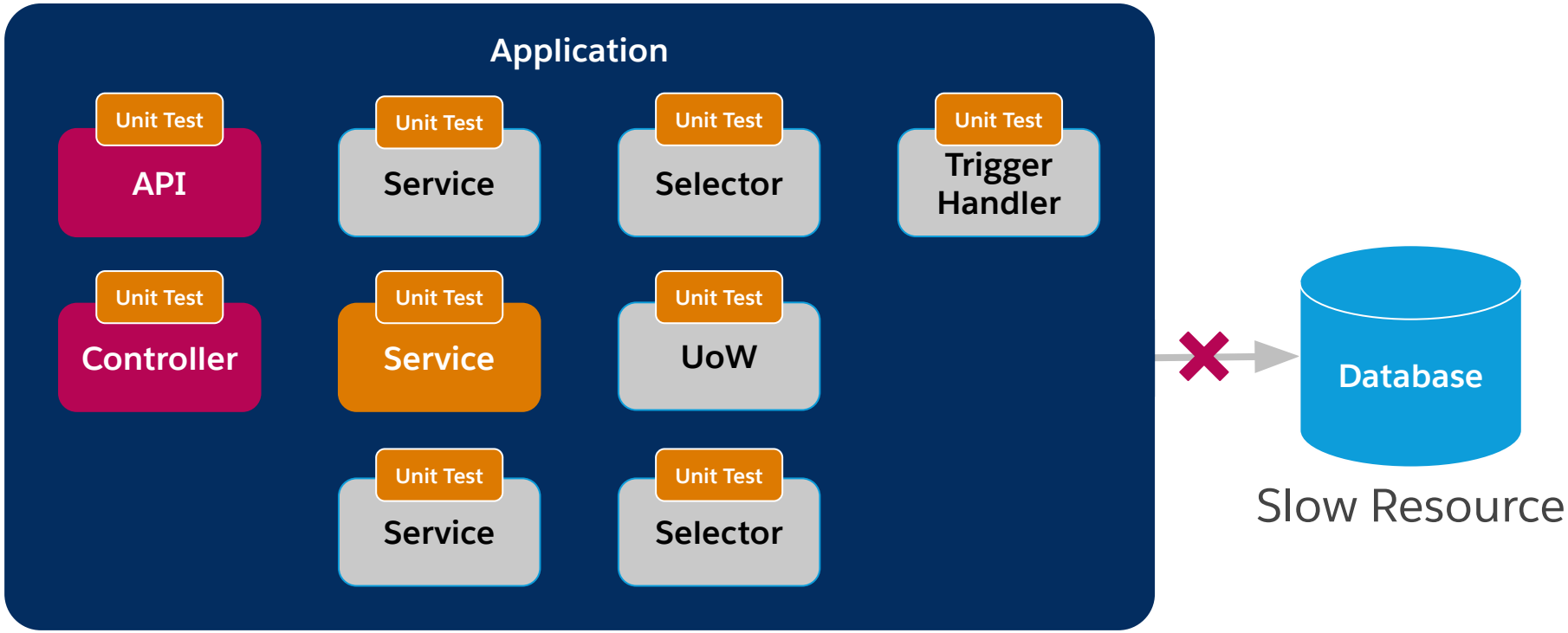
Unit Tests

For individual modules testing.

Unit Tests

What Are They?

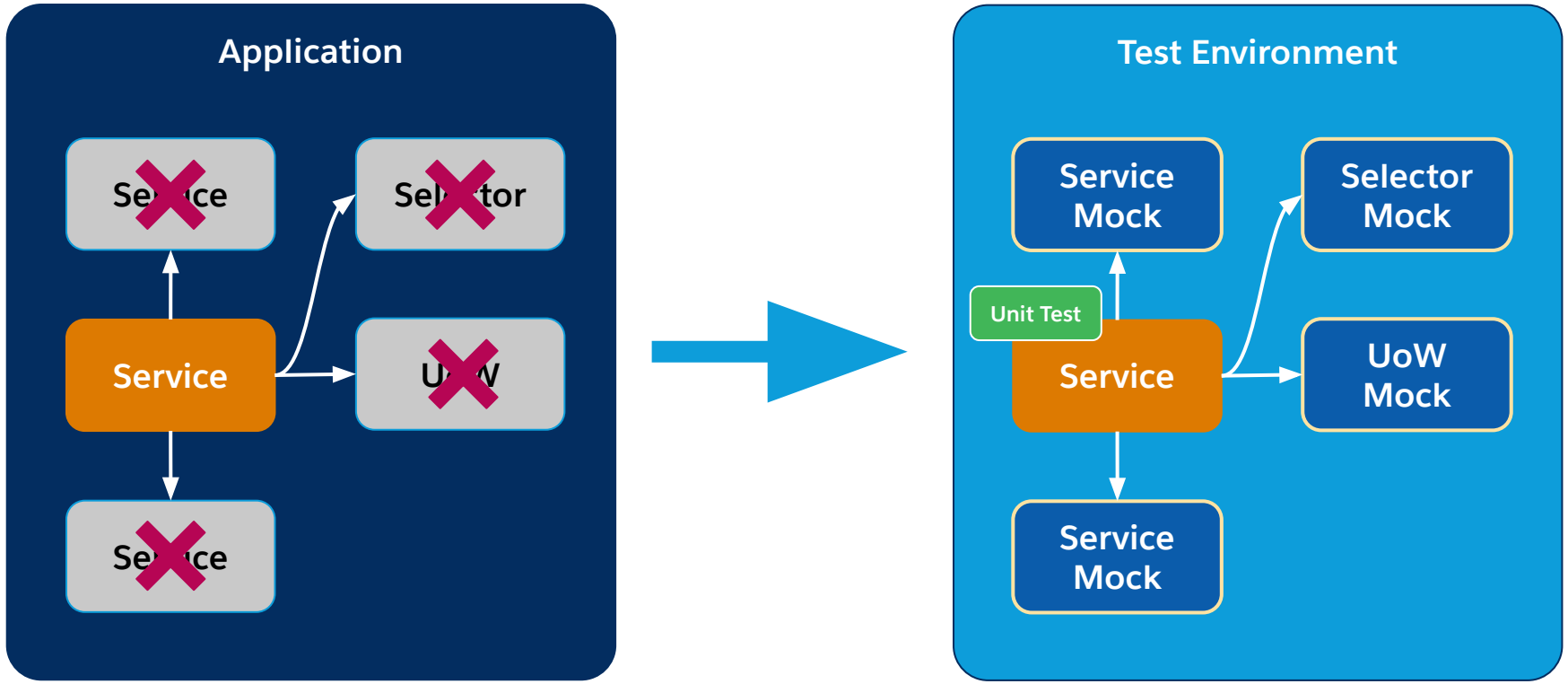
- The unit tests are low-level and close to the application source code.
- They consist of testing individual components isolating them from the other components.



Unit Tests

How Do They Deal With Dependencies?

- We can replace the real dependencies by **Mocked Classes**.
- But how can we create **Mock Classes**?



Unit Tests x Integration Tests

- Unit Tests don’t replace Integration Tests
- Both are different tools to ensure the high quality of our code

Unit Tests

Integration Tests

Apex Stub API

Native Salesforce Apex Stub API

Allow us:

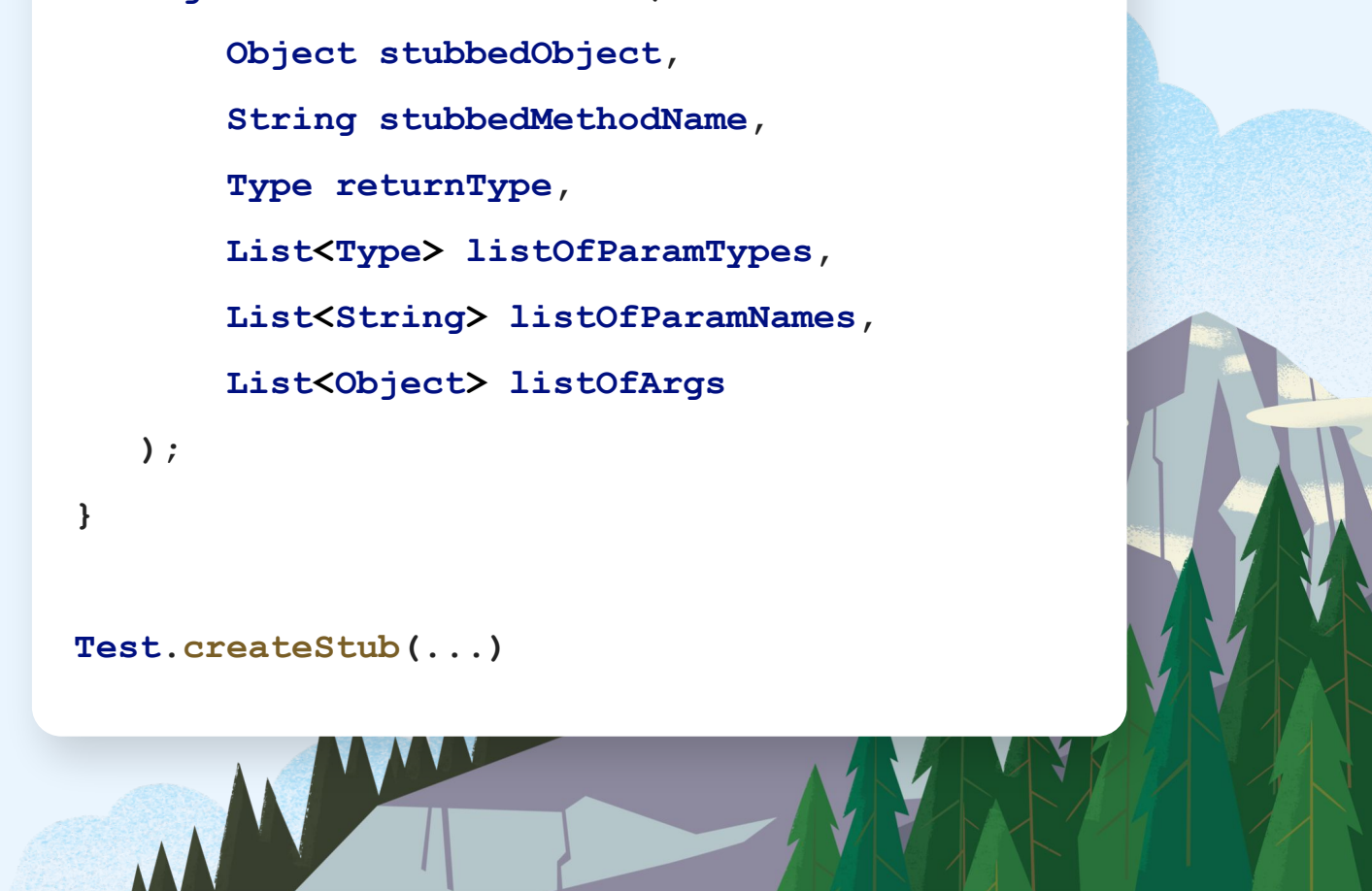
- To create mocked objects
- To handle method calls
- To read the method arguments
- To define the method return value

However:

- It is a low-level API
- It is necessary to implement the Stub Provider interface
- It is not easy to understand and use

```
public interface System.StubProvider {
    Object handleMethodCall(
        Object stubbedObject,
        String stubbedMethodName,
        Type returnType,
        List<Type> listOfParamTypes,
        List<String> listOfParamNames,
        List<Object> listOfArgs
    );
}

Test.createStub(...)
```

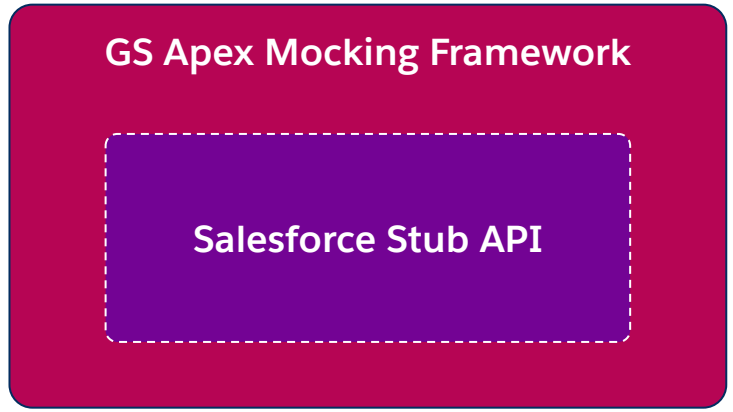


GS Apex Mocking Framework

An Open-Source Easy-To-Use Mocking Framework

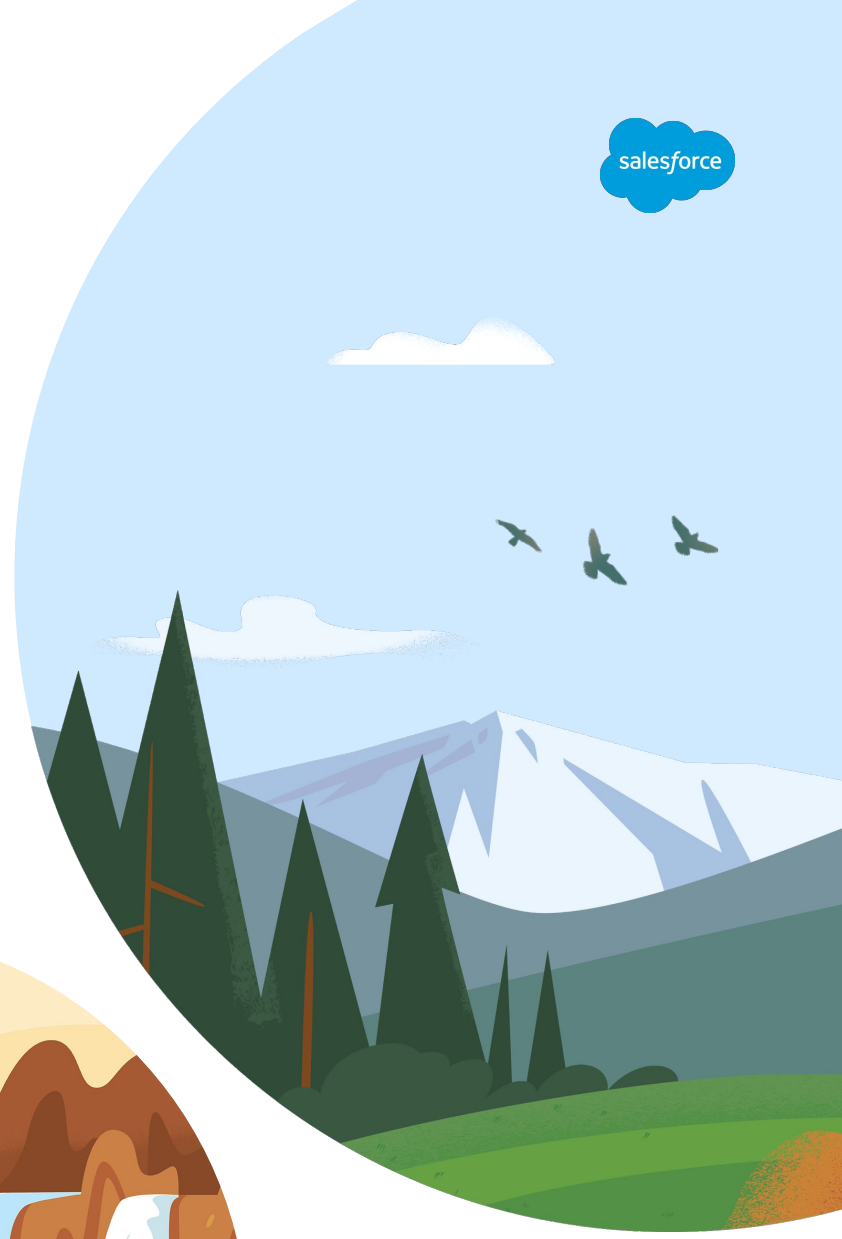
GS Apex Mocking Framework

- It encapsulates the STUB API complexity exposing an easy-to-use fluent interface.
- It records the expected mock behavior and replicates this behavior during the test execution phase.
- It also collects the execution statistics that can be asserted on the assertion phase.

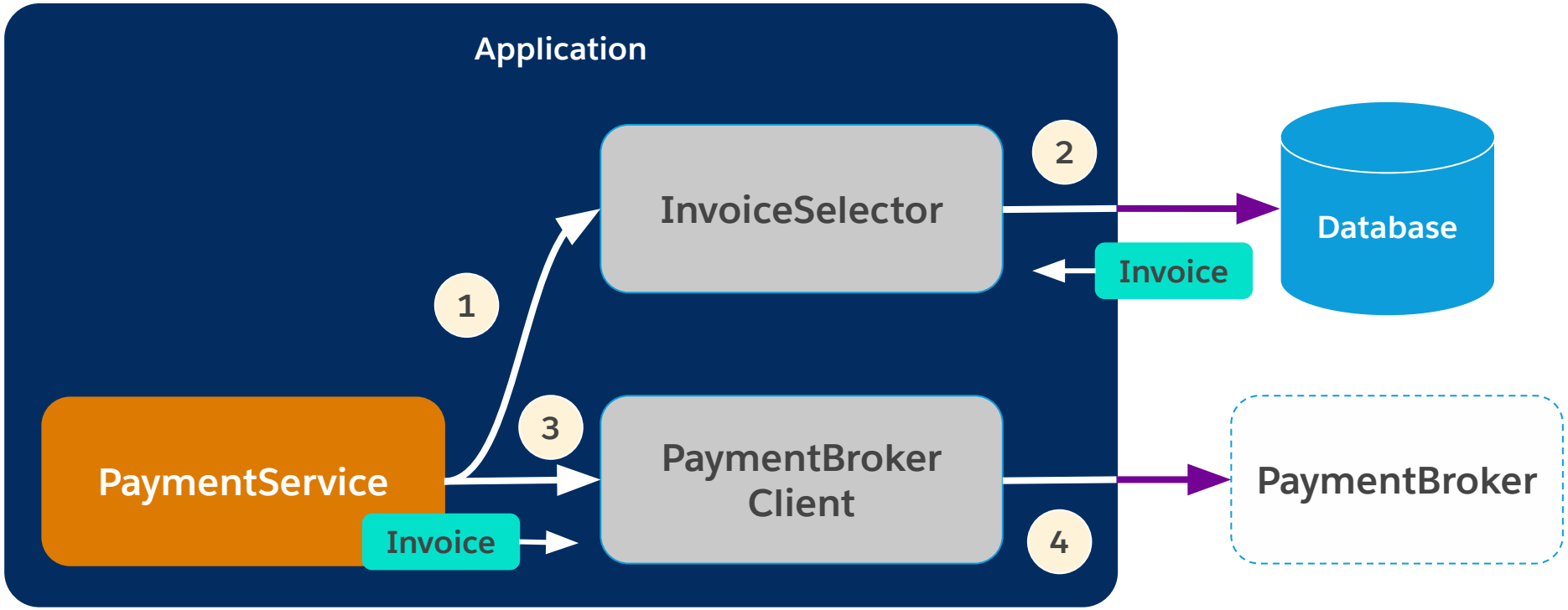


Creating An Unit Test

With the GS Apex Mocking Framework

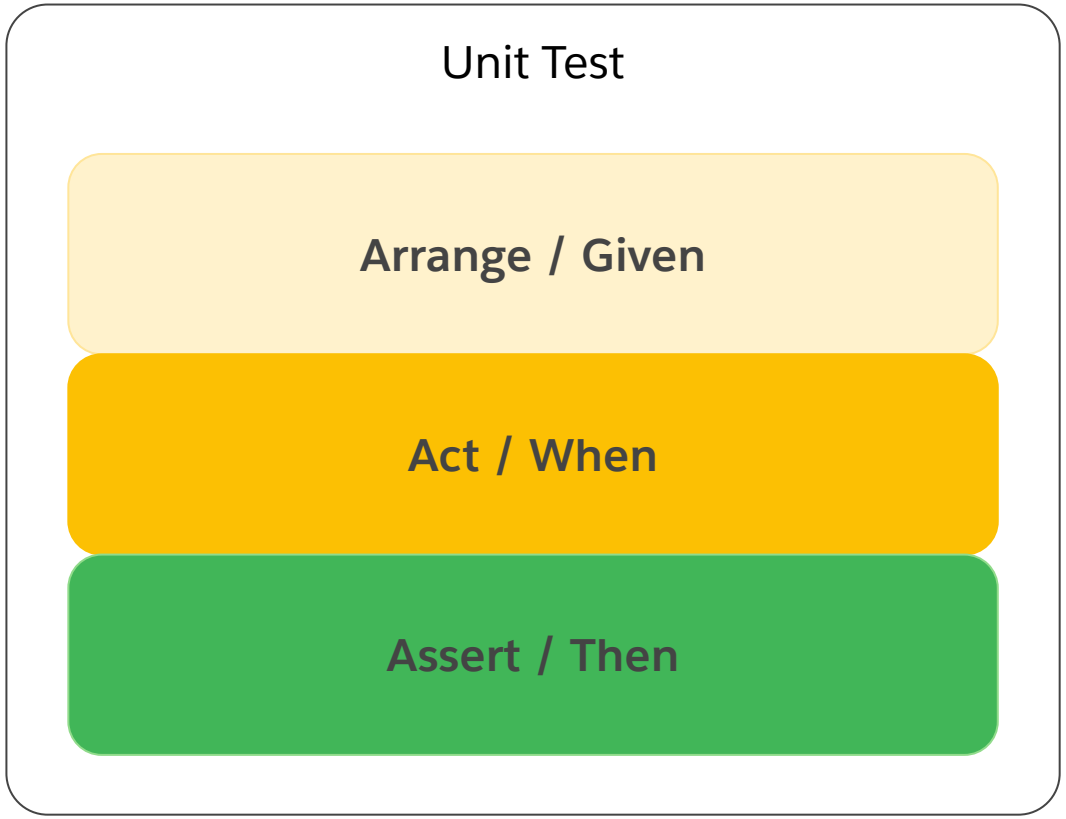


Unit Test Scenario

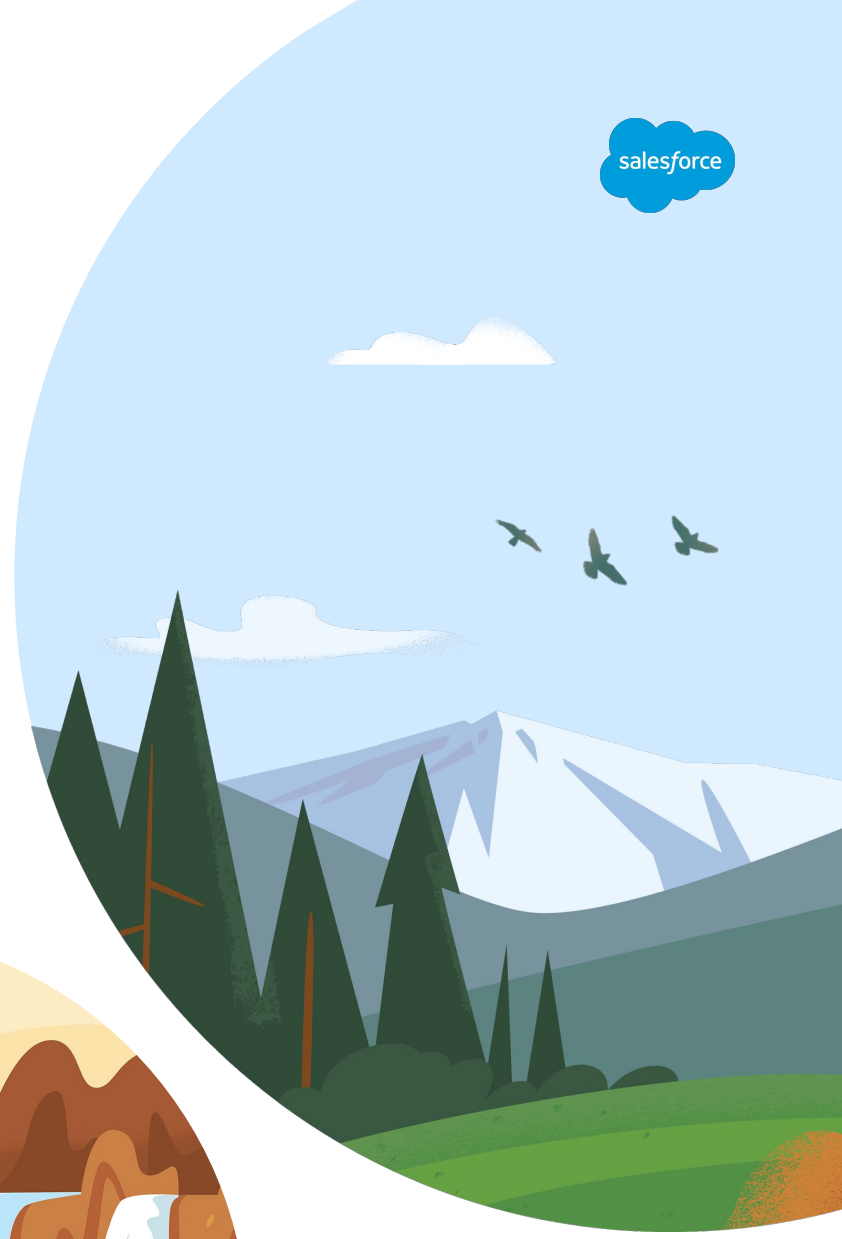


- Has the Payment Broker been called once?
- Has the Payment Broker received the correct Invoice?

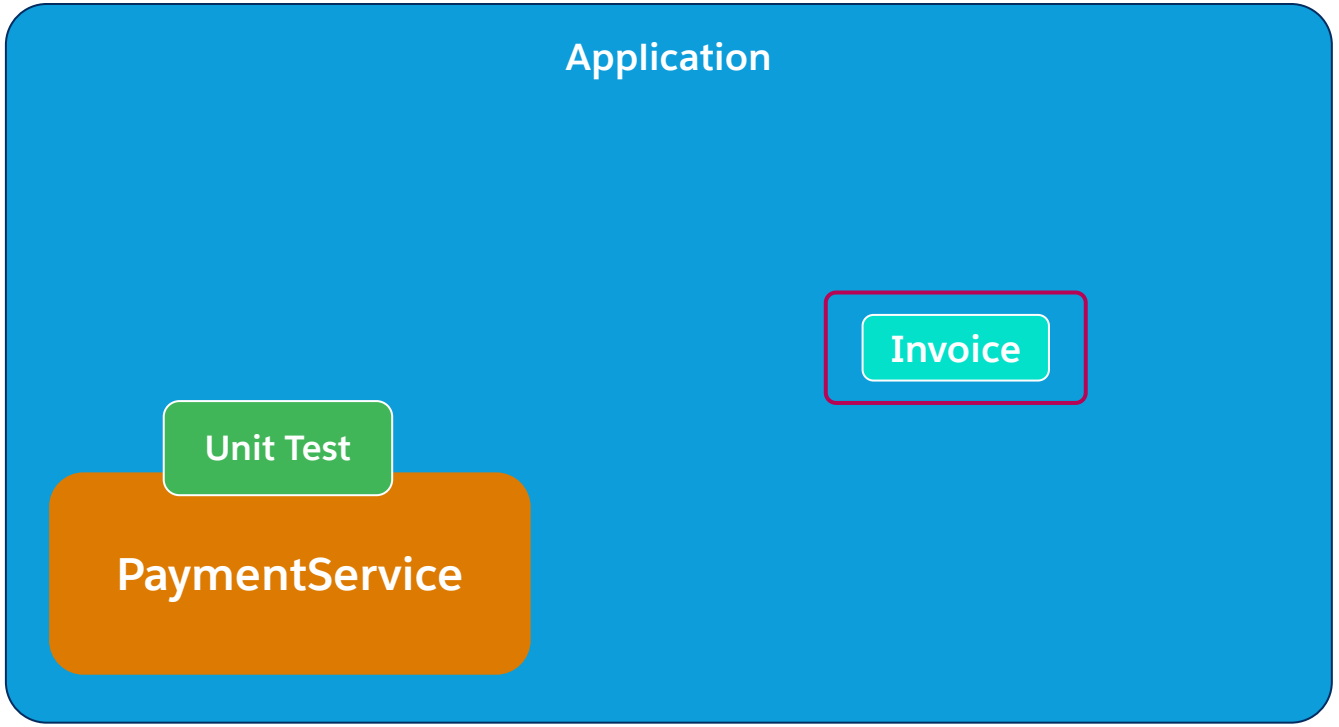
Unit Testing Pattern



Unit Test - Arrange



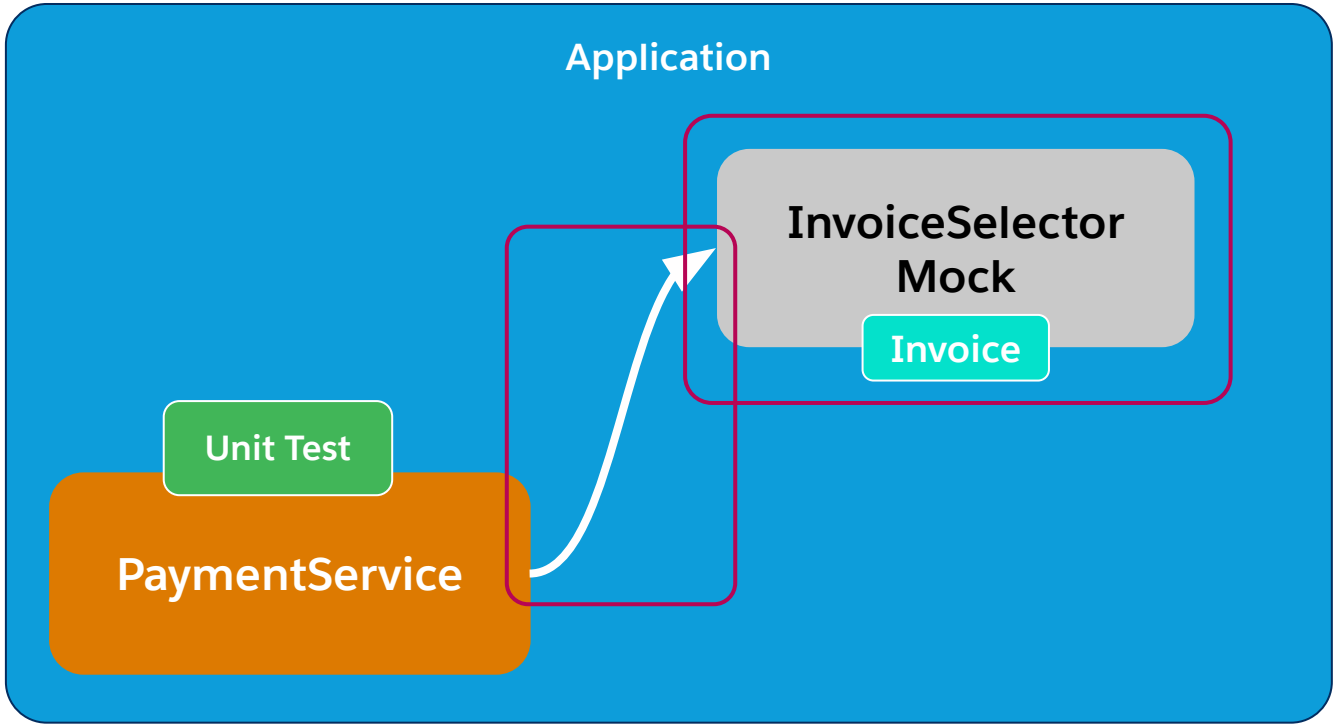
Creating The Invoice In Memory



Creating The Invoice In Memory

```
@IsTest
public class PaymentServiceTest {
    @IsTest
    static void processPaymentShouldCallBrokerWhenInvoiceIsValid() {
        // Generating a fake Invoice Id and creating the Invoice in memory
        Id invoiceId = MockerUtils.generateId(Invoice__c.SObjectType);
        // Creating the Invoice in Memory
        Invoice__c invoice = new Invoice__c(
            Id = invoiceId,
            State__c = 'Open',
            TotalAmount__c = 1,000.00,
            ... );
```

Create The Invoice Selector Mock



Create The Invoice Selector Mock

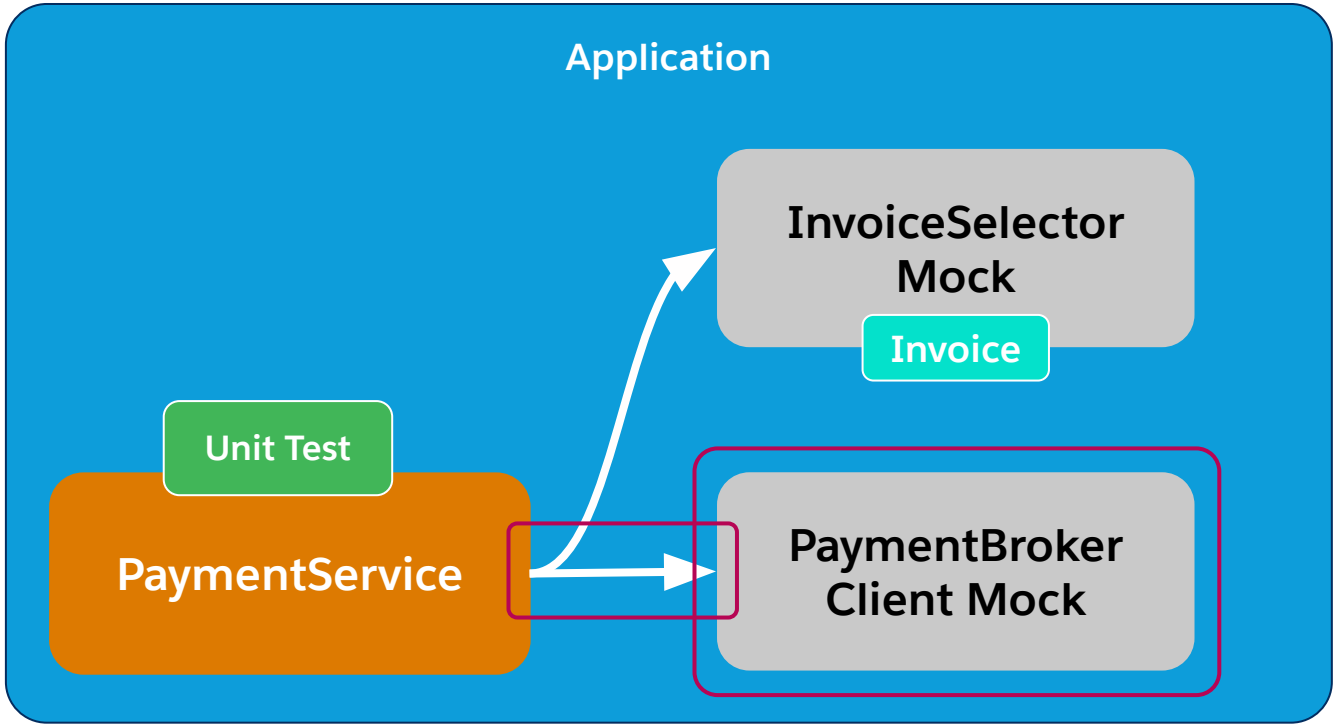
```
// Starting the recording phase
Mocker mocker = Mocker.startStubbing();
```

```
// Creating the Invoice Selector Mock
InvoiceSelector selectorMock = (InvoiceSelector) mocker.mock(InvoiceSelector.class);
```

```
// Recording the return value for the getInvoice method
mocker.when(selectorMock.getInvoice(invoiceId)).thenReturn(invoice);
```

```
// Injecting the Invoice Selector Mock into the Payment Service
PaymentService.invoiceSelector = selectorMock;
```

Create The Payment Broker Client Mock



Create The Payment Broker Client Mock

```
// Creating the Payment Broker Cliner mock
PaymentBrokerClient brokerClientMock = mocker.mock(PaymentBrokerClient.class);
```

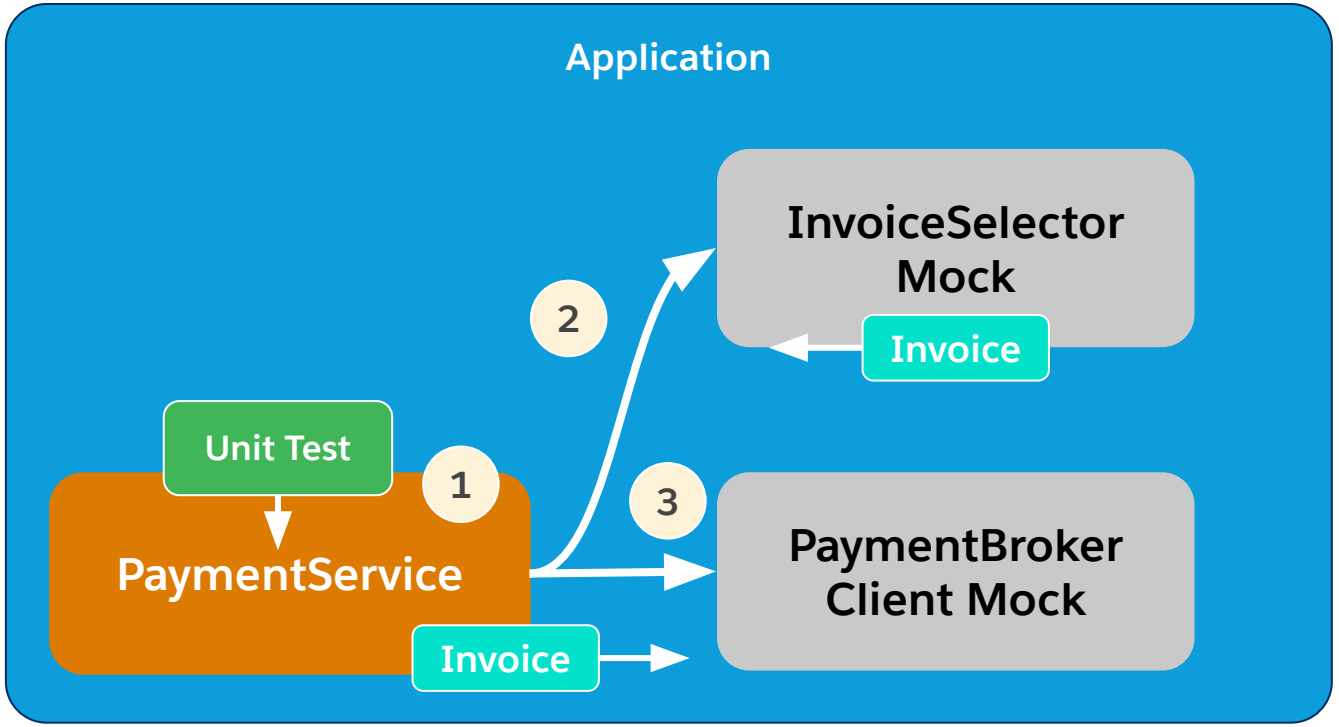
```
// Recording the method behavior
brokerClientMock.processPayment(invoiceId);
Mocker.MethodRecorder processPaymentRec = mocker.when().getMethodRecorder();
```

```
// Injecting the Payment Broker Client Mock into the Payment Service
PaymentService.brokerClient = brokerClientMock;
```

```
// Stopping the recording phase and going to the execution phase
mocker.stopStubbing();
```

Unit Test - Act

Creating Invoice In Memory



Calling The Method Unter Test

```
// Calling The Method Unter Test
Test.startTest();
new PaymentService().processPayment(invoiceId);
Test.stopTest();
```

Unit Test - Assert

Asserting The Results

- Has the Payment Broker been called once?

```
// Asserting how many calls the method
// PaymentBrokerClient.processPayment(Invoice__c invoice) has received
System.assertEquals(1, processPaymentRec.getCallsCount());
```

- Has the Payment Broker received the correct Invoice?

```
// Asserting the argument invoice received on the
// PaymentBrokerClient.processPayment(Invoice__c invoice) call
System.assertEquals(
    invoice, processPaymentRec.getCallRecording(1).getArgument('invoice')
);
```

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Other Features

GS Apex Mocking Framework

Other features

```
// It can have different return values depending on the argument value
mocker.when(selectorMock.getInvoice('0I1000000111AAA'))
      .thenReturn(new Invoice__c(Amount__c = 1000.0));


mocker.when(selectorMock.getInvoice('0I1000000222AAA'))
      .thenReturn(new Invoice__c(Amount__c = 2000.0));
```

GS Apex Mocking Framework

Other features

```
// It can ignore the argument value
mocker.when(selectorMock.getInvoice(null))
      .withAnyValues()   // <====
      .thenReturn(new Invoice__c(Amount__c = 5000.0));


// It can also simulate an exception
mocker.when(selectorMock.getInvoice('0I1000000333AAA'))
      .thenThrow(new DmlException('Record not found'));
```

GS Apex Mocking Framework

Other features

```
// We can define expected behaviors
mocker.when(selectorMock.getInvoice('0I1000000444AAA'))
      .thenReturn(new Invoice__c(Amount__c = 4000.0))
      .shouldBeCalledOnce();

mocker.when(selectorMock.getInvoice('0I1000000555AAA'))
      .shouldNeverBeCalled();
```

Open Source GS Apex Mocking Framework

Blog Post

https://gscloudsolutions.com/tips-tricks/gs-apex-mocking-framework

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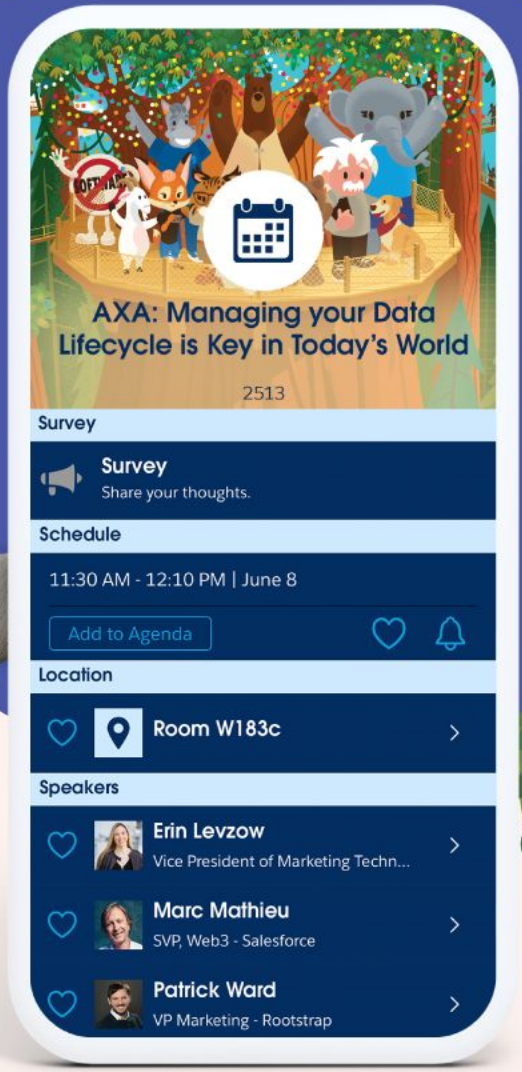

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We're all wearing "**G**" pins so come say hello!

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Product Practice Manager

Presenting: ***Best Practices for Data Security in Experience Cloud***

Cameron Reid

Emerging Technologies Lead

Presented: ***Diagramming for the Admin***

Pei Huang

CTO

Presenting: ***Named Credentials: Securing & Simplifying API Callouts***

3 pm today!

Gerauld Rivera

Marketing Cloud Product Lead

Colin Hamilton

Field Service Product Lead

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Thank you