

Internet Application Development

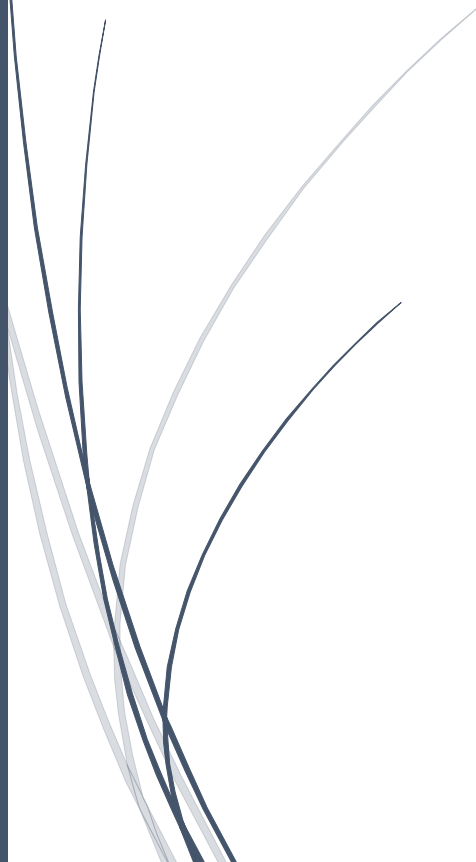
Web Services Assignment

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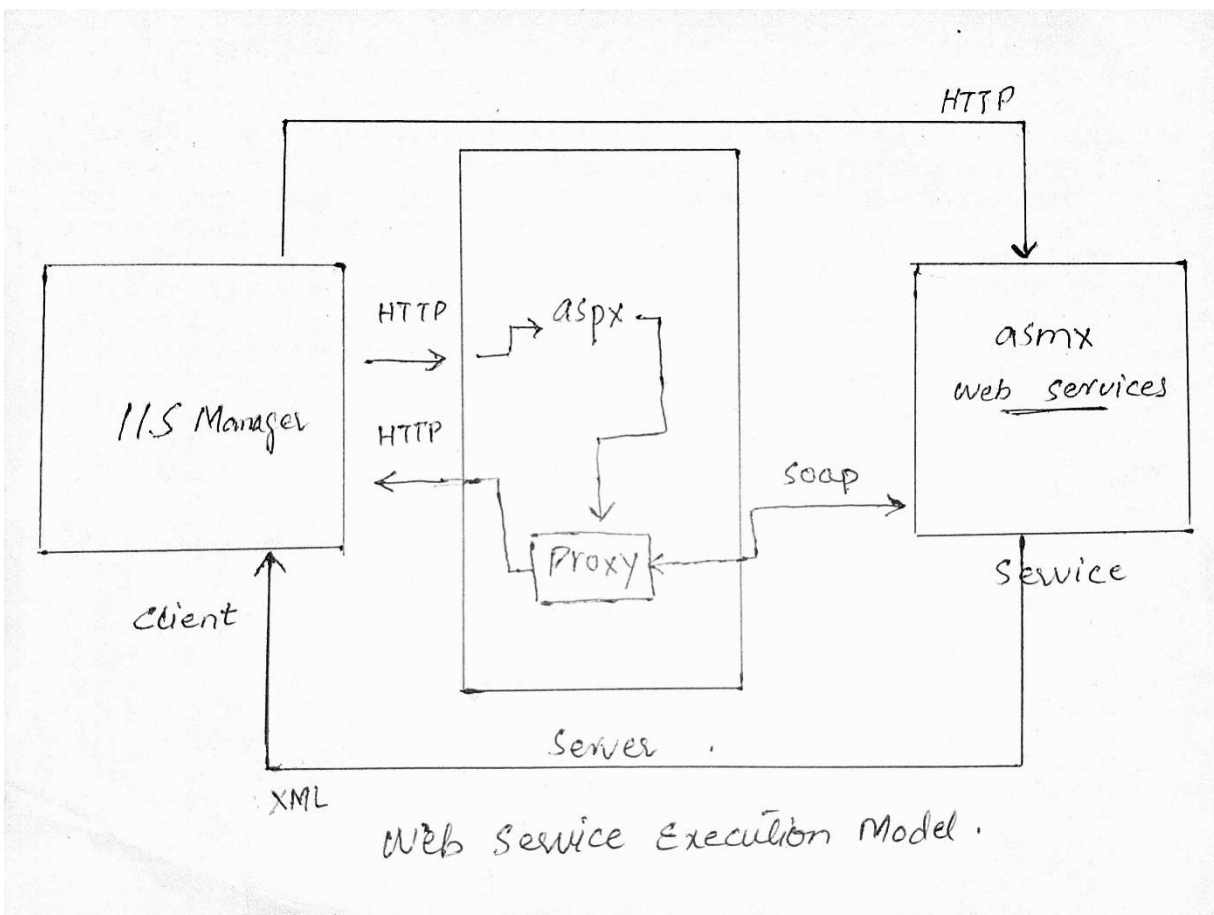
Web Service Implementation and Client Integration

Objective

The objective of this assignment is to:

1. Draw web services execution model
2. Implement a web service (MathLibService) that performs four basic arithmetic operations.
3. Create a web application (ServiceClient) that consumes the web service.
4. Deploy the service using IIS.

Web Service Execution Model



Implementing Web Service

The web service was developed using **ASP.NET (ASMX)** and contains four methods:

- Add(a, b)
- Subtract(a, b)
- Multiply(a, b)
- Divide(a, b)

All methods:

- Accept two Integer parameters
- Return the result as a String

MathLibService.asmx

```
<%@ WebService Language="VB" CodeBehind="~/App_Code/MathLibService.vb" Class="MathLibService" %>
```

MathLibService.vb

```
Imports System.Web
Imports System.Web.Services
Imports System.Web.Services.Protocols

' To allow this Web Service to be called from script, using ASP.NET AJAX, uncomment the
following line.
' <System.Web.Script.Services.ScriptService()> _
<WebService(Namespace:="http://microsoft.com/webservices/")>
<WebServiceBinding(ConformsTo:=WsiProfiles.BasicProfile1_1)>
<Global.Microsoft.VisualBasic.CompilerServices.DesignerGenerated()>
Public Class MathLibService
    Inherits System.Web.Services.WebService

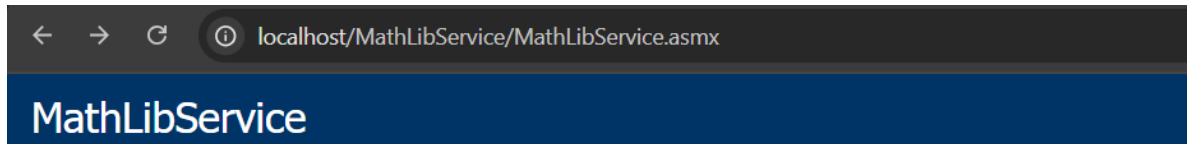
    <WebMethod()>
    Public Function Add(a As Double, b As Double) As String
        Return (a + b).ToString()
    End Function

    <WebMethod()>
    Public Function Subtract(a As Double, b As Double) As String
        Return (a - b).ToString()
    End Function

    <WebMethod()>
    Public Function Multiply(a As Double, b As Double) As String
        Return (a * b).ToString()
    End Function

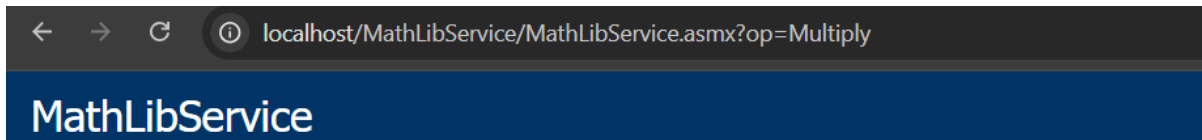
    <WebMethod()>
    Public Function Divide(a As Double, b As Double) As String
        If b = 0 Then
            Return "Division by zero error"
        End If
        Return (a / b).ToString()
    End Function
End Class
```

Output



The following operations are supported. For a formal definition, please review the [Service Description](#).

- [Add](#)
- [Divide](#)
- [Multiply](#)
- [Subtract](#)



Click [here](#) for a complete list of operations.

Multiply

Test

To test the operation using the HTTP POST protocol, click the 'Invoke' button.

Parameter	Value
a:	
b:	

SOAP 1.1

The following is a sample SOAP 1.1 request and response. The [placeholders](#) shown need to be replaced with actual values.

```
POST /MathLibService/MathLibService.asmx HTTP/1.1
Host: localhost
Content-Type: text/xml; charset=utf-8
```

Implement a web application “ServiceClient”

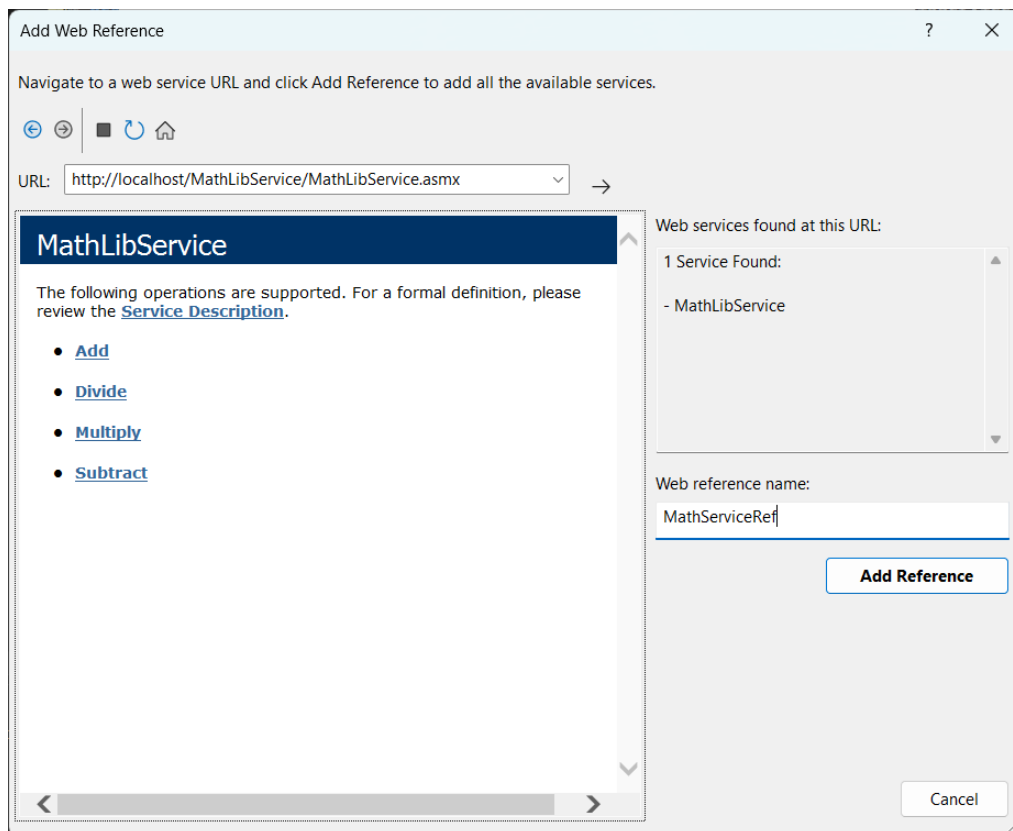
- The ServiceClient is a VB.NET Web Forms application that connects to the MathLibService using a **proxy class**.

Steps Taken:

- Added a web reference to the deployed MathLibService (see deployment heading).

Right Click on Project > Add > Service Reference > Advance > Add Web Reference

Named it: **MathServiceRef**



- Created a web form interface to:
 - Input two numbers
 - Select an operation
 - Display the result
- Handled the button click to call the corresponding method via proxy

ServiceClient.aspx

```
<%@ Page Language="VB" AutoEventWireup="false" CodeFile="Default.aspx.vb"
Inherits="_Default" %>

<!DOCTYPE html>

<html xmlns="http://www.w3.org/1999/xhtml">
<head runat="server">
    <title></title>
</head>
<body>
    <form id="form1" runat="server">
        <div>
            <h2>Math Operations</h2>

            <asp:Label ID="lblA" runat="server" Text="Enter First Number:" /><br />
            <asp:TextBox ID="txtA" runat="server" /><br /><br />

            <asp:Label ID="lblB" runat="server" Text="Enter Second Number:" /><br />
            <asp:TextBox ID="txtB" runat="server" /><br /><br />

            <asp:Label ID="lblOperation" runat="server" Text="Select Operation:" /><br />
            <asp:DropDownList ID="ddlOperation" runat="server">
                <asp:ListItem Text="Add" />
                <asp:ListItem Text="Subtract" />
                <asp:ListItem Text="Multiply" />
                <asp:ListItem Text="Divide" />
            </asp:DropDownList><br /><br />

            <asp:Button ID="btnCalculate" runat="server" Text="Calculate"
OnClick="btnCalculate_Click" /><br /><br />

            <asp:Label ID="lblResult" runat="server" Font-Bold="True" />
        </div>
    </form>
</body>
</html>
```

ServiceClient.aspx.vb

```
Imports System
Imports MathServiceRef

Partial Public Class _Default
    Inherits System.Web.UI.Page

    Protected Sub btnCalculate_Click(sender As Object, e As EventArgs)
        Try
            Dim a As Integer = Integer.Parse(txtA.Text)
            Dim b As Integer = Integer.Parse(txtB.Text)

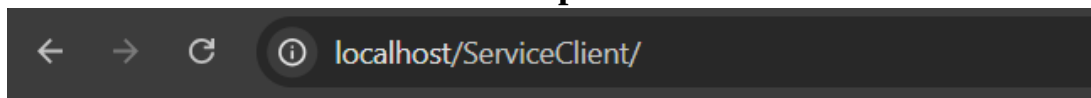
            Dim service As New MathLibService()
            Dim result As String = ""

            Select Case ddlOperation.SelectedValue
                Case "Add"
                    result = service.Add(a, b)
                Case "Subtract"
```

```
        result = service.Subtract(a, b)
    Case "Multiply"
        result = service.Multiply(a, b)
    Case "Divide"
        result = service.Divide(a, b)
End Select

lblResult.Text = "Result: " & result
Catch ex As Exception
    lblResult.Text = "Unexpected error: " & ex.Message
End Try
End Sub
End Class
```

Output



Math Operations

Enter First Number:

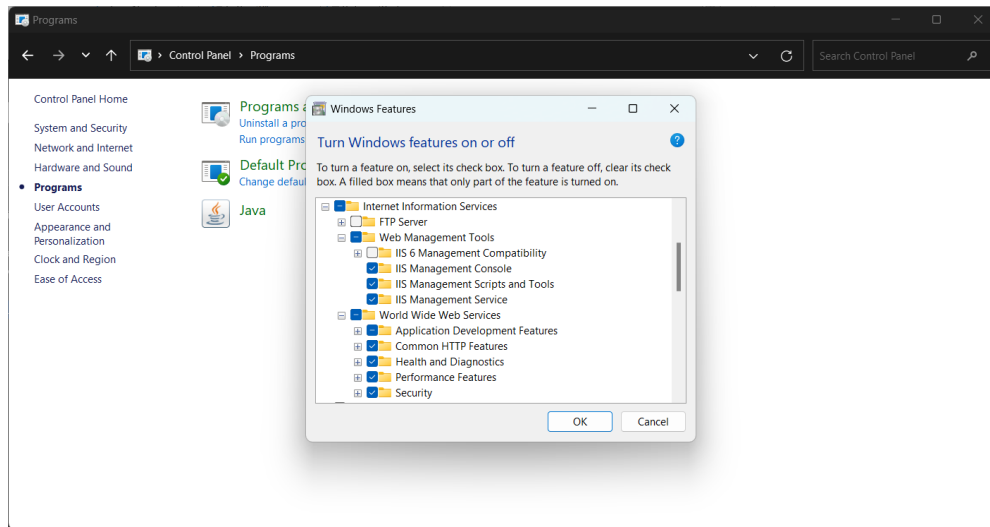
Enter Second Number:

Select Operation:

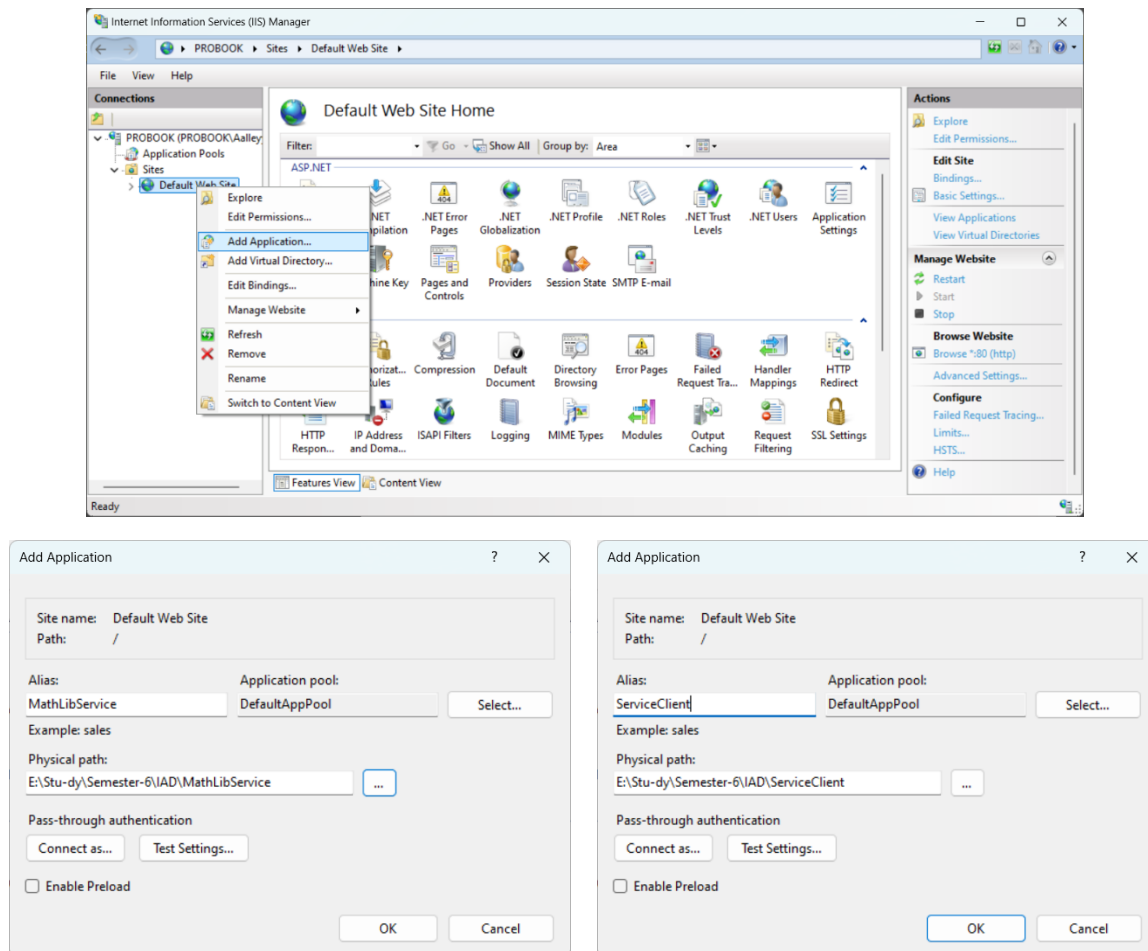
Result: 15

Deploying the service using IIS

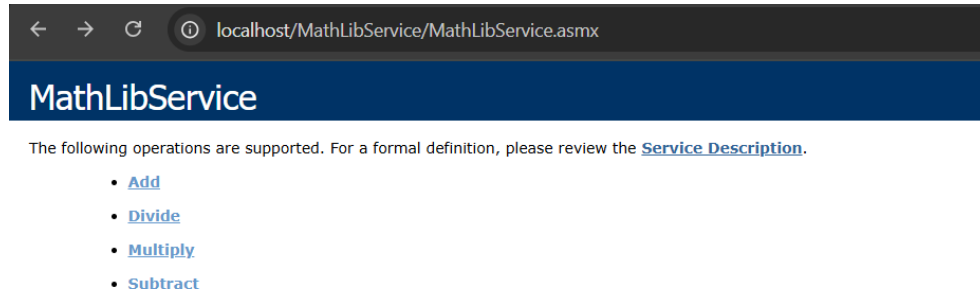
- IIS was installed and configured using Control Panel > Turn Windows Features On or Off.



- The MathLibService was deployed to IIS using:



- MathLibService
Physical path: E:\Study\Semester-6\IAD\MathLibService
Access URL: <http://localhost/MathLibService/MathLibService.aspx>
- ServiceClient
Physical path: E:\Study\Semester-6\IAD\ServiceClient
Access URL: <http://localhost/ServiceClient/Default.aspx>
- The service was tested via browser. Each method was callable directly by providing inputs.

A screenshot of a web browser window. The address bar shows 'localhost/ServiceClient/'. The page has a title 'Math Operations'. Below the title, there are two input fields: 'Enter First Number:' with the value '3' and 'Enter Second Number:' with the value '5'. Below these is a dropdown menu for 'Select Operation:' with 'Multiply' selected. There is a 'Calculate' button. At the bottom, it says 'Result: 15'.