Module 8

Accessing Data over a Network

Module Overview

- Accessing Data Across the Web
- Accessing Data by Using WCF and OData Connected Services

Lesson 1: Accessing Data Across the Web

- Overview of Web Connectivity in the .NET Framework
- Defining a Data Contract
- Creating a Request and Processing a Response
- Authenticating a Web Request
- Sending and Receiving Data
- Demonstration: Consuming a Web Service

Overview of Web Connectivity in the .NET Framework

- Use the request and response pattern
- Use the classes in the **System.Net** namespace:
  - **WebRequest** (abstract base class)
  - **WebResponse** (abstract base class)
  - **HttpWebRequest**
  - **HttpWebResponse**
  - **FtpWebRequest**
  - **FtpWebResponse**
  - **FileWebRequest**
  - **FileWebResponse**

Creating a Request and Processing a Response

- Get a URI

```
var uri =
    "http://sales.fourthcoffee.com/SalesService.svc/GetSalesPerson";
```

- Create a request object

```
var request = WebRequest.Create(uri) as HttpWebRequest;
```

- Get a response object from the request object

```
var response = request.GetResponse() as HttpWebResponse;
```

- Read the properties in the response object

```
var status = response.StatusCode;
// Returns OK if a response is received.
```

Authenticating a Web Request

- Create the request object

```
var uri =
    "http://sales.fourthcoffee.com/SalesService.svc/GetSalesPerson";
var request = WebRequest.Create(uri) as HttpWebRequest;
```

- Use the **NetworkCredential** class

```
var username = "jespera";
var password = "Pa$$w0rd";
request.Credentials = new NetworkCredential(username, password);
```

- Use the **CredentialCache** class

```
request.Credentials = CredentialCache.DefaultCredentials;
```

- Use the **X509Certificate2** class

```
var certificate = FourthCoffeeCertificateServices.GetCertificate();
request.ClientCertificates.Add(certificate);
```

Sending and Receiving Data

- Send data

```
var uri =
   "http://sales.fourthcoffee.com/SalesService.svc/GetSalesPerson";
var rawData = Encoding.Default.GetBytes(
   "{\"emailAddress\":\"jespera@fourthcoffee.com\"}");
var request = WebRequest.Create(uri) as HttpWebRequest;
request.Method = "POST";
request.ContentType = "application/json";
request.ContentLength = rawData.Length;
var dataStream = request.GetRequestStream();
dataStream.Write(rawData, 0, rawData.Length);
dataStream.Close();
```

- Process the response

```
var response = request.GetResponse() as HttpWebResponse;
var stream = new StreamReader(response.GetResponseStream());
// Code to process the stream.
stream.Close();
```

Demonstration: Consuming a Web Service

In this demonstration, you will use the **HttpWebRequest** and **HttpWebResponse** classes to consume a web service over HTTP

Lesson 2: Accessing Data by Using OData Connected Services

- What Is WCF Data Services?
- Defining a WCF Data Service
- Exposing a Data Model by Using WCF Data Services
- Exposing Web Methods by Using WCF Data Services
- Referencing a WCF Data Source
- Retrieving and Updating Data in a WCF Data Service
- Demonstration: Retrieving and Modifying Grade Data Remotely

What Is WCF Data Services?

- What is a service?
- What is a Web Service?
  - SOAP
  - http://example.com/Service**.asmx**
- What is WCF?
  - http://example.com/Service**.svc**
- What is REST?
- What is HTTP WEB API?

What Is WCF Data Services?

WCF Data Services:

- Enables you to create highly flexible data services
- Uses the REST model for data access

```
http://FourthCoffee.com/SalesService.svc/SalesPersons
http://FourthCoffee.com/SalesService.svc/SalesPersons/99
http://FourthCoffee.com/SalesService.svc/SalesPersons?top=10
```

- Enables you to query and modify data by using URIs with standard HTTP verbs: GET, PUT, POST, and DELETE

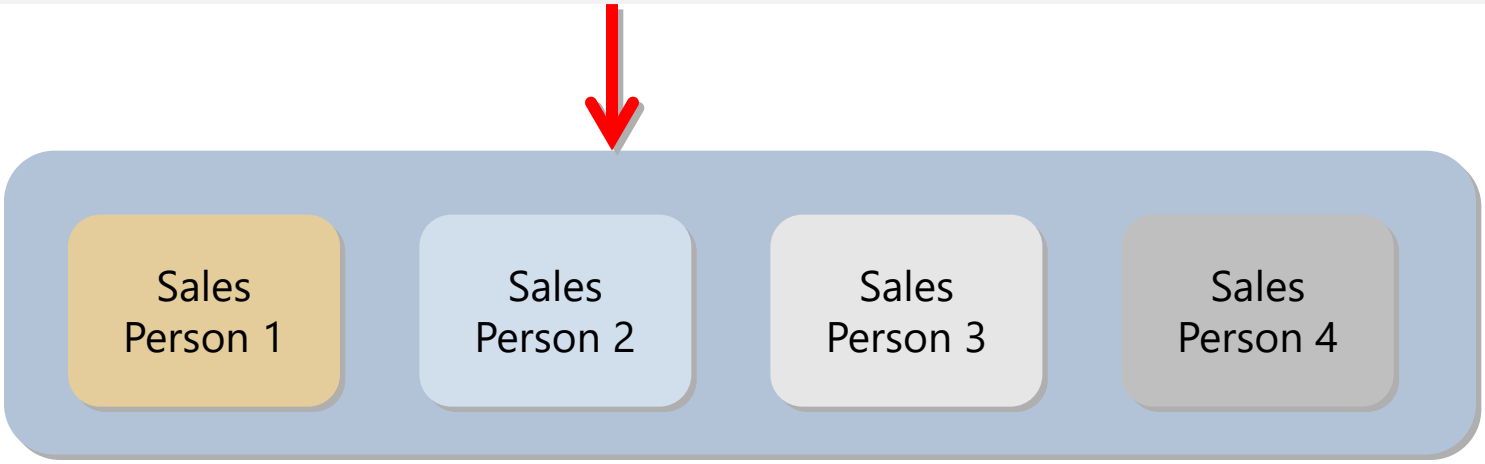
Defining a WCF Data Service

- WCF Data Services is based on the **System.Data.Services.DataService** generic class

```
public class FourthCoffeeDataService : DataService<FourthCoffee>
{
   ...
}
```

- URIs are mapped to entity sets by a data service:

```
http://FourthCoffee.com/SalesService.svc/SalesPersons
```



Exposing a Data Model by Using WCF Data Services

Configure the access rules on the WCF Data Service by using the **SetEntitySetAccessRule** method

```
public class FourthCoffeeDataService : DataService<FourthCoffee>
{
   public static void InitializeService(
      DataServiceConfiguration config)
   {
      config.SetEntitySetAccessRule("*", EntitySetRights.All);
   }
}
```

Exposing Web Methods by Using WCF Data Services

Expose operations by using the **WebGet** and **WebInvoke** attributes

```
public class FourthCoffeeDataService : DataService<FourthCoffee>
{
    public static void InitializeService(DataServiceConfiguration config)
    {
        config.SetServiceOperationAccessRule("SalesPersonByEmail",
            ServiceOperationRights.ReadMultiple);
    }

    [WebGet]
    [SingleResult]
    public SalesPerson SalesPersonByEmail(string emailAddress)
    {
        ...
    }
}
```

Referencing a WCF Data Source

- Client libraries:
  - Are derived from the **DataServiceContext** class
  - Expose entities that the **DataServiceQuery** collection contains
- Create a client library by using:
  - OData Connected Services
  - The **Add Service Reference** function in Visual Studio
  - The **DataSvcUtil** command line utility

Retrieving and Updating Data in a WCF Data Service

- Retrieve entities:
  - Use the properties that are exposed by the context
  - Invoke custom service operations
  - Use eager or explicit loading to get related entities
- Modify entities:
  - Use the **AddTo***XXXX* method to add a new entity
  - Use the **DeleteObject** method to remove an existing entity
  - Use the **UpdateObject** method to modify an existing entity

Demonstration: Retrieving and Modifying Grade Data Remotely

In this demonstration, you will learn about the tasks that you will perform in the lab for this module

Lab: Retrieving and Modifying Grade Data Remotely

- Exercise 1: Creating a WCF Data Service for the SchoolGrades Database
- Exercise 2: Integrating the Data Service into the Application
- Exercise 3: Retrieving Student Photographs Over the Web (If Time Permits)

Estimated Time: 60 minutes

Lab Scenario

Currently, the application retrieves data from a local database. However, you have decided to store the data in the cloud and must configure the application so that it can retrieve data across the web.

You must create a WCF Data Service for the **SchoolGrades** database that will be integrated into the application to enable access to the data.

Finally, you have been asked to write code that displays student images by retrieving them from across the web.

Module Review and Takeaways

- Review Questions