.NET App Dev Hands-On Lab

Razor Pages/MVC/API Lab 2a – Common Services

This lab builds the shared services used by the ASP.NET Core applications. Before starting this lab, you must have completed Razor Pages/MVC/API Lab 1. This entire lab works in the `AutoLot.Services` project.

Start by renaming the `Class1.cs` file to `GlobalUsings.cs`. Update the code to the following:

```
global using AutoLot.Dal.Repos;
global using AutoLot.Dal.Repos.Interfaces;

global using Microsoft.AspNetCore.Builder;
global using Microsoft.Extensions.DependencyInjection;
global using Microsoft.Extensions.Configuration;
global using Microsoft.Extensions.Hosting;
global using Microsoft.Extensions.Logging;

global using Serilog;
global using Serilog.Context;
global using Serilog.Core.Enrichers;
global using Serilog.Events;
global using Serilog.Sinks.MSSqlServer;

global using System.Data;
global using System.Diagnostics;
global using System.Runtime.CompilerServices;
```

Part 1: Add Logging Support

Step 1: Add the Logging Settings View Model

- Add a new folder named `Logging` in the `AutoLot.Services` project. In that folder add a new folder named `Settings`, and in that folder, add a new class file named `AppLoggingSettings.cs`. Update the class code to the following:

```
namespace AutoLot.Services.Logging.Settings;

public class AppLoggingSettings
{
  public GeneralSettings General { get; set; }
  public FileSettings File { get; set; }
  public SqlServerSettings MSSqlServer { get; set; }

  public class GeneralSettings
  {
    public string RestrictedToMinimumLevel { get; set; }
  }
  public class SqlServerSettings
  {
    public string TableName { get; set; }
    public string Schema { get; set; }
    public string ConnectionStringName { get; set; }
  }

  public class FileSettings
  {
    public string Drive { get; set; }
    public string FilePath { get; set; }
    public string FileName { get; set; }
    public string FullLogPathAndFileName =>
$"{Drive}{Path.VolumeSeparatorChar}{Path.DirectorySeparatorChar}{FilePath}{Path.DirectorySeparator
Char}{FileName}";
  }
}
```


Step 2: Add the Logging Interface

- In the `Logging` folder, add a new folder named `Interfaces`, and in that folder, add a new interface file named `IAppLogging.cs`. Update the interface code to the following:

```
namespace AutoLot.Services.Logging.Interfaces;

public interface IAppLogging<T>
{
  void LogAppError(Exception exception, string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
  void LogAppError(string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
  void LogAppCritical(Exception exception, string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
  void LogAppCritical(string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
  void LogAppDebug(string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
  void LogAppTrace(string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
  void LogAppInformation(string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
  void LogAppWarning(string message,
    [CallerMemberName] string memberName = "",
    [CallerFilePath] string sourceFilePath = "",
    [CallerLineNumber] int sourceLineNumber = 0);
}
```

- Add the following to the `GlobalUsings.cs` file:

```
global using AutoLot.Services.Logging;
global using AutoLot.Services.Logging.Interfaces;
global using AutoLot.Services.Logging.Settings;
```

Step 3: Add the Logging Implementation

- In the `Logging` folder add a class file named `AppLogging.cs`. Make the class public and generic and implement `IAppLogging`. Add a default constructor that takes an instance of `ILogger<T>`:

```
namespace AutoLot.Services.Logging;

public class AppLogging<T>(ILogger<T> logger) : IAppLogging<T>
{
  //implementation goes here
}
```

- Create two internal methods to push the additional properties into the `SeriLog` context. One works with exception, the other without:

```
internal static void LogWithException(string memberName,string sourceFilePath,
  int sourceLineNumber, Exception ex, string message,
  Action<Exception, string, object[]> logAction)
{
  var list = new List<IDisposable>
  {
    LogContext.PushProperty("MemberName", memberName),
    LogContext.PushProperty("FilePath", sourceFilePath),
    LogContext.PushProperty("LineNumber", sourceLineNumber),
  };
  logAction(ex,message,null);
  foreach (var item in list)
  {
    item.Dispose();
  }
}

internal static void LogWithoutException(string memberName, string sourceFilePath,
    int sourceLineNumber, string message, Action<string, object[]> logAction)
{
  var list = new List<IDisposable>
  {
    LogContext.PushProperty("MemberName", memberName),
    LogContext.PushProperty("FilePath", sourceFilePath),
    LogContext.PushProperty("LineNumber", sourceLineNumber),
  };
  logAction(message, null);
  foreach (var item in list)
  {
    item.Dispose();
  }
}
```


- Implement the logging interface members:

```
public void LogAppError(Exception exception, string message,
  [CallerMemberName] string memberName = "", [CallerFilePath] string sourceFilePath = "",
  [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithException(memberName, sourceFilePath, sourceLineNumber,
    exception, message, logger.LogError);
}
public void LogAppError(string message, [CallerMemberName] string memberName = "",
  [CallerFilePath] string sourceFilePath = "", [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithoutException(memberName, sourceFilePath, sourceLineNumber, message, logger.LogError);
}
public void LogAppCritical(Exception exception, string message,
  [CallerMemberName] string memberName = "", [CallerFilePath] string sourceFilePath = "",
  [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithException(memberName, sourceFilePath, sourceLineNumber, exception, message,
    logger.LogCritical);
}
public void LogAppCritical(string message, [CallerMemberName] string memberName = "",
  [CallerFilePath] string sourceFilePath = "", [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithoutException(memberName, sourceFilePath, sourceLineNumber, message, logger.LogCritical);
}
public void LogAppDebug(string message, [CallerMemberName] string memberName = "",
  [CallerFilePath] string sourceFilePath = "", [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithoutException(memberName, sourceFilePath, sourceLineNumber, message, logger.LogDebug);
}
public void LogAppTrace(string message, [CallerMemberName] string memberName = "",
  [CallerFilePath] string sourceFilePath = "", [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithoutException(memberName, sourceFilePath, sourceLineNumber, message, logger.LogTrace);
}
public void LogAppInformation(string message, [CallerMemberName] string memberName = "",
  [CallerFilePath] string sourceFilePath = "", [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithoutException(memberName, sourceFilePath, sourceLineNumber, message,
    logger.LogInformation);
}
public void LogAppWarning(string message, [CallerMemberName] string memberName = "",
  [CallerFilePath] string sourceFilePath = "", [CallerLineNumber] int sourceLineNumber = 0)
{
  LogWithoutException(memberName, sourceFilePath, sourceLineNumber, message, logger.LogWarning);
}
```


Step 4: Add the Logging Configuration Extension Method

- Create a new folder named `Configuration` in the `Logging` folder. Add a new class named `LoggingConfiguration.cs` to the `Configuration` directory. Make the class public and static and add a method to register the `IAppLogging` interface with the ASP.NET Core DI Service Collection:

```
namespace AutoLot.Services.Logging.Configuration;

public static class LoggingConfiguration
{
  public static IServiceCollection RegisterLoggingInterfaces(this IServiceCollection services)
  {
    services.AddScoped(typeof(IAppLogging<>), typeof(AppLogging<>));
    return services;
  }
}
```

- Add public static variables to the class to hold the output template (for text file logging) and the `ColumnOptions` (for SQL Server logging):

```
private static readonly string OutputTemplate =
  @"[{Timestamp:yy-MM-dd HH:mm:ss}
{Level}]{ApplicationName}:{SourceContext}{NewLine}Message:{Message}{NewLine}in method {MemberName}
at {FilePath}:{LineNumber}{NewLine}{Exception}{NewLine}";

private static readonly ColumnOptions ColumnOptions = new()
{
  AdditionalColumns = new List<SqlColumn>
  {
    new() { DataType = SqlDbType.VarChar, ColumnName = "ApplicationName" },
    new() { DataType = SqlDbType.VarChar, ColumnName = "MachineName" },
    new() { DataType = SqlDbType.VarChar, ColumnName = "MemberName" },
    new() { DataType = SqlDbType.VarChar, ColumnName = "FilePath" },
    new() { DataType = SqlDbType.Int, ColumnName = "LineNumber" },
    new() { DataType = SqlDbType.VarChar, ColumnName = "SourceContext" },
    new() { DataType = SqlDbType.VarChar, ColumnName = "RequestPath" },
    new() { DataType = SqlDbType.VarChar, ColumnName = "ActionName" }
  }
};
```

- Add the extension method to register `Serilog` as the logging framework for ASP.NET Core:

```
public static void ConfigureSerilog(this WebApplicationBuilder builder)
{
  builder.Logging.ClearProviders();
  var config = builder.Configuration;
  var settings = config.GetSection(nameof(AppLoggingSettings)).Get<AppLoggingSettings>();
  var connectionStringName = settings.MSSqlServer.ConnectionStringName;
  var connectionString = config.GetConnectionString(connectionStringName);
  var tableName = settings.MSSqlServer.TableName;
  var schema = settings.MSSqlServer.Schema;
  string restrictedToMinimumLevel = settings.General.RestrictedToMinimumLevel;
  if (!Enum.TryParse<LogEventLevel>(restrictedToMinimumLevel, out var logLevel))
  {
    logLevel = LogEventLevel.Debug;
  }
  var sqlOptions = new MSSqlServerSinkOptions
  {
    AutoCreateSqlTable = false, SchemaName = schema, TableName = tableName,
  };
  if (builder.Environment.IsDevelopment())
  {
    sqlOptions.BatchPeriod = new TimeSpan(0, 0, 0, 1);
    sqlOptions.BatchPostingLimit = 1;
  }
  var log = new LoggerConfiguration()
    .MinimumLevel.Is(logLevel)
    .MinimumLevel.Override("Microsoft", LogEventLevel.Error)
    .Enrich.FromLogContext()
    .Enrich.With(new PropertyEnricher(
       "ApplicationName", config.GetValue<string>("ApplicationName")))
    .Enrich.WithMachineName()
    .WriteTo.File(
       path: builder.Environment.IsDevelopment()
         ? settings.File.FileName : settings.File.FullLogPathAndFileName, // "ErrorLog.txt",
       rollingInterval: RollingInterval.Day,
       restrictedToMinimumLevel: logLevel,
       outputTemplate: OutputTemplate)
    .WriteTo.Console(restrictedToMinimumLevel: logLevel)
    .WriteTo.MSSqlServer(
       connectionString: connectionString,
       sqlOptions,
       restrictedToMinimumLevel: logLevel,
       columnOptions: ColumnOptions);
  if (builder.Environment.IsDevelopment())
  {
    Serilog.Debugging.SelfLog.Enable(msg =>
    {
      Debug.Print(msg);
      Debugger.Break();
    });
  }
  builder.Logging.AddSerilog(log.CreateLogger(), false);
}
```

Part 2: Add the String Utility Extension Method

- Add a new folder named `Utilities` in the `AutoLot.Services` project and, in that folder, add a new class file named `StringExtensions.cs`. Update the code to match the following:

```
namespace AutoLot.Services.Utilities;
public static class StringExtensions
{
  public static string RemoveController(this string original)
      => original.Replace("Controller", "", StringComparison.OrdinalIgnoreCase);
}
```

Part 3: Add the SimpleService Interface and Classes

- Create a new folder named `Simple`, and in that folder create a new interface named `ISimpleService.cs` and update the contents to the following:

```
namespace AutoLot.Services.Simple;
public interface ISimpleService
{
  string SayHello();
}
```

- Create two new classes named `SimpleServiceOne` and `SimpleServiceTwo`, and update them to the following:

```
//SimpleServiceOne
namespace AutoLot.Services.Simple;
public class SimpleServiceOne : ISimpleService
{
  public string SayHello() => "Hello from One";
}
//SimpleServiceTwo
namespace AutoLot.Services.Simple;
public class SimpleServiceTwo : ISimpleService
{
  public string SayHello() => "Hello from Two";
}
```

Summary

This lab created the Services project used by all the ASP.NET Core projects.

Next steps

In the next part of this tutorial series, you will update the configuration settings for the ASP.NET Core application.