

.NET App Dev Hands-On Workshop

Lab 8 – Common Services

This lab builds the shared services used by the ASP.NET Core applications. Prior to starting this lab, you must have completed Lab 6 (Lab 7 is an optional lab). The 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.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.DirectorySeparatorChar}{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`:

```
namespace AutoLot.Services.Logging;

public class AppLogging<T> : IAppLogging<T>
{
    //Implementation goes here
}
```

- Inject into the constructor the framework `ILogger<T>` and create a private variable for it:

```
private readonly ILogger<T> _logger;

public AppLogging(ILogger<T> logger)
{
    _logger = logger;
}
```

- 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 to the Logging folder. Add a new class named LoggingConfiguration.cs to the Configuration directory. Make the class public and static:

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

```

public static class LoggingConfiguration
{
    //implementation goes here
}

```

- Add a method to register the IAppLogging interface with the ASP.NET Core DI Service Collection:

```

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

```

- Add variables 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 `WebApplicationBuilder` 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)
        .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);
    builder.Logging.AddSerilog(log.CreateLogger(), false);
}
```


Step 5: Update the Root AppSettings.json file

- Update the appsettings.json in the AutoLot.Mvc project to the following:

```
{
  "AllowedHosts": "*",
```

Step 6: Update the Development App Settings

- Update the appsettings.Development.json in the AutoLot.Mvc project to the following:

```
{
  "AppLoggingSettings": {
    "MSSqlServer": {
      "TableName": "SerilogLogs",
      "Schema": "Logging",
      "ConnectionStringName": "AutoLot"
    },
    "File": {
      "Drive": "c",
      "FilePath": "temp",
      "FileName": "log_AutoLot.txt"
    },
    "General": {
      "RestrictedToMinimumLevel": "Information"
    }
  },
  "AppName": "AutoLot.Mvc - Dev"
}
```

Step 7: Add and Update the Production App Settings File

- Add a new JSON file to the AutoLot.Mvc project named appsettings.Production.json and update the file to the following:

```
{
  "AppLoggingSettings": {
    "MSSqlServer": {
      "TableName": "SeriLogs",
      "Schema": "Logging",
      "ConnectionStringName": "AutoLot"
    },
    "File": {
      "Drive": "c",
      "FilePath": "temp",
      "FileName": "log_AutoLot.txt"
    },
    "General": {
      "RestrictedToMinimumLevel": "Error"
    }
  },
  "AppName": "AutoLot.Mvc"
}
```

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);
}
```

Summary

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

Next steps

In the next part of this tutorial series, you will start working with ASP.NET Core.