

.NET 9 App Dev Hands-On Lab

Razor Pages Lab 3 –Pipeline Configuration, Dependency Injection

This lab configures the HTTP pipeline and configures the configuration and dependency injection. Before starting this lab, you must have completed Razor Pages Lab 2b.

Part 1: Configure the Application

Step 1: Update the Development App Settings

- Update the `appsettings.Development.json` in the `AutoLot.Web` project to the following (adjusted for your connection string and ports):
Note the comma added after "AutoLot.Web - Dev"

```
{
  "AppLoggingSettings": {
    "MSSqlServer": {
      "TableName": "Serilogs",
      "Schema": "Logging",
      "ConnectionStringName": "AutoLot"
    },
    "File": {
      "Drive": "c",
      "FilePath": "temp",
      "FileName": "log_AutoLot_Debug.txt"
    },
    "General": {
      "RestrictedToMinimumLevel": "Information"
    }
  },
  "AppName": "AutoLot.Web - Dev",
  "RebuildDataBase": true,
  "ConnectionStrings": {
    //SQL Server Local Db
    "AutoLot": "Server=(localdb)\\MSSQLLocalDB;Database=AutoLot_Hol;Trusted_Connection=True;"
    //"AutoLot": "Server=(localdb)\\ProjectModels;Database=AutoLot_Hol;Trusted_Connection=True;"
    //Docker
    //"AutoLot": "Server=.,5433;Database=AutoLot_Hol;User ID=sa;Password=P@ssw0rd;"
  },
  "DealerInfo": {
    "DealerName": "Skimedic's Used Cars Development Razor Pages Site",
    "City": "West Chester",
    "State": "Ohio"
  }
}
```

Step 2: Add the Staging Settings File

- Add a new file named `appsettings.Staging.json` to the root of the `AutoLot.Web` project and update it to the following:

```
{
  "AppLoggingSettings": {
    "MSSqlServer": {
      "TableName": "SeriLogs",
      "Schema": "Logging",
      "ConnectionStringName": "AutoLot"
    },
    "File": {
      "Drive": "c",
      "FilePath": "temp",
      "FileName": "log_AutoLot_Staging.txt"
    },
    "General": {
      "RestrictedToMinimumLevel": "Information"
    }
  },
  "AppName": "AutoLot.Web - Staging",
  "RebuildDataBase": false,
  "ConnectionStrings": {
    //SQL Server Local Db
    "AutoLot": "Server=(localdb)\\MSSQLLocalDB;Database=AutoLot_Hol;Trusted_Connection=True;"
    //"AutoLot": "Server=(localdb)\\ProjectModels;Database=AutoLot_Hol;Trusted_Connection=True;"
    //Docker
    //"AutoLot": "Server=.,5433;Database=AutoLot_Hol;User ID=sa;Password=P@ssw0rd;"
  },
  "DealerInfo": {
    "DealerName": "Skimedic's Used Cars Staging Razor Pages Site",
    "City": "West Chester",
    "State": "Ohio"
  }
}
```

Step 3: Update the AppSettings.json file

- Update the `appsettings.json` in the `AutoLot.Web` project to the following:
Note the added comma after `"**"`

```
{
  "AllowedHosts": "**",
  "DealerInfo": {
    "DealerName": "Skimedic's Used Cars",
    "City": "West Chester",
    "State": "Ohio"
  }
}
```

Step 4: Update the Production Settings File

- Update the appsettings.Production.json in the AutoLot.Web project to the following: Note the comma added after "AutoLot.Web"

```
{
  "AppLoggingSettings": {
    "MSSqlServer": {
      "TableName": "SeriLogs",
      "Schema": "Logging",
      "ConnectionStringName": "AutoLot"
    },
    "File": {
      "Drive": "c",
      "FilePath": "temp",
      "FileName": "log_AutoLot.txt"
    },
    "General": {
      "RestrictedToMinimumLevel": "Error"
    }
  },
  "AppName": "AutoLot.Web",
  "RebuildDataBase": false,
  "ConnectionStrings": {
    "AutoLot": "[its-a-secret]"
  },
  "DealerInfo": {
    "DealerName": "Skimedic's Used Cars Production Razor Pages Site",
    "City": "West Chester",
    "State": "Ohio"
  }
}
```

Part 2: Add the GlobalUsings.cs File

- Create a new file named GlobalUsings.cs in the AutoLot.Web project and update the contents to the following:

```
global using AutoLot.Dal.EfStructures;
global using AutoLot.Dal.Initialization;
global using AutoLot.Dal.Repos;
global using AutoLot.Dal.Repos.Interfaces;
global using AutoLot.Services.Logging.Configuration;
global using AutoLot.Services.Logging.Interfaces;
global using AutoLot.Services.Simple;
global using AutoLot.Services.Simple.Interfaces;
global using AutoLot.Services.Utilities;
global using AutoLot.Services.ViewModels;
global using Microsoft.AspNetCore.Http.Features;
global using Microsoft.AspNetCore.Mvc;
global using Microsoft.AspNetCore.Mvc.Infrastructure;
global using Microsoft.AspNetCore.Mvc.RazorPages;
global using Microsoft.EntityFrameworkCore;
global using Microsoft.EntityFrameworkCore.Diagnostics;
global using Microsoft.Extensions.DependencyInjection.Extensions;
global using Microsoft.Extensions.Options;
global using System.Diagnostics;
global using System.Text.Json.Serialization;
```

Part 3: Update the Program.cs Top Level Statements

Step 1: Add Logging

- Add Serilog to the WebApplicationBuilder and the logging interfaces to the DI container in Program.cs in the AutoLot.Web project:

```
var builder = WebApplication.CreateBuilder(args);
builder.ConfigureSerilog();
builder.Services.RegisterLoggingInterfaces();
```

Step 2: Update WebHost for CSS Isolation

- The CSS Isolation file is created in the development environment or when an app is published. To create the CSS file in other environments, update the web host to use static web assets:

```
builder.Services.RegisterLoggingInterfaces();
if (!builder.Environment.IsDevelopment())
{
    builder.WebHost.UseStaticWebAssets();
}
```

Step 3: Add Application Services to the Dependency Injection Container

- Add the repos to the DI container after the comment *//Add services to the container* and after the call to `AddRazorPages()`:

```
//Add services to the DI container
builder.Services.AddRazorPages();
builder.Services.AddScoped<ICarDriverRepo, CarDriverRepo>();
builder.Services.AddScoped<ICarRepo, CarRepo>();
builder.Services.AddScoped<IDriverRepo, DriverRepo>();
builder.Services.AddScoped<IMakeRepo, MakeRepo>();
builder.Services.AddScoped<IRadioRepo, RadioRepo>();
```

- Add the keyed services into the DI container:

```
builder.Services.AddKeyedScoped<ISimpleService, SimpleServiceOne>(nameof(SimpleServiceOne));
builder.Services.AddKeyedScoped<ISimpleService, SimpleServiceTwo>(nameof(SimpleServiceTwo));
```

- Add the following code to populate the DealerInfo class from the configuration file:

```
builder.Services.Configure<DealerInfo>(builder.Configuration.GetSection(nameof(DealerInfo)));
```

- Add the `IActionContextAccessor` and `HttpContextAccessor`:

```
builder.Services.TryAddSingleton<IActionContextAccessor, ActionContextAccessor>();
builder.Services.AddHttpContextAccessor();
```

- Add the `ApplicationDbContext`:

```
var connectionString = builder.Configuration.GetConnectionString("AutoLot");
builder.Services.AddDbContextPool<ApplicationDbContext>(
    options =>
    {
        options.ConfigureWarnings(wc => wc.Ignore(RelationalEventId.BoolWithDefaultWarning));
        options.UseSqlServer(connectionString,
            sqlOptions => sqlOptions.EnableRetryOnFailure().CommandTimeout(60));
    });
```

Step 4: Add DI Validation

- Add the code to validate DI services and scopes on building the web app:

```
builder.Services.AddRazorPages()
    .AddControllersAsServices()
    .AddViewComponentsAsServices()
    .AddTagHelpersAsServices();

builder.Host.UseDefaultServiceProvider(o =>
{
    o.ValidateOnBuild = true;
    o.ValidateScopes = true;
});
```

Step 5: Add JSON Configuration

- Add the code to configure JSON handling:

```
builder.Services.AddRazorPages()
    .AddJsonOptions(options =>
    {
        options.JsonSerializerOptions.PropertyNamingPolicy = null;
        options.JsonSerializerOptions.PropertyNameCaseInsensitive = true;
        options.JsonSerializerOptions.WriteIndented = true;
        options.JsonSerializerOptions.ReferenceHandler = ReferenceHandler.IgnoreCycles;
    })
    .AddControllersAsServices()
// rest omitted for brevity
```

Step 6: Call the Data Initializer and Update the Project File

- In the section after `builder.Build()`, flip the `IsDevelopment` if block around, and add the `UseDeveloperExceptionPage` so the code looks like this:

```
// Configure the HTTP request pipeline.
if (app.Environment.IsDevelopment())
{
}
else
{
    app.UseExceptionHandler("/Error");
    // The default HSTS value is 30 days.
    // You may want to change this for production scenarios, see https://aka.ms/aspnetcore-hsts.
    app.UseHsts();
}
```

- In the `IsDevelopment` if block, check the settings to determine if the database should be rebuilt, and if yes, call the data initializer:

```
if (app.Environment.IsDevelopment())
{
    app.UseDeveloperExceptionPage();
    if (app.Configuration.GetValue<bool>("RebuildDataBase"))
    {
        using var scope = app.Services.CreateScope();
        var dbContext = scope.ServiceProvider.GetRequiredService<ApplicationDbContext>();
        SampleDataInitializer.ClearAndReseedDatabase(dbContext);
    }
}
else
{
    app.UseExceptionHandler("/Error");
    // The default HSTS value is 30 days.
    // You may want to change this for production scenarios, see https://aka.ms/aspnetcore-hsts.
    app.UseHsts();
}
```

- If you converted the tables to be temporal (EF Core Lab 8), comment out the IncludeAssets tag for EntityFrameworkCore.Design in the AutoLot.Web.csproj file:

```
<PackageReference Include="Microsoft.EntityFrameworkCore.Design" Version="[9.0.*,10.0)">
  <!--<IncludeAssets>runtime; build; native; contentfiles; analyzers;
buildtransitive</IncludeAssets>-->
  <PrivateAssets>all</PrivateAssets>
</PackageReference>
```

Part 4: Add WebOptimizer

This section shows how to use WebOptimizer for bundling, minification, and caching. The MapStaticFiles method (introduced in ASP.NET Core 9) and WebOptimizer do not work together yet, so it must be commented out.

Step 1: Add WebOptimizer to DI Container

- Update the Program.cs top-level statements by adding the following code after adding the services but before the WebApplication is built:

```
if (builder.Environment.IsDevelopment() || builder.Environment.IsEnvironment("Local"))
{
    builder.Services.AddWebOptimizer(false, false);
}
else
{
    builder.Services.AddWebOptimizer(options =>
    {
        //options.MinifyCssFiles(); //Minifies all CSS files
        options.MinifyCssFiles("css/**/*.css");
        //options.MinifyJsFiles(); //Minifies all JS files
        options.MinifyJsFiles("js/site.js");
        //options.MinifyJsFiles("js/**/*.js");
    });
}
var app = builder.Build();
```

Step 2: Add UseStaticFiles to the HTTP Pipeline

- Add in the call to UseStaticFiles and comment out the MapStaticAssets() and WithStaticAssets() calls in Program.cs as shown here:

```
app.UseHttpsRedirection();
app.UseStaticFiles();
app.UseRouting();
app.UseAuthorization();
//app.MapStaticAssets();
app.MapRazorPages();
//app.MapRazorPages()
//    .WithStaticAssets();
```

Step 3: Add WebOptimizer to the HTTP Pipeline

- Update the Configure method by adding the following code (**before** `app.UseStaticFiles()`):

```
app.UseWebOptimizer();
app.UseHttpsRedirection();
app.UseStaticFiles();
```

Step 4: Update _ViewImports to enable WebOptimizer Tag Helpers

- Update the `_ViewImports.cshtml` file to enable WebOptimizer tag helpers:

```
@using AutoLot.Web
@addTagHelper *, Microsoft.AspNetCore.Mvc.TagHelpers
@addTagHelper *, WebOptimizer.Core
```

Part 5: Update the Index.cshtml Page

- Replace the default ILogger with the IAppLogging and convert the constructor to a primary constructor in `Index.cshtml.cs` and update the `OnGet` method to log an error:

```
public class IndexModel(IAppLogging<IndexModel> logger) : PageModel
{
    public void OnGet()
    {
        logger.LogAppError("Test Error");
    }
}
```

- Run the application and launch a browser. Since the Index page is the application's default entry point, just running the app should create an error file and an entry in the Serilog table.
- Once you have confirmed that logging works, comment out the error logging code:

```
//logger.LogAppError("Test error");
```

- Inject the DealerInfo OptionsMonitor into the primary Constructor, add a public DealerInfo property, and set the value in the constructor:

```
public class IndexModel(IAppLogging<IndexModel> logger,
    IOptionsMonitor<DealerInfo> dealerOptionsMonitor) : PageModel
{
    [BindProperty]
    public DealerInfo Entity { get; } = dealerOptionsMonitor.CurrentValue;

    public void OnGet()
    {
        //logger.LogAppError("Test Error");
    }
}
```


- Replace the HTML in Index.cshtml with the following:

```
@page
@model IndexModel
@inject IServiceProvider serviceProvider
@{
    ViewData["Title"] = "Home page";
    var service = serviceProvider.GetKeyedService<ISimpleService>(nameof(SimpleServiceOne));
}
<div class="text-center">
    <h1 class="display-4">Welcome to @Model.Entity.DealerName</h1>
    <p class="lead">Located in @Model.Entity.City, @Model.Entity.State</p>
</div>
<div>
    @if (service != null)
    {
        <p>@service.SayHello()</p>
    }
</div>
```

Summary

This lab added the necessary classes to the DI container and modified the application configuration.

Next steps

In the next part of this tutorial series, you will add support for client-side libraries, update the layout, and add GDPR Support.