Build an ASP.NET Core Service, and App with Core 2.2 Two-Day Hand-On Lab

Lab 1

This lab walks you through creating the projects and adding/updating the NuGet packages. Prior to starting this lab, you must have completed Lab 0, Installing the Prerequisites.

Part 1: Creating the Solution and Projects

Visual Studio (all versions) is capable of creating projects and solutions, but it is much more efficient to use the .NET Core command line. When creating projects using the command line, the names of solutions, projects, and directories are case sensitive.

Step 1: Pin the .NET Core SDK Version

When using the command line, .NET Core will use the most current version of the SDK installed. For this reason, the required version of .NET Core must be pinned with a global.json file.

1. Check current version by typing:

```
dotnet --version
```

2. If the version is not the version you need (e.g. 2.2.300), enter the following command to create a new file named `global.json`:

Visual Studio Version	Runtime Version	SDK Needed
2017 15.9+	2.1	2.1.500
2017 15.9+	2.2	2.2.100
2019 16.0	2.1	2.1.600
2019 16.0	2.2	2.2.200
2019 16.1 (Update 1)	2.1	2.1.700
2019 16.1 (Update 1)	2.2	2.2.300

```
dotnet new globaljson --sdk-version <version from the chart above>
```

3. This creates the global.json file with the following content:

```
{
    "sdk": {
        "version":"<version from the chart above>"
    }
}
```

4. Execute "dotnet --version" again and the version will return as the version you entered from the chart above.

Step 2: Create the Solution

The templates that are installed with .NET Core range from very simple to quite complex. Creating the global.json file is an example of a simple template, as is creating a new solution.

1. To create a new solution file named `SpyStore.Hol`, enter the following command:

```
dotnet new sln -n SpyStore.Hol
```

Step 3: Create the ASP.NET Core Service project

1) The `webapi` template is extremely configurable. In addition to setting the name, authentication scheme, and directory location, there are many other options. These can be explored by entering:

```
dotnet new webapi -h
```

2) From the same directory as the solution file, enter the following command to create the ASP.NET Core Service project, set the name, turn off authentication, not require https, and set the directory for the project as `SpyStore.Hol.Service`:

```
dotnet new webapi -n SpyStore.Hol.Service -au none --no-https  -o .\SpyStore.Hol.Service
```

3) Add the project to the solution with the following command:

```
dotnet sln SpyStore.Hol.sln add SpyStore.Hol.Service
```

Step 4: Create the ASP.NET Core Web Application project

1) The `mvc` template is extremely configurable. In addition to setting the name, authentication scheme, and directory location, there are many other options. These can be explored by entering:

```
dotnet new mvc -h
```

2) From the same directory as the solution file, enter the following command to create the ASP.NET Core project using the model-view-controller pattern, set the name, turn off authentication, not require https, and set the directory for the project as `SpyStore.Hol.Mvc`:

```
dotnet new mvc -n SpyStore.Hol.Mvc -au none --no-https  -o .\SpyStore.Hol.Mvc
```

3) Add the project to the solution with the following command:

```
dotnet sln SpyStore.Hol.sln add SpyStore.Hol.Mvc
```

Step 5: Create the Models and Data Access Layer projects

The `classlib` template create .NET Core class libraries or .NET Standard class libraries. Either will work. For this lab, use .NET Core class libraries.

1) The template takes a name and an output directory. Create the `SpyStore.Hol.Dal` and `SpyStore.Hol.Models` projects by entering the following commands:

```
REM .NET Core 2.1
dotnet new classlib -n SpyStore.Hol.Dal -o .\SpyStore.Hol.Dal -f netcoreapp2.1
dotnet new classlib -n SpyStore.Hol.Models -o .\SpyStore.Hol.Models -f netcoreapp2.1
REM .NET Core 2.2
dotnet new classlib -n SpyStore.Hol.Dal -o .\SpyStore.Hol.Dal -f netcoreapp2.2
dotnet new classlib -n SpyStore.Hol.Models -o .\SpyStore.Hol.Models -f netcoreapp2.2
```

2) Add the projects to the solution with the following commands:

```
dotnet sln SpyStore.Hol.sln add SpyStore.Hol.Dal
dotnet sln SpyStore.Hol.sln add SpyStore.Hol.Models
```

Step 6: Create the Unit Test projects [Optional]

The xUnit template creates a new .NET Core class library with all of the required packages for unit testing. This include xUnit and the `Microsoft.NET.Test.Sdk`.

1) Create the 2 projects with the names of `SpyStore.Hol.Dal.Tests` and `SpyStore.Hol.Service.Tests` in their respective directories using the following command:

```
dotnet new xunit -n SpyStore.Hol.Dal.Tests -o .\SpyStore.Hol.Dal.Tests
dotnet new xunit -n SpyStore.Hol.Service.Tests -o .\SpyStore.Hol.Service.Tests
```

2) Add the project to the solution with the following command:

```
dotnet sln SpyStore.Hol.sln add SpyStore.Hol.Dal.Tests
dotnet sln SpyStore.Hol.sln add SpyStore.Hol.Service.Tests
```

Part 2: Add the Project References

When adding project references through the command line, the commands are not case sensitive.

Step 1: Update the SpyStore.Hol.Service Project

The `SpyStore.Hol.Service` project references the `SpyStore.Hol.Dal` and the `SpyStore.Hol.Models` projects.

1) Enter the following commands to add the references:

```
dotnet add SpyStore.Hol.Service reference SpyStore.Hol.Models
dotnet add SpyStore.Hol.Service reference SpyStore.Hol.Dal
```

Step 2: Update the SpyStore.Hol.Mvc Project

The `SpyStore.Hol.Mvc` project references the `SpyStore.Hol.Models` project.

2) Enter the following commands to add the references:

```
dotnet add SpyStore.Hol.Mvc reference SpyStore.Hol.Models
```

Step 3: Update the SpyStore.Hol.Dal Project

The `SpyStore.Hol.Dal` project references the `SpyStore.Hol.Models` project.

1) Enter the following command to add the reference:

```
dotnet add SpyStore.Hol.Dal reference SpyStore.Hol.Models
```

Step 4: Update the SpyStore.Hol.Dal.Tests and SpyStore.Hol.Service.Tests Projects

Both the `SpyStore.Hol.Dal.Tests` project and the `SpyStore.Hol.Service.Tests` projects reference the `SpyStore.Hol.Dal` and the `SpyStore.Hol.Models` projects.

2) Enter the following commands to add the references:

```
dotnet add SpyStore.Hol.Dal.Tests reference SpyStore.Hol.Models
dotnet add SpyStore.Hol.Dal.Tests reference SpyStore.Hol.Dal
```

Part 3: Add the NuGet packages to the Projects

.NET Core, ASP.NET Core, and EF Core are composed of a series of NuGet packages. Additional tools are also distributed as NuGet packages. The command line can also be used for adding NuGet packages.

Step 1: Update the SpyStore.Hol.Service Project

The `SpyStore.Hol.Service` project needs `Automapper`, `Newtonsoft.json`, Swashbuckle, and container support added.

1) Enter the following commands to add the packages (each on a single line):

```
dotnet add SpyStore.Hol.Service package AutoMapper
dotnet add SpyStore.Hol.Service package Newtonsoft.Json
dotnet add SpyStore.Hol.Service package Swashbuckle.AspNetCore.Annotations
dotnet add SpyStore.Hol.Service package Swashbuckle.AspNetCore.Swagger
dotnet add SpyStore.Hol.Service package Swashbuckle.AspNetCore.SwaggerGen
dotnet add SpyStore.Hol.Service package Swashbuckle.AspNetCore.SwaggerUI
REM This must be entered on one line
dotnet add SpyStore.Hol.Service package Microsoft.VisualStudio.Azure.Containers.Tools.Targets -v
1.7.9
dotnet add SpyStore.Hol.Service package Microsoft.VisualStudio.Web.CodeGeneration.Design -v 2.2.3
```

Step 2: Update the SpyStore.Hol.Mvc Project

The `SpyStore.Hol.Mvc` project needs `Automapper`, `Newtonsoft.json`, Library Manager, and `Ligershark.WebOptimizer.Core` added.

1) Enter the following commands to add the packages:

```
dotnet add SpyStore.Hol.Mvc package AutoMapper
dotnet add SpyStore.Hol.Mvc package Newtonsoft.Json
dotnet add SpyStore.Hol.Mvc package LigerShark.WebOptimizer.Core
dotnet add SpyStore.Hol.Mvc package LigerShark.WebOptimizer.sass -v 1.0.34-beta
dotnet add SpyStore.Hol.Mvc package Microsoft.Web.LibraryManager.Build
```

Step 3: Update the SpyStore.Hol.Models Project

The `SpyStore.Hol.Models` project needs `AutoMapper` and `Microsoft.EntityFrameworkCore.Abstractions`. The version of EF Core added into the support projects should match the version that is included with `Microsoft.AspNetCore.App` (unless you update all projects to the same version)

1) Add the packages with the following commands:

```
REM .NET Core 2.1
dotnet add SpyStore.Hol.Models package Microsoft.EntityFrameworkCore.Abstractions -v 2.1.1
REM .NET Core 2.2
dotnet add SpyStore.Hol.Models package Microsoft.EntityFrameworkCore.Abstractions -v 2.2.0
REM Both Versions
dotnet add SpyStore.Hol.Models package AutoMapper
dotnet add SpyStore.Hol.Models package Newtonsoft.Json
```

Step 4: Update the SpyStore.Hol.Dal Project

The `SpyStore.Hol.Dal` project needs `NewtonSoft.Json`, `Microsoft.EntityFrameworkCore.SqlServer` (SQL Server provider for EF Core), and `Microsoft.EntityFrameworkCore.Design` (command line tooling). In order to use the EF Core tooling from Package Manager Console, the project also needs `Microsoft.EntityFramewordCore.Tools`.

1) Add the packages with the following commands:

```
REM .NET Core 2.1
dotnet add SpyStore.Hol.Dal package Microsoft.EntityFrameworkCore.SqlServer -v 2.1.1
dotnet add SpyStore.Hol.Dal package Microsoft.EntityFrameworkCore.Design -v 2.1.1
dotnet add SpyStore.Hol.Dal package Microsoft.EntityFrameworkCore.Tools -v 2.1.1
REM .NET Core 2.2
dotnet add SpyStore.Hol.Dal package Microsoft.EntityFrameworkCore.SqlServer -v 2.2.0
dotnet add SpyStore.Hol.Dal package Microsoft.EntityFrameworkCore.Design -v 2.2.0
dotnet add SpyStore.Hol.Dal package Microsoft.EntityFrameworkCore.Tools -v 2.2.0
REM Both Version
dotnet add SpyStore.Hol.Dal package Newtonsoft.Json
```

Step 5: Update the Unit Test Projects

The `SpyStore.Hol.Dal.Tests` and `SpyStore.Hol.Dal.Tests` projects need the `Microsoft.EntityFrameworkCore.SqlServer` package.

1) Add the package with the following command:

```
REM .NET Core 2.1
dotnet add SpyStore.Hol.Dal.Tests package Microsoft.EntityFrameworkCore.SqlServer -v 2.1.1
dotnet add SpyStore.Hol.Service.Tests package Microsoft.EntityFrameworkCore.SqlServer -v 2.1.1
REM .NET Core 2.2
dotnet add SpyStore.Hol.Dal.Tests package Microsoft.EntityFrameworkCore.SqlServer -v 2.2.0
dotnet add SpyStore.Hol.Service.Tests package Microsoft.EntityFrameworkCore.SqlServer -v 2.2.0
```

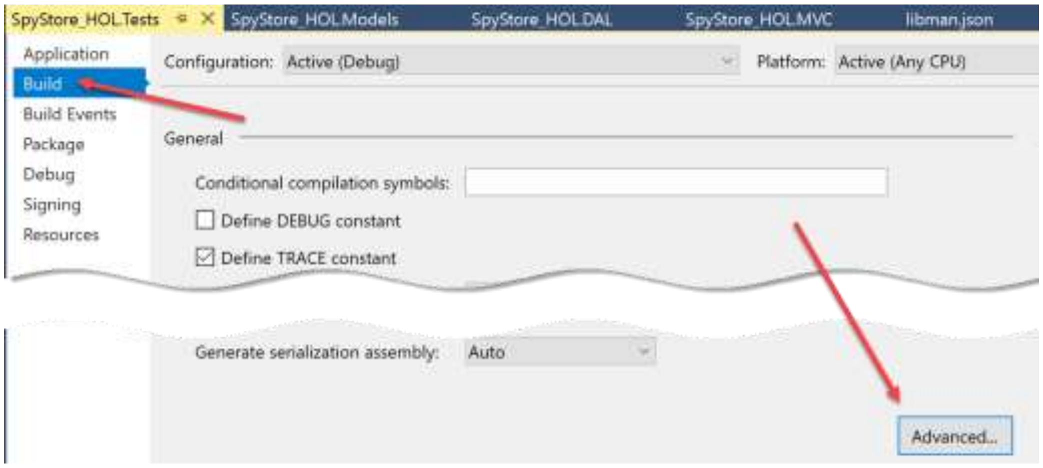
Part 4: Update the C# Version (VS2017/Visual Studio Code)

By default, C# projects created using VS 2017 are set to use the latest Major version. This has been changed for VS 2019, which uses the latest supported minor version by default.

To get all of the latest features of C# 7.x when using VS2017, the projects need to enable the latest Minor version. This can be done with Visual Studio or by editing the project files directly.

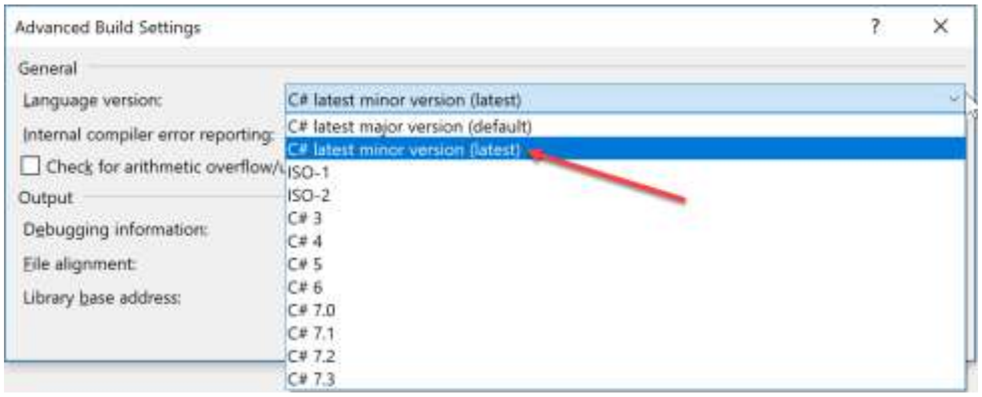
Option 1: Update Using Visual Studio

1) To change to the latest Minor version, right click each project, select Properties, choose the Build tab, and click Advanced (images are from VS2017).



Configuration: Active (Debug)
Platform: Active (Any CPU)
Conditional compilation symbols:
☐ Define DEBUG constant
☑ Define TRACE constant
Generate serialization assembly: Auto

2) Select “C# latest minor version (latest)” in the resulting dialog:



Advanced Build Settings

General

Language version: C# latest minor version (latest)

Internal compiler error reporting:
Check for arithmetic overflow/u
Output
Debugging information:
File alignment:
Library base address:
C# latest major version (default)
C# latest minor version (latest)
ISO-1
ISO-2
C# 3
C# 4
C# 5
C# 6
C# 7.0
C# 7.1
C# 7.2
C# 7.3

Option 2: Update Using the Project File

1) To enable Minor version by editing the project file, add the `LangVersion` tag to the top `PropertyGroup`, as follows (changes in bold):

```
<PropertyGroup>
  <!—ommitted for brevity -->
  <LangVersion>latest</LangVersion>
</PropertyGroup>
```

Summary

This lab created all of the projects for the HOL, added the NuGet packages, and the appropriate references.

Next steps

In the next part of this tutorial series, you will start to build the data access library using Entity Framework Core.