100 XP

Set up the environment

10 minutes

Sandbox activated! Time remaining: 3 hr 53 min

You have used 4 of 10 sandboxes for today. More sandboxes will be available tomorrow.

Choose the ASP.NET Core Identity data store

PostgreSQL [✓ SQL Server]

In this unit, you'll gain an understanding of Identity architecture. You'll start by running a script to set up the module's Linux development environment. The script downloads a cross-platform starter project and provisions Azure resources to support tasks throughout the module. Identity will be added to the starter project. No prior Linux experience is necessary.

This module focuses on just two of the possible EF Core data stores supported by Identity. Use the toggle above to select your preference.

Set up development environment

Run the following command in the command shell. The command reflects your data store choice in the toggle above. Be patient, as setup can take a few minutes to complete. Continue reading while the script runs.

Bash Copy

```bash
. <(wget -q -O - https://aka.ms/secure-aspnet-core-identity-setup) "sql"
```

Tip

You can use the **Copy** button to copy commands to the clipboard. To paste, right-click on a new line in the Cloud Shell window and select **Paste** or use the `Shift+Insert` keyboard shortcut (`⌘+V` on macOS).

The preceding command retrieves and runs a setup script from a GitHub repository. The script completes the following steps:

- Clones the ASP.NET Core starter code from a GitHub repository.
- Builds and deploys an ASP.NET Core web API to supply the web app with data.
- Provisions a database to store Identity framework entities.
- Sets environment variables that are required for this module.
- Displays connection information for the Azure resources.
- Launches the Cloud Shell Editor to view the starter code.

Review ASP.NET Core Identity architecture

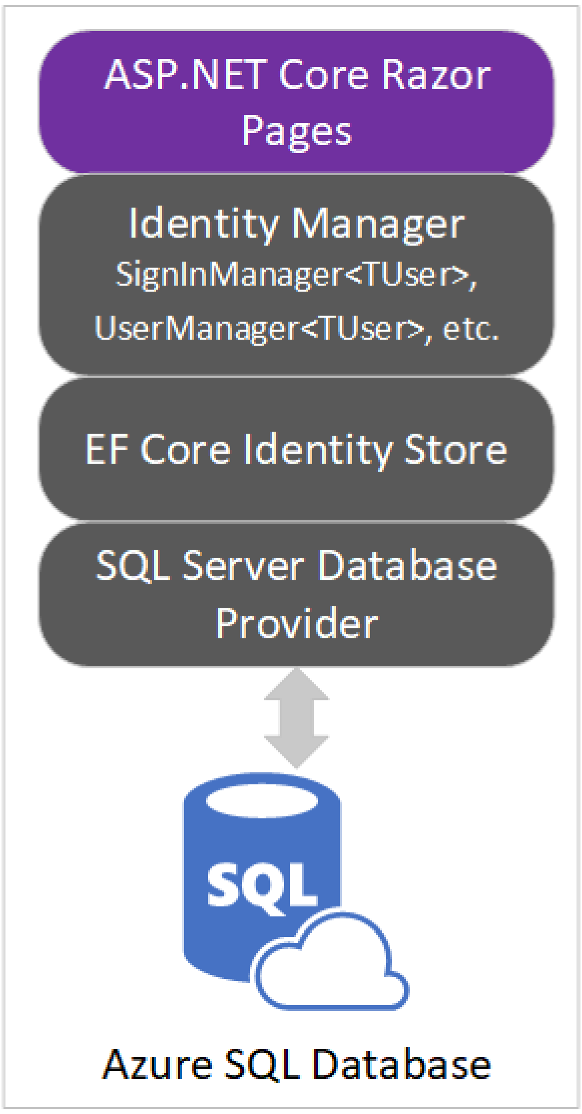
ASP.NET Core Identity is a membership system that adds user registration and login capabilities to an ASP.NET Core web UI. The membership system handles both authentication and authorization concerns. Authentication is concerned with who you are. Authorization is concerned with what you're allowed to do. Authentication is therefore a prerequisite for authorization.

As an alternative to local account creation, Identity supports external login providers such as Facebook and Twitter. User sessions are preserved using cookie-based authentication. By default, a cookie is created upon log in and destroyed upon log out.

Membership data is persisted using a data store and data access technology of your choosing. The default data access technology is an Object-Relational Mapper (O/RM) called Entity Framework (EF) Core. The default data store is SQL Server.

The intricacies of interacting with the underlying database are abstracted away by EF Core. Therefore, EF Core generally makes it possible to use any of its database providers with Identity. Database providers are available for PostgreSQL, SQLite, and several other data stores. PostgreSQL, however, is a third-party provider and is therefore not eligible for support from Microsoft. Identity also provides the flexibility to use a data access technology of your choosing. Dapper is one popular alternative.

The following diagram depicts the Identity architecture used in this module:



In the preceding diagram:

- The *ASP.NET Core Razor Pages* app represents the web UI to which Identity support will be added in this module.
- The *Identity Manager* layer contains classes used from the `Microsoft.AspNetCore.Identity` namespace. Examples of such classes used explicitly in this module are `SignInManager<TUser>` and `UserManager<TUser>`.
- The *EF Core Identity Store* layer contains classes from the `Microsoft.AspNetCore.Identity.EntityFrameworkCore` namespace. An example of such a class used implicitly in this module is `UserStore<TUser>`.
- The *Database Provider* is a database-specific library that accepts SQL from the *EF Core Provider* (not pictured) and executes it.

Review project requirements

Your stakeholders have defined the following business requirements:

- There are two types of authenticated users for the system: employees and administrators.
- Anonymous users aren't allowed to view the product catalog.
- Employees can only view the product catalog.
- Administrators can modify products.
- Upon successful login, the user's first and last name should appear in the app's header.

Your development team makes the following technical decisions:

- Identity data should be isolated in its own database.
- The database tables supporting Identity should belong to the default schema.
- Administrators will self-enroll using a single-use token.
- The app must support logging in with multi-factor authentication using a TOTP authenticator app.
- The database credentials should be stored in Azure Key Vault.

Review starter code

The app consists of a single ASP.NET Core Razor Pages project named *ContosoPets.Ui*. The project contains the user interface for viewing and managing product data. The product data is obtained via an external ASP.NET Core web API.

Of particular interest are the following files and directories in *ContosoPets.Ui*:

Name	Description
Controllers/AdminTokenController.cs	Exposes `AdminRegistrationTokenService` as an HTTP endpoint. Unused until Unit 6.
Pages/Products/	Contains web UI for CRUD operations.
Services/AdminRegistrationTokenService.cs	Generates tokens allowing administrators to self-register. Unused until Unit 6.
Services/ProductService.cs	Manages all interactions with the external ASP.NET Core web API.
Services/QRCodeService.cs	Manages the creation of QR codes for supporting multi-factor authentication. Unused until Unit 5.
wwwroot/js/product.js	Enables deletion of a product from *Pages/Products/Index.cshtml* without a server-side postback.

Name	Description
Program.cs	Serves as the app's main entry point and registers the Azure Key Vault configuration provider.
Startup.cs	Configures services and the app's HTTP request pipeline.

Note

Azure Key Vault is used to securely store and retrieve sensitive data. The starter code implements it to demonstrate one possible way to secure database credentials. It's unrelated to Identity and therefore out of scope for this module. See the `ConfigureKeyVault` method in the *Program.cs* file for the Key Vault registration code.

Verify database connectivity

Run the following command:

Bash Copy

```bash
db -Q "SELECT TABLE_NAME FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_SCHEMA='dbo'
ORDER BY TABLE_NAME" -Y 25
```

The script created a `db` alias. The alias corresponds to `sqlcmd` with `-U` (username), `-P` (password), `-S` (server hostname), and `-d` (database name) options. sqlcmd is a cross-platform command-line tool for administering and querying SQL Server databases. The preceding command retrieves a list of non-system tables from the Azure SQL Database that was created earlier.

As expected, the list is empty because there are no tables in the database's `dbo` schema.

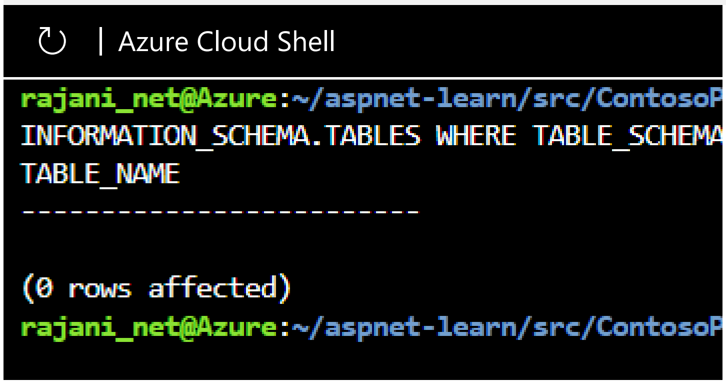
Console Copy

```console
TABLE_NAME
-------------------------

(0 rows affected)
```

Next unit: Exercise - Configure Identity support

Continue >


Azure Cloud Shell

```
rajani_net@Azure:~/aspnet-learn/src/ContosoP
INFORMATION_SCHEMA.TABLES WHERE TABLE_SCHEMA
TABLE_NAME
-------------------------

(0 rows affected)
rajani_net@Azure:~/aspnet-learn/src/ContosoP
```