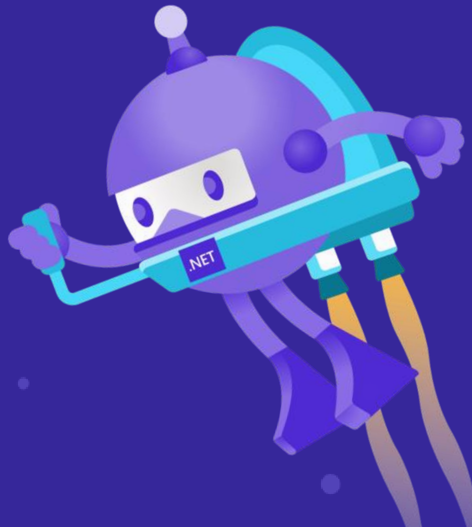
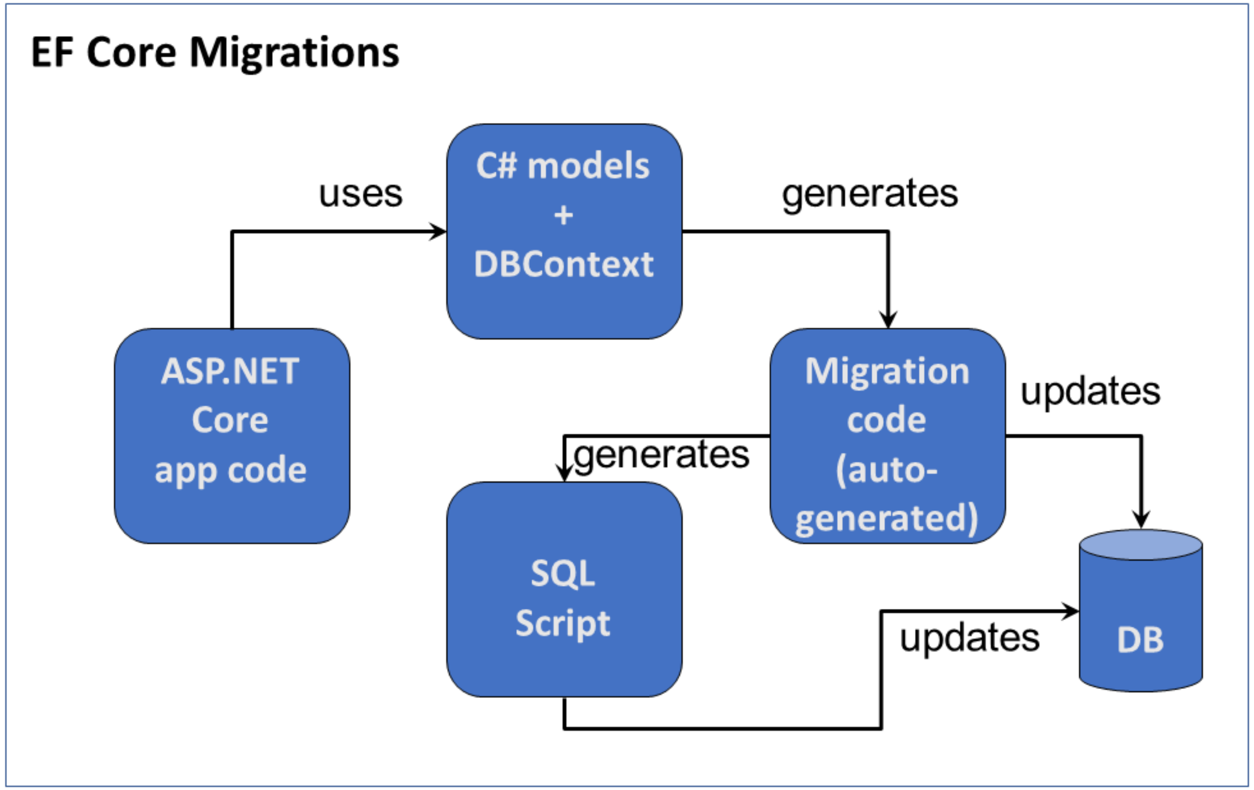
Day 13 : EF – Customizations & Migrations



Migrations

- Provides a way to incrementally update the database schema to keep it in sync with the entities



EF Core Migrations - Tools

- Package Manager Console in Visual Studio

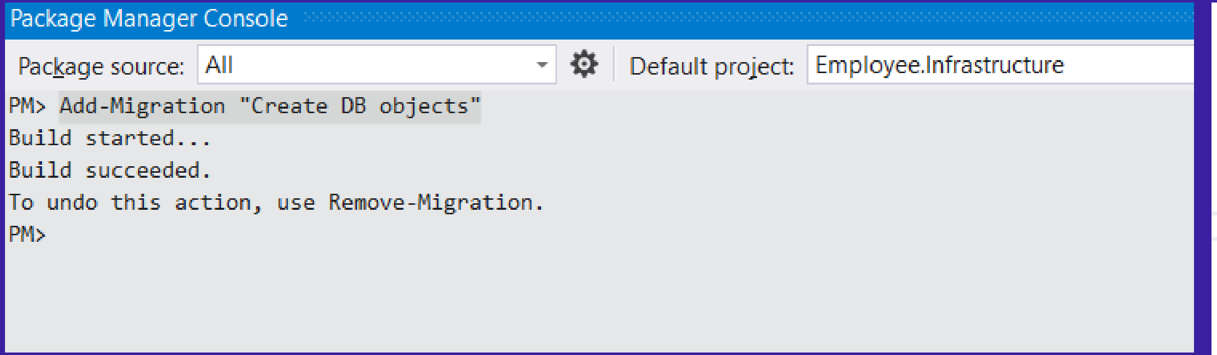
```
Install-Package Microsoft.EntityFrameworkCore.Tools
```

- Command Line tools
  - Runs from the command line
  - Visual Studio is not a requirement
  - No additional installation is needed in v2.1 and newer, tools will be included with the SDK itself

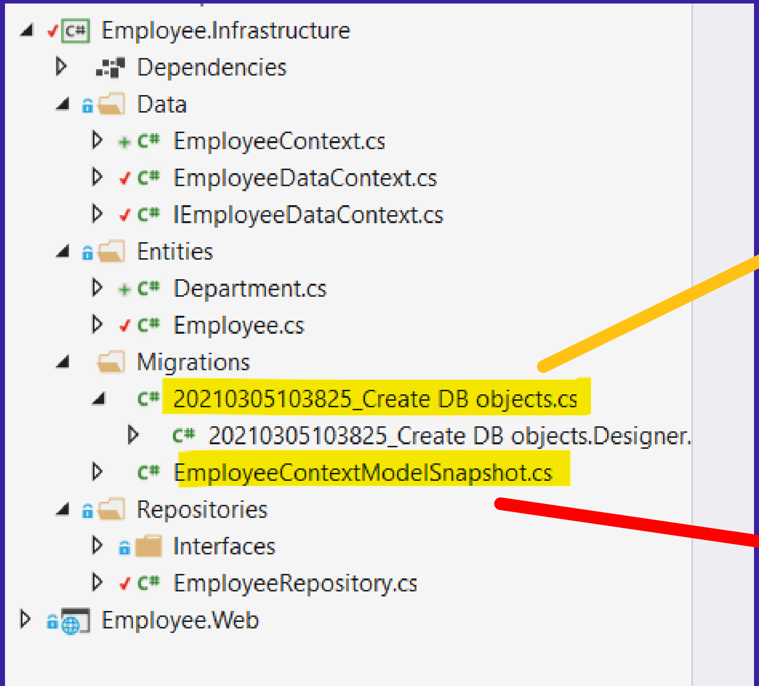
Migration Commands

PMC Command	CLI Commands	Remarks
Add-Migration	dotnet ef migrations add	Adds a new migration.
Drop-Database	dotnet ef database drop	Drops the database
Get-DbContext	dotnet ef dbcontext info	Gets information about a DbContext type.
Remove-Migration	dotnet ef migrations remove	Removes the last migration
Scaffold-DbContext	dotnet ef dbcontext scaffold	Scaffolds a DbContext and entity types for a database.
Script-Migration	dotnet ef migrations script	Generates a SQL script from migrations.
Update-Database	dotnet ef database update	Updates the database
NA	dotnet ef dbcontext list	Lists available DbContext types.
NA	dotnet ef migrations list	Lists available migrations.

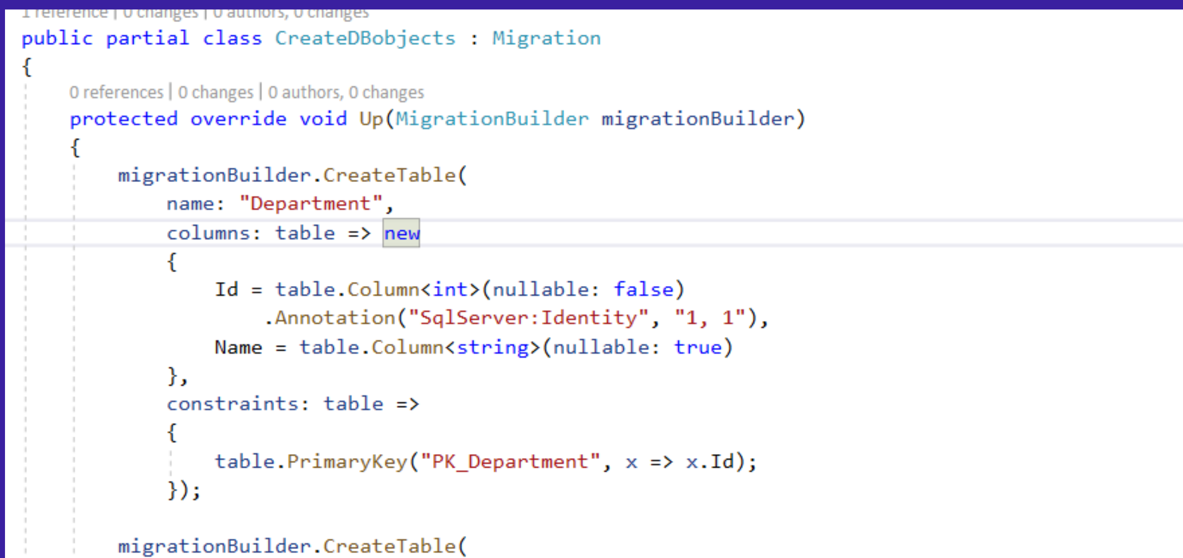
Adding Migrations



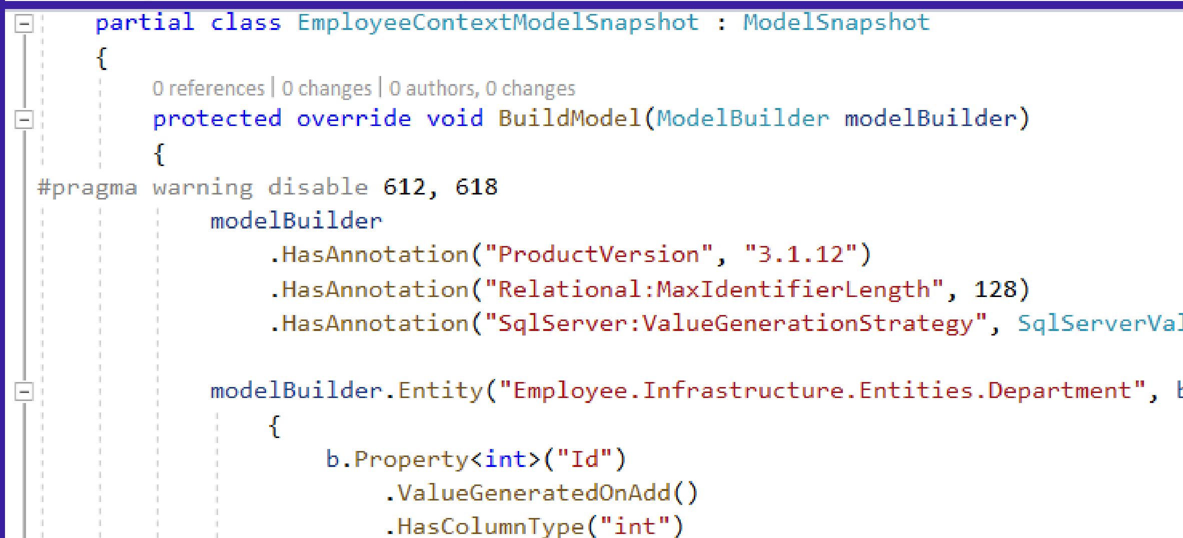
```
PM> Add-Migration "Create DB objects"
Build started...
Build succeeded.
To undo this action, use Remove-Migration.
PM>
```



```
◢ Employee.Infrastructure
    ▷ Dependencies
    ◢ Data
        ▷ EmployeeContext.cs
        ▷ EmployeeDataContext.cs
        ▷ IEmployeeDataContext.cs
    ◢ Entities
        ▷ Department.cs
        ▷ Employee.cs
    ◢ Migrations
        ◢ 20210305103825_Create DB objects.cs
            ▷ 20210305103825_Create DB objects.Designer.
        ▷ EmployeeContextModelSnapshot.cs
    ◢ Repositories
        ▷ Interfaces
        ▷ EmployeeRepository.cs
▷ Employee.Web
```



```
1 reference | 0 changes | 0 authors, 0 changes
public partial class CreateDBobjects : Migration
{
    0 references | 0 changes | 0 authors, 0 changes
    protected override void Up(MigrationBuilder migrationBuilder)
    {
        migrationBuilder.CreateTable(
            name: "Department",
            columns: table => new
            {
                Id = table.Column<int>(nullable: false)
                    .Annotation("SqlServer:Identity", "1, 1"),
                Name = table.Column<string>(nullable: true)
            },
            constraints: table =>
            {
                table.PrimaryKey("PK_Department", x => x.Id);
            });

        migrationBuilder.CreateTable(
```

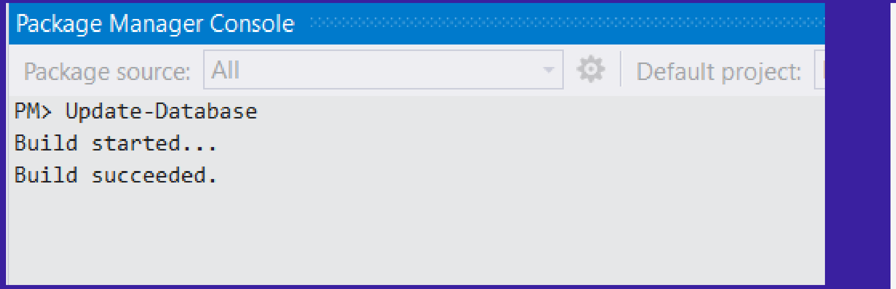


```
    partial class EmployeeContextModelSnapshot : ModelSnapshot
    {
        0 references | 0 changes | 0 authors, 0 changes
        protected override void BuildModel(ModelBuilder modelBuilder)
        {
#pragma warning disable 612, 618
            modelBuilder
                .HasAnnotation("ProductVersion", "3.1.12")
                .HasAnnotation("Relational:MaxIdentifierLength", 128)
                .HasAnnotation("SqlServer:ValueGenerationStrategy", SqlServerVal

            modelBuilder.Entity("Employee.Infrastructure.Entities.Department", b
                {
                    b.Property<int>("Id")
                        .ValueGeneratedOnAdd()
                        .HasColumnType("int")
```

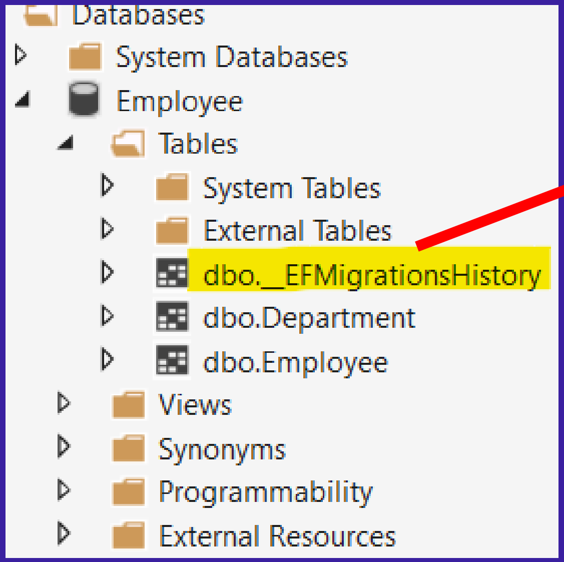
Updating Database

- *Add-Migration* only creates the migration package

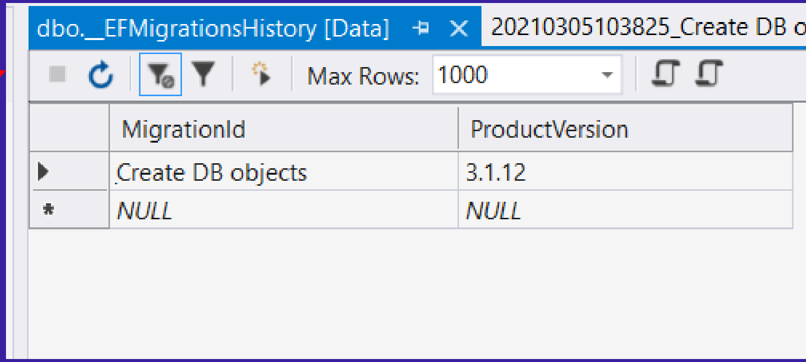
- To apply the changes to the database, *Update-Database* command is used



```
PM> Update-Database
Build started...
Build succeeded.
```

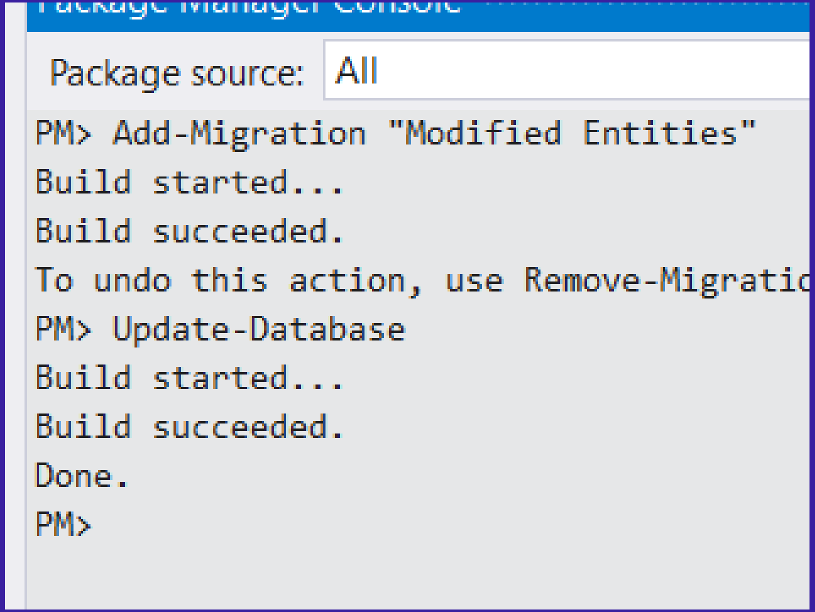


```
Databases
  System Databases
  Employee
    Tables
      System Tables
      External Tables
      dbo.__EFMigrationsHistory
      dbo.Department
      dbo.Employee
    Views
    Synonyms
    Programmability
    External Resources
```



MigrationId	ProductVersion
Create DB objects	3.1.12
NULL	*NULL*

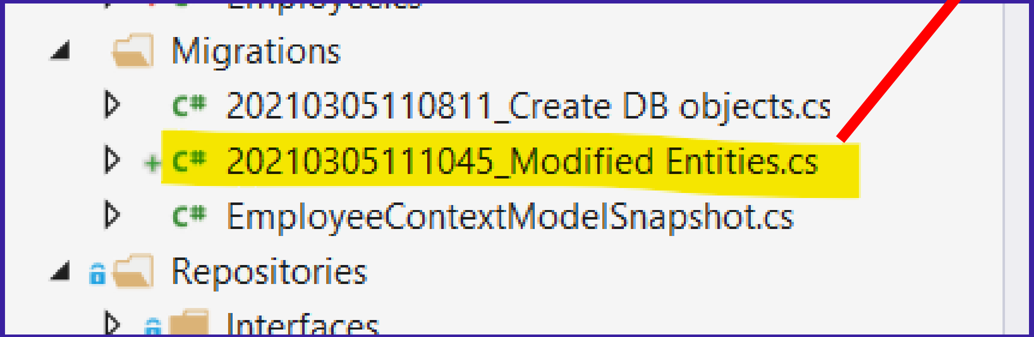
Managing Updates



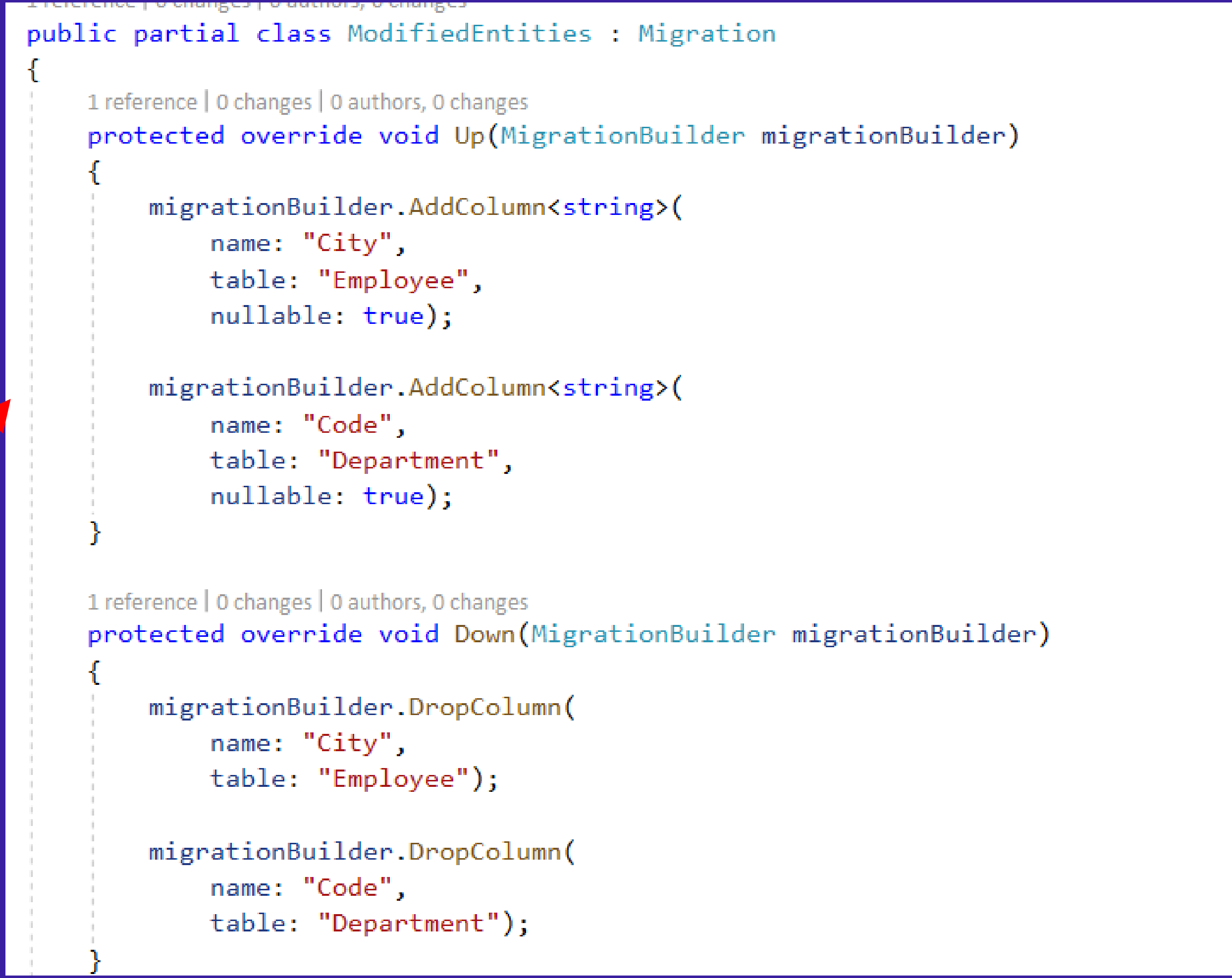
Package Manager Console

Package source: All

```
PM> Add-Migration "Modified Entities"
Build started...
Build succeeded.
To undo this action, use Remove-Migratic
PM> Update-Database
Build started...
Build succeeded.
Done.
PM>
```



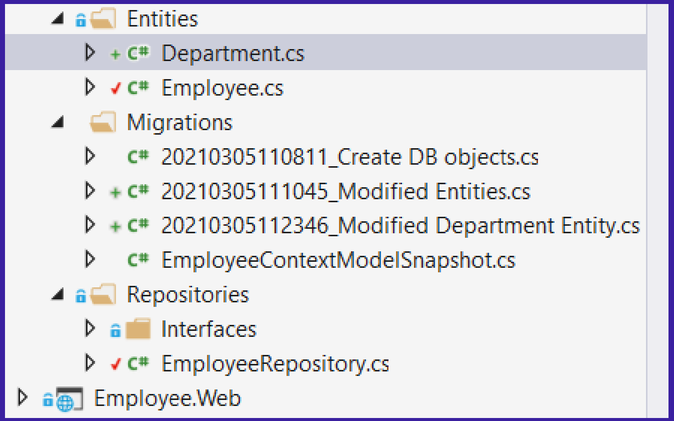
```
Employees
◢ Migrations
    ▷ C# 20210305110811_Create DB objects.cs
    ▷ + C# 20210305111045_Modified Entities.cs
    ▷ C# EmployeeContextModelSnapshot.cs
◢ Repositories
    ▷ Interfaces
```

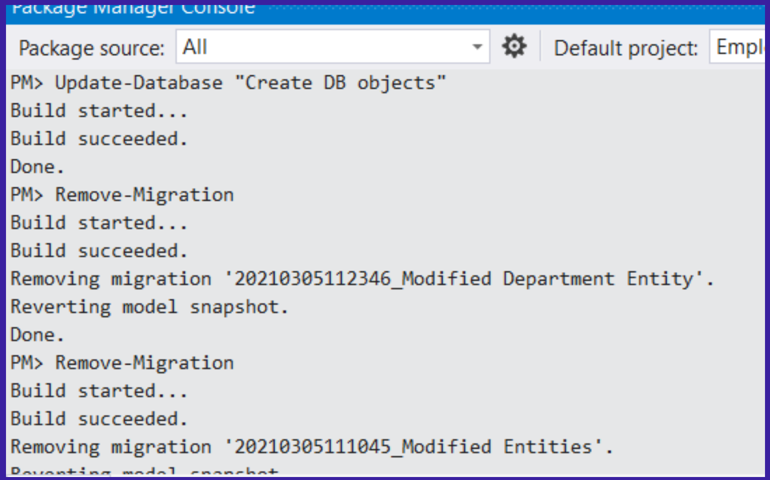


```
1 reference | 0 changes | 0 authors, 0 changes
public partial class ModifiedEntities : Migration
{
    1 reference | 0 changes | 0 authors, 0 changes
    protected override void Up(MigrationBuilder migrationBuilder)
    {
        migrationBuilder.AddColumn<string>(
            name: "City",
            table: "Employee",
            nullable: true);

        migrationBuilder.AddColumn<string>(
            name: "Code",
            table: "Department",
            nullable: true);
    }

    1 reference | 0 changes | 0 authors, 0 changes
    protected override void Down(MigrationBuilder migrationBuilder)
    {
        migrationBuilder.DropColumn(
            name: "City",
            table: "Employee");

        migrationBuilder.DropColumn(
            name: "Code",
            table: "Department");
    }
```

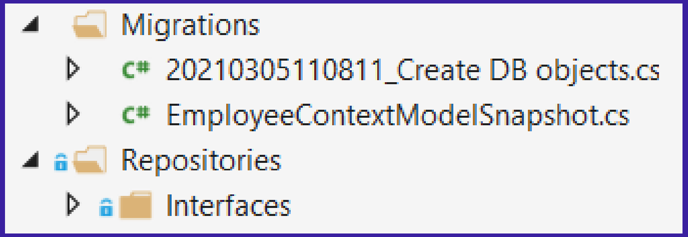
Reverting Migrations

- Use ***Update-Database*** command to revert the changes in the DB
- Then remove the migration details using ***Remove-Migrations*** command


Entities
Department.cs
Employee.cs
Migrations
20210305110811_Create DB objects.cs
20210305111045_Modified Entities.cs
20210305112346_Modified Department Entity.cs
EmployeeContextModelSnapshot.cs
Repositories
Interfaces
EmployeeRepository.cs
Employee.Web

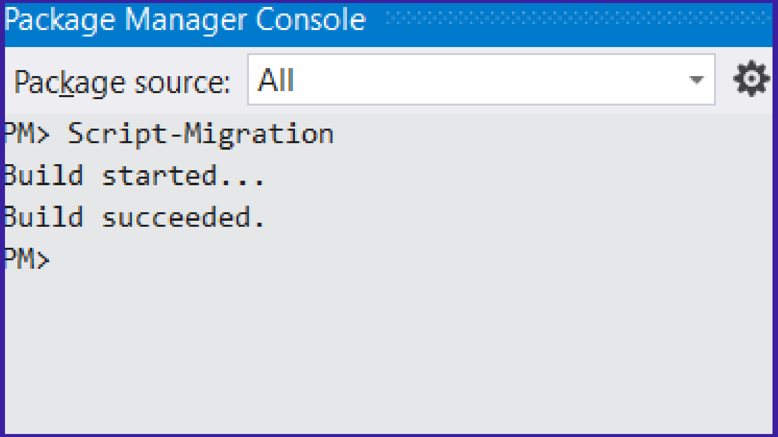


```
PM> Update-Database "Create DB objects"
Build started...
Build succeeded.
Done.
PM> Remove-Migration
Build started...
Build succeeded.
Removing migration '20210305112346_Modified Department Entity'.
Reverting model snapshot.
Done.
PM> Remove-Migration
Build started...
Build succeeded.
Removing migration '20210305111045_Modified Entities'.
Reverting model snapshot.
```


Migrations
20210305110811_Create DB objects.cs
EmployeeContextModelSnapshot.cs
Repositories
Interfaces

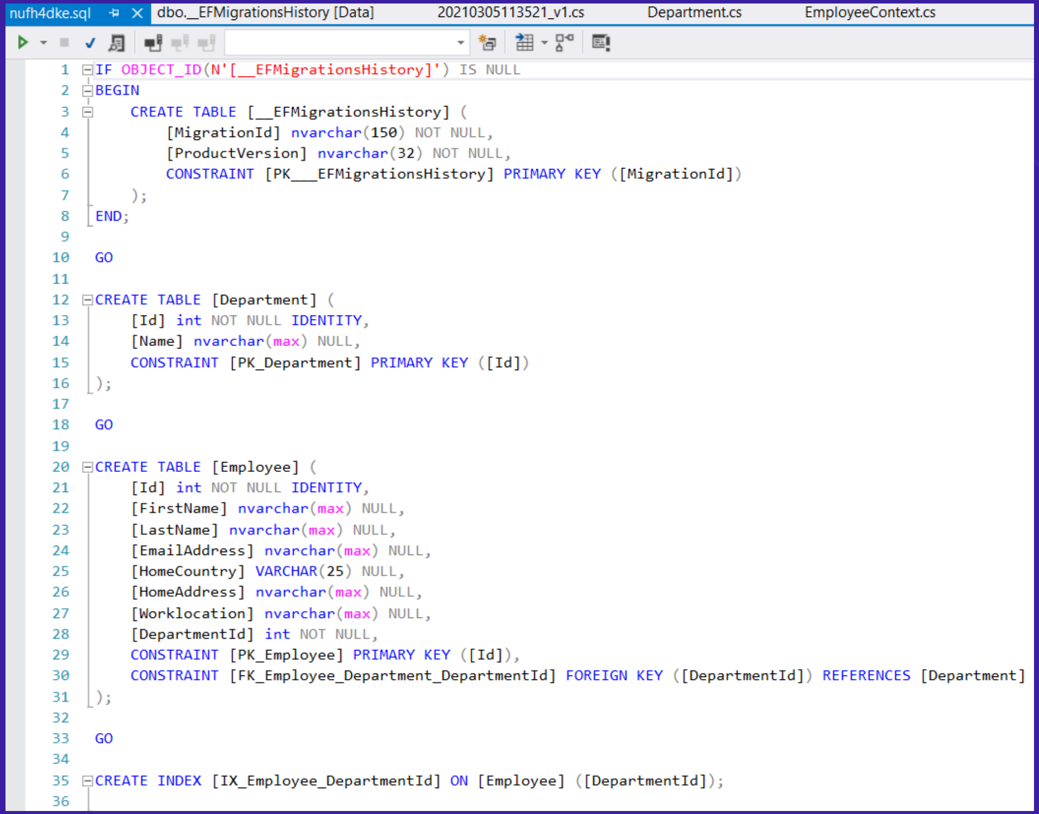
Generate Migration Script

- ***script-migration*** is used to generate the raw SQL statements for your migrations



Package source: All

```
PM> Script-Migration
Build started...
Build succeeded.
PM>
```

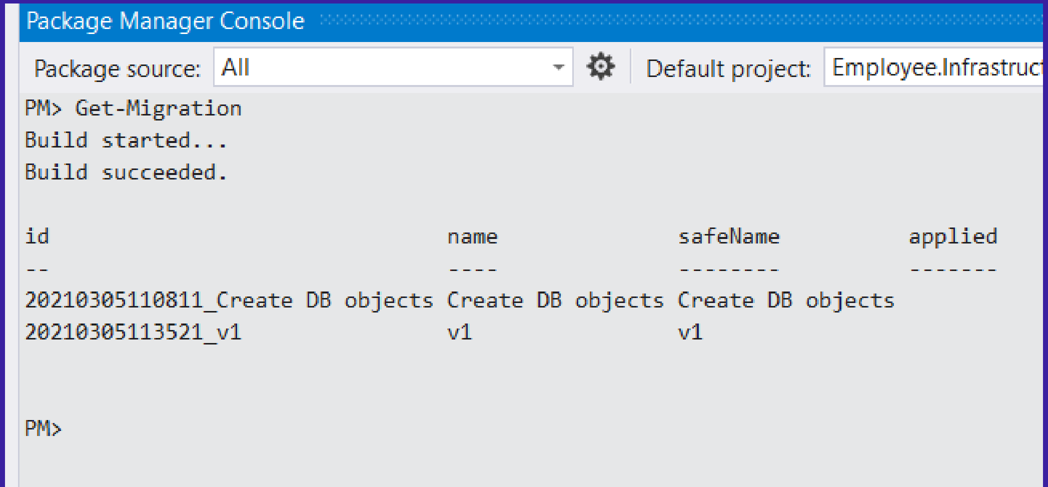


```sql
IF OBJECT_ID(N'[__EFMigrationsHistory]') IS NULL
BEGIN
    CREATE TABLE [__EFMigrationsHistory] (
        [MigrationId] nvarchar(150) NOT NULL,
        [ProductVersion] nvarchar(32) NOT NULL,
        CONSTRAINT [PK___EFMigrationsHistory] PRIMARY KEY ([MigrationId])
    );
END;

GO

CREATE TABLE [Department] (
    [Id] int NOT NULL IDENTITY,
    [Name] nvarchar(max) NULL,
    CONSTRAINT [PK_Department] PRIMARY KEY ([Id])
);

GO

CREATE TABLE [Employee] (
    [Id] int NOT NULL IDENTITY,
    [FirstName] nvarchar(max) NULL,
    [LastName] nvarchar(max) NULL,
    [EmailAddress] nvarchar(max) NULL,
    [HomeCountry] VARCHAR(25) NULL,
    [HomeAddress] nvarchar(max) NULL,
    [Worklocation] nvarchar(max) NULL,
    [DepartmentId] int NOT NULL,
    CONSTRAINT [PK_Employee] PRIMARY KEY ([Id]),
    CONSTRAINT [FK_Employee_Department_DepartmentId] FOREIGN KEY ([DepartmentId]) REFERENCES [Department]
);

GO

CREATE INDEX [IX_Employee_DepartmentId] ON [Employee] ([DepartmentId]);

```

Get-Migration

Other Commands

- Listing migrations
  - Get-Migration



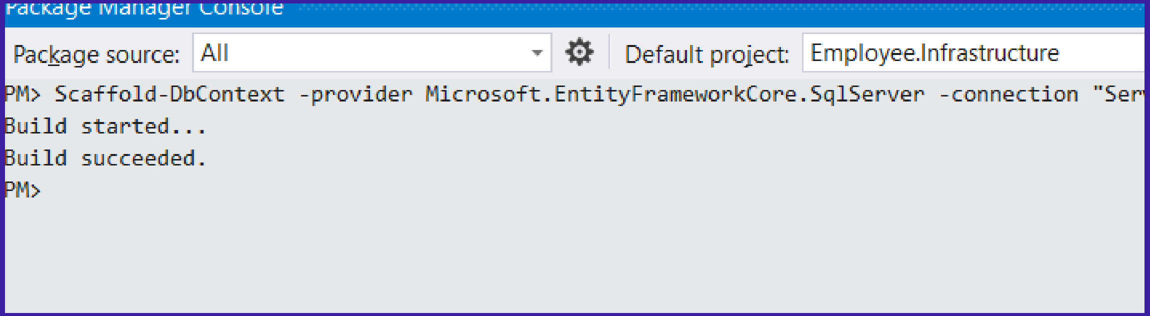
Package source: All

Default project: Employee.Infrastruct

```
PM> Get-Migration
Build started...
Build succeeded.

id                              name              safeName          applied
--                              ----              --------          -------
20210305110811_Create DB objects Create DB objects Create DB objects
20210305113521_v1               v1                v1


PM>
```

Reverse Engineering

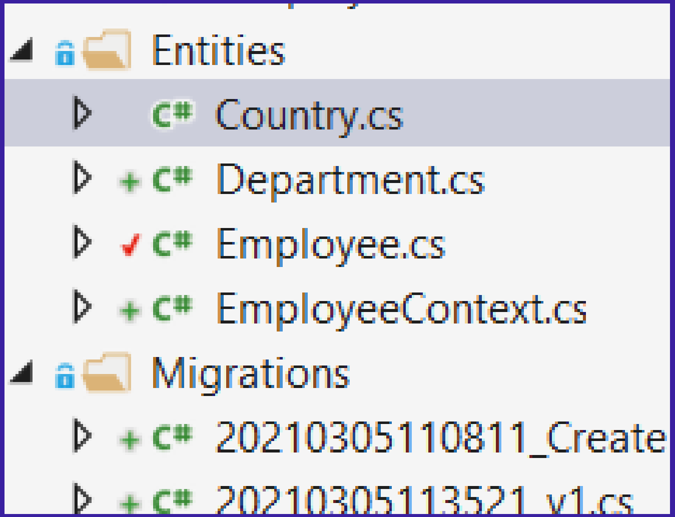
- Create entity for existing table
- `Scaffold-DbContext -provider <provider name> -connection <connection-string> -outputdir <output dir> -Tables <Table names>`



Package source: All

Default project: Employee.Infrastructure

```
PM> Scaffold-DbContext -provider Microsoft.EntityFrameworkCore.SqlServer -connection "Ser
Build started...
Build succeeded.
PM>
```



Thanks for joining!