Automated Testing with EF Core

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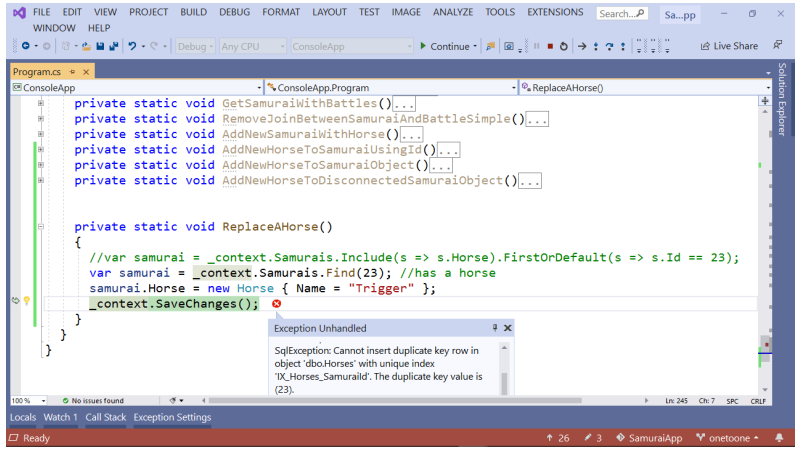
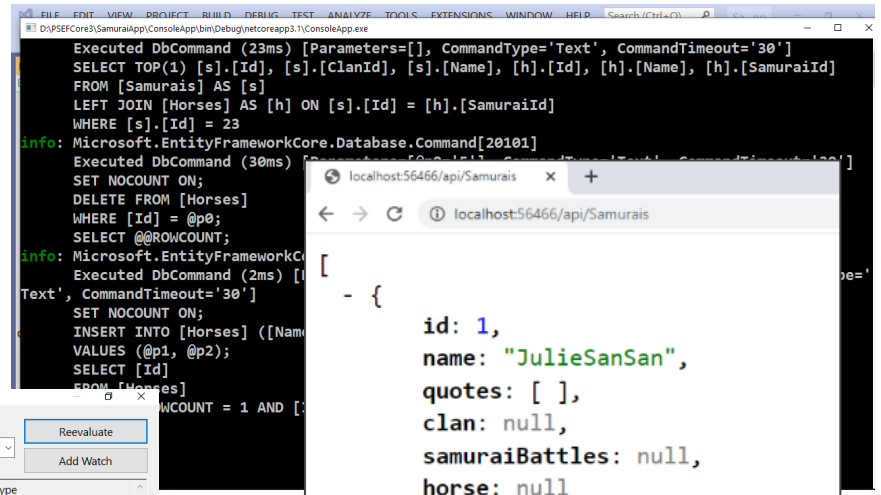
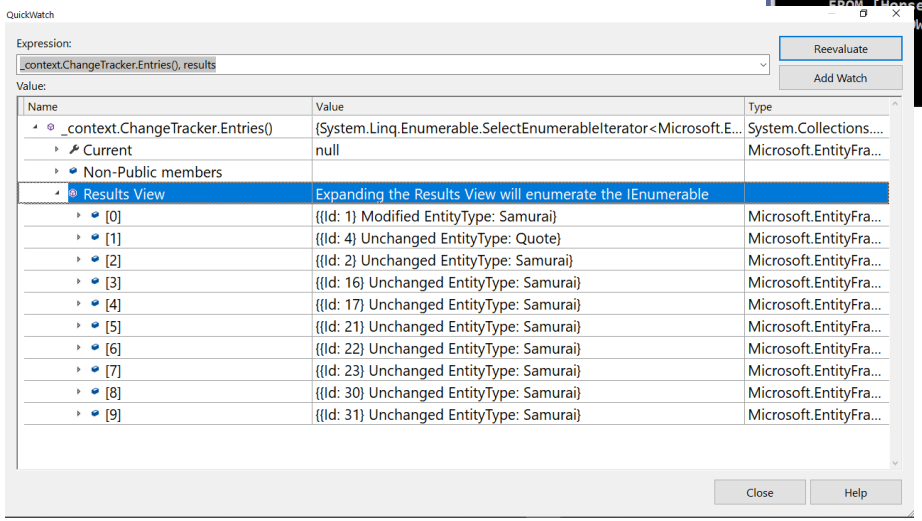
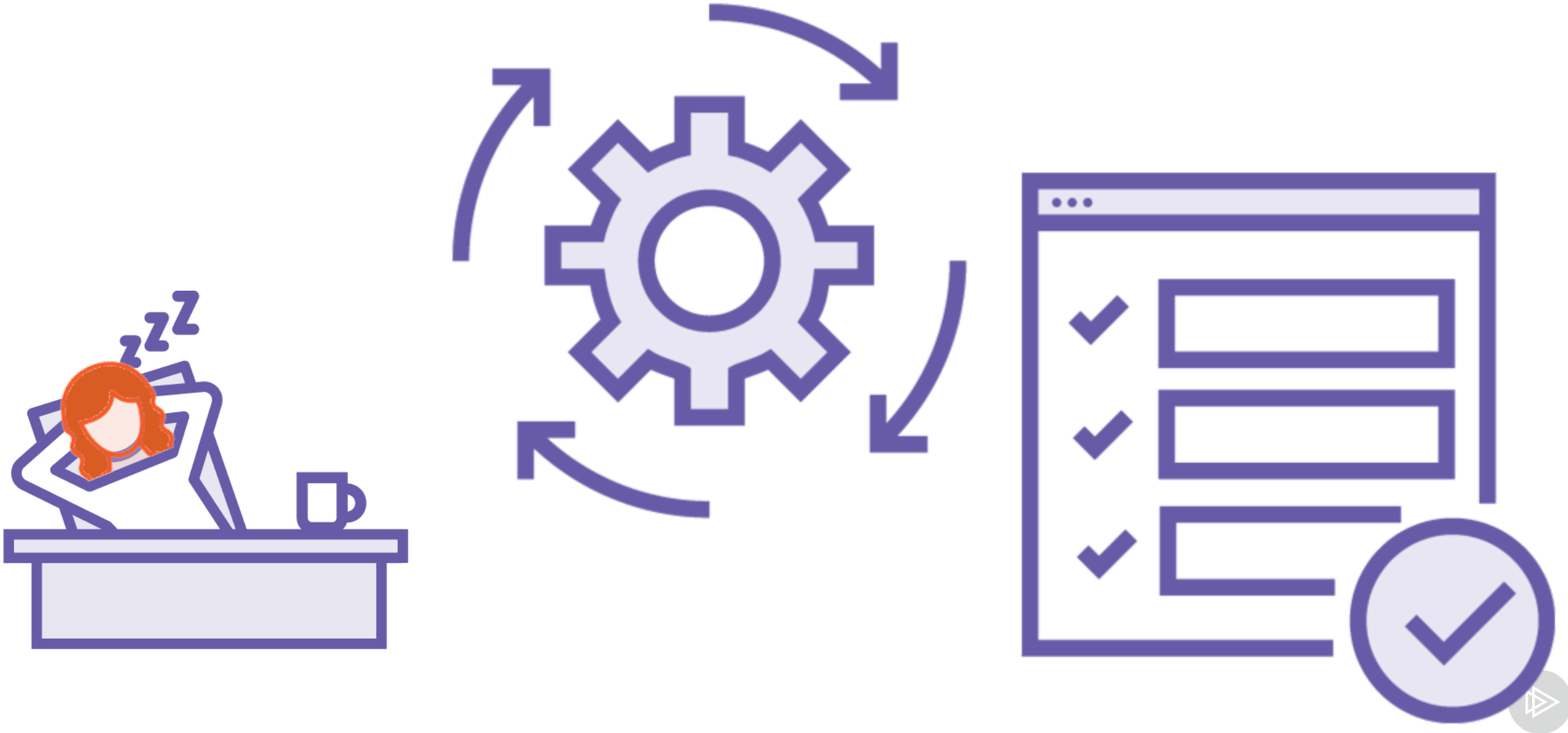
Manual Testing







Automated Testing



Module Overview

- Super quick testing intro
- What does it mean to test EF Core?
- Writing tests that use a database
- Writing tests to use an in-memory database
- Testing EF Core used in your apps
- Testing EF Core when used in a web app
- Refactor demos for testability
- Learn about structure of testable apps

A Very Quick Testing Overview

Common Types of Automated Tests

Unit Test

Test small units of your own code

```
public class Person
{
  public Person(string first, string last)
  {
    FirstName = first;
    LastName = last;
  }
  public string FirstName { get; }
  public string LastName { get; }
}
```

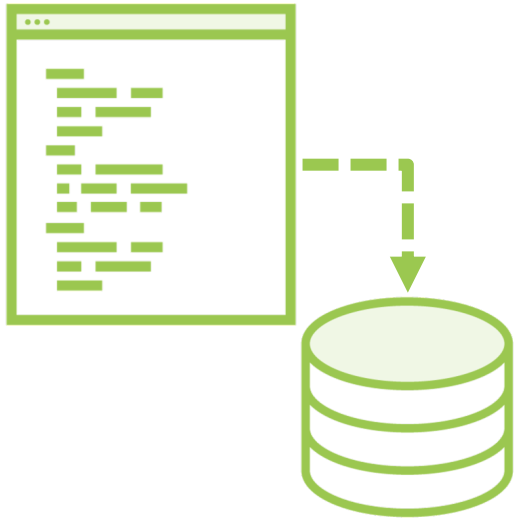
```
var person = new Person("Maria", "Adigun");
```

```
Is person.FirstName==“Maria” ?
Is person.LastName==“Adigon” ?
```

Common Types of Automated Tests

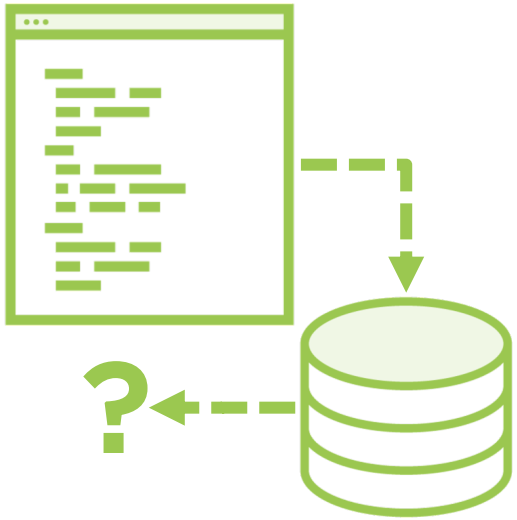
Unit Test

Test small units of your own code



Integration Test

Test that your logic interacts with other services or modules



Functional Test

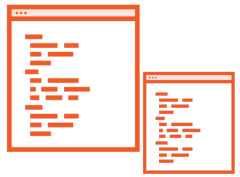
Verify results of interaction

Many other types of automated testing

Understanding What We Mean by “Testing EF Core”

Testing EF Core Directly or Indirectly

Validate your DbContext against the database



Validate your business logic against the DbContext

Validate your business logic that uses the DbContext and database

Creating Your First Test and Using It Against the Database

Exploring Test Results & Performance Considerations

When Your Database Server Is a Resource Hog

Use SQL Server

Need to test specific behaviors of the target database

SQLite or SQL CE

Need to test generic SQL database behaviors

EF Core's InMemory DB

Need to test EF Core behavior or biz logic that uses EF Core

Using the InMemory Provider in Place of a Database Provider

Microsoft.EntityFramework.InMemory

- Emulates RDBMS via in-memory lists
- Handles generic RDBMS scenarios
- Great alternative for test mocks
- Requires mods to our existing solution

Writing Your First Test with the InMemory Provider

InMemoryDatabase Connection String

```
public void Test1()
{

  builder
   .UseInMemoryDatabase("Test1DB");
```

Test1DB is a fresh, empty, unique in memory database

```
public void TestX()
{
   builder
   .UseInMemoryDatabase("TestXYDB");


public void TestY()
{
   builder
   .UseInMemoryDatabase("TestXYDB");
```

TestXYDB is a fresh database in the first method, and will get reused in the second

Refactoring and Testing Some Console App Logic

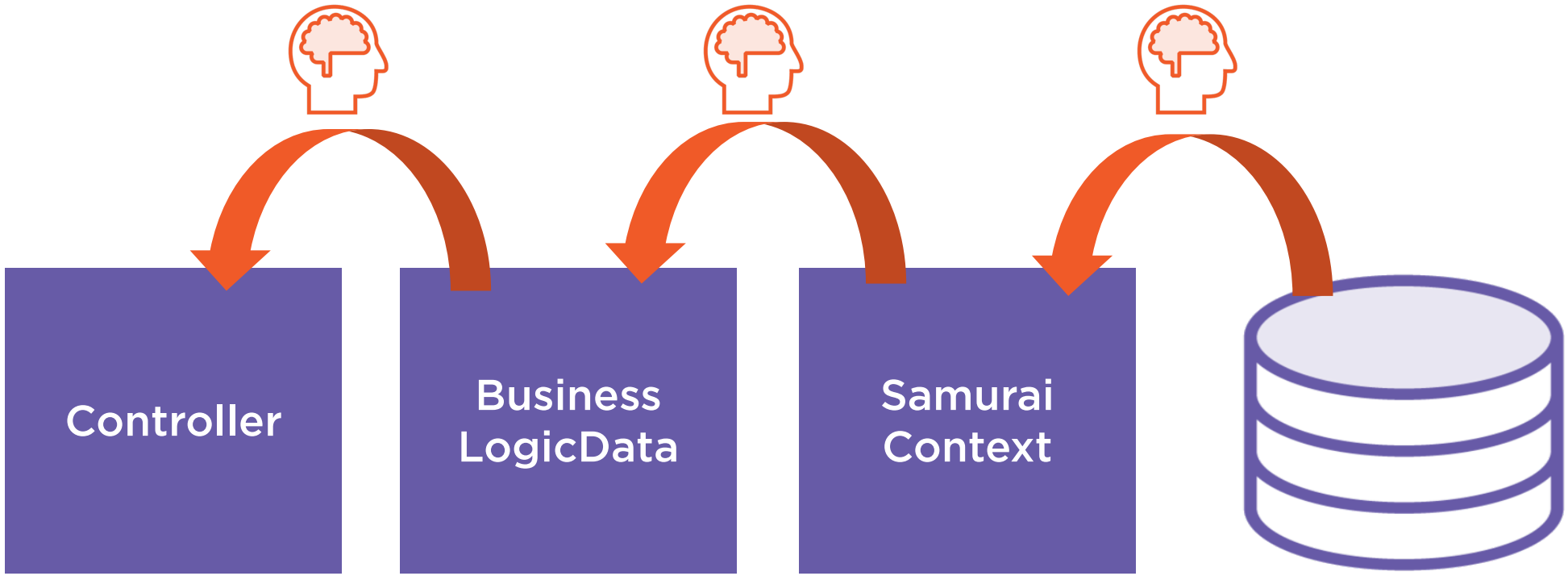
Re-using an InMemory Provider Database

Testing EF Core in an ASP.NET Core App

Testing the API's DbContext Configuration

Deep Integration/Interaction Testing

API
Configuration



Deep Integration/Interaction Testing

API
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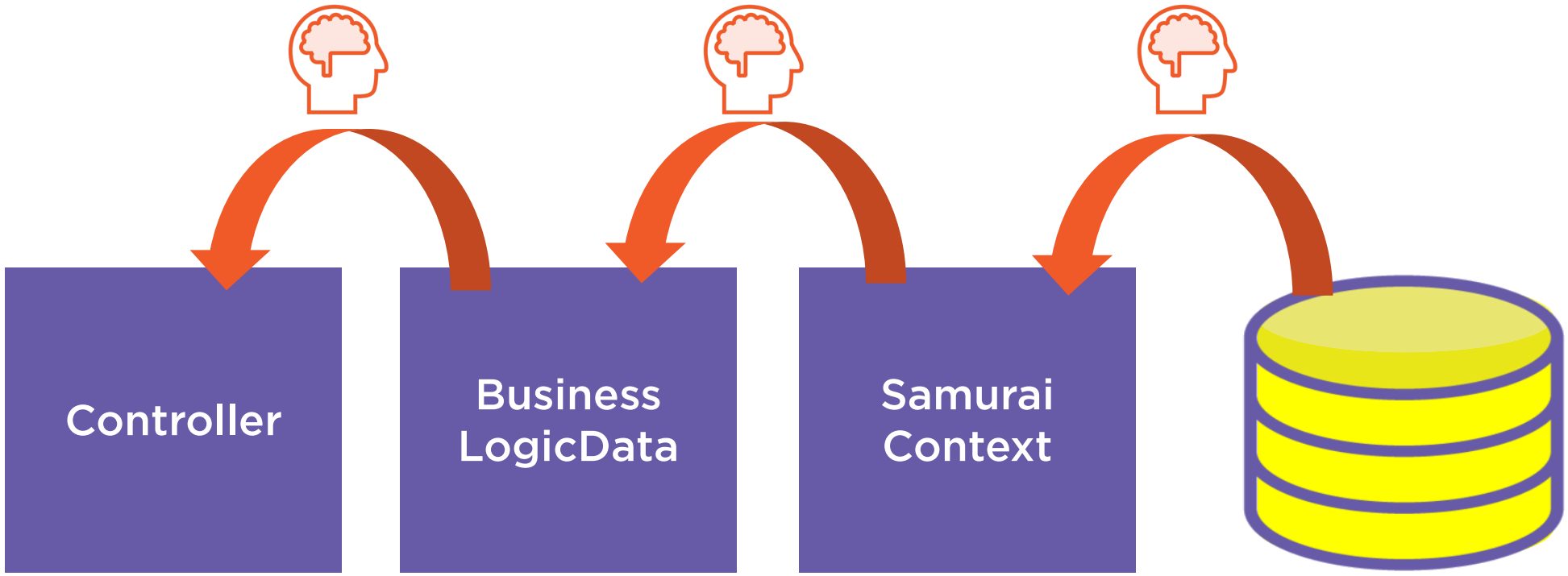

Review

- Testing is an important skill
- Verify that EF Core comprehends your DbContext mappings
- Testing against the app's database is not always necessary or efficient
- Substitute with lighter db or InMemory provider
- Test only logic that uses EF Core
- Test full integration of app with EF Core

Resources

Entity Framework Core on GitHub github.com/aspnet/entityframework

EF Core Documentation docs.microsoft.com/ef

Microsoft Docs on ASP.NET Core Testing
docs.microsoft.com/en-us/aspnet/core/test/integration-tests?view=aspnetcore-3.1

Course: Automated Testing for Fraidy Cats Like Me bit.ly/PS_Testing

Entity Framework Core: Getting Started

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