Understanding Foundational Architectural Principles

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Overview

Foundational design principles

Understanding Clean Architecture

Foundational Architectural Principles

Important Design Principles

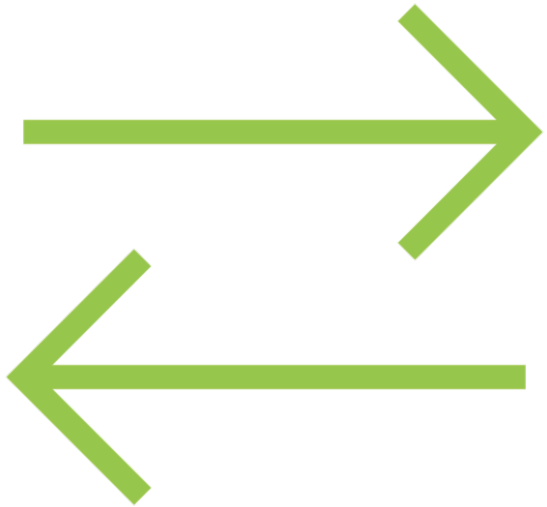
Dependency inversion

Separation of concerns

Single responsibility

DRY

Persistence ignorance



Dependency Inversion

- Decoupling modules

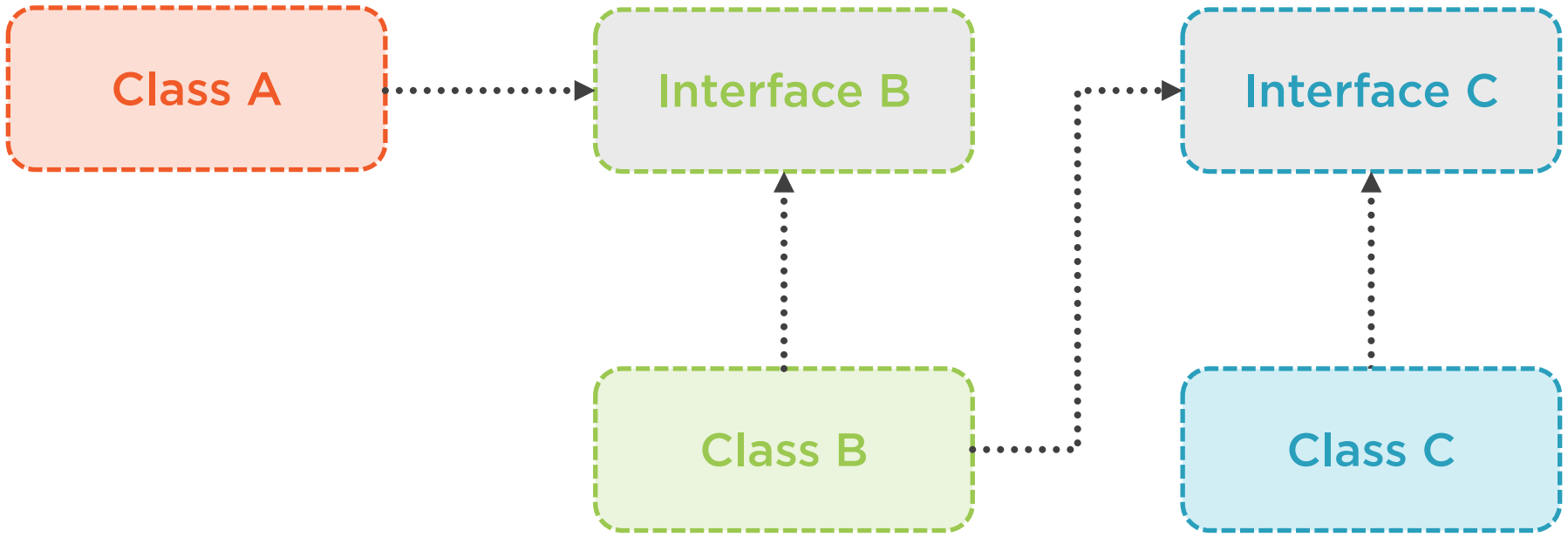
Dependencies should be pointing to abstractions

- Typically top to bottom

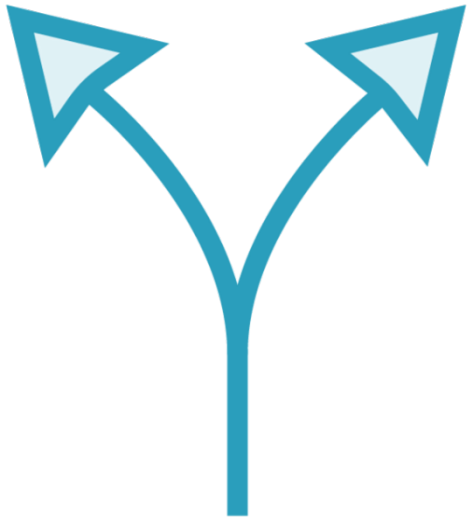
Helps with building more loosely-coupled applications

Typical Approach

Adding Dependency Inversion



Separation of Concerns



Split into blocks of functionality

- Each covering a concern

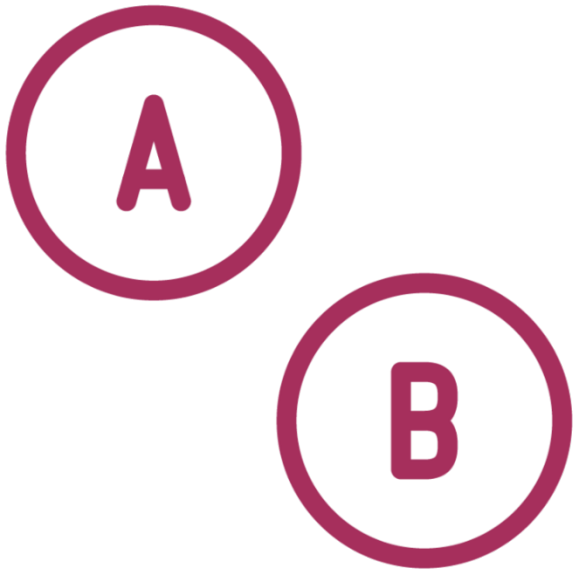
More modular code

- Encapsulation within a module

Typical layered application

Easier to maintain

Single Responsibility



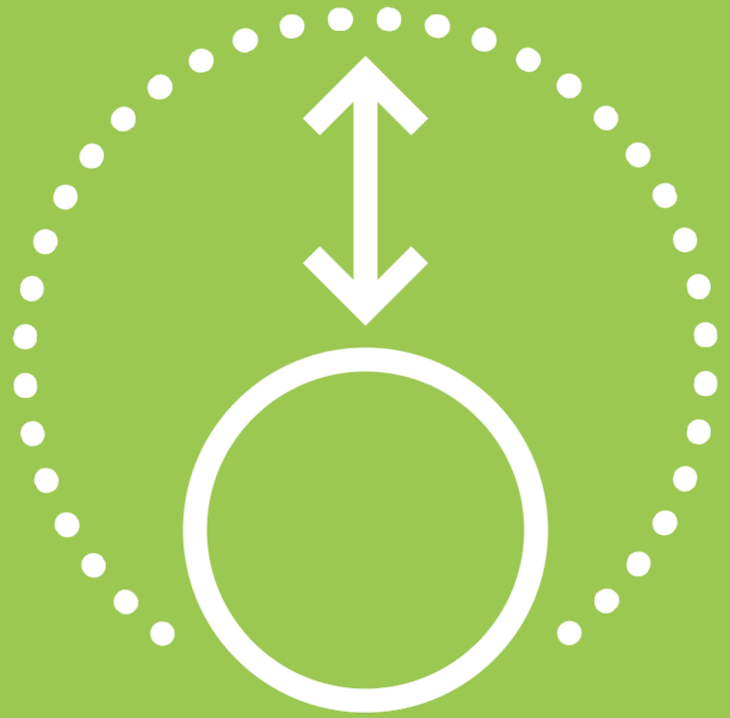
OO terminology

Each block should just have one single responsibility which it encapsulates

More, new classes are created

Can be extended to application-level

- Different layers have their own responsibility



DRY

(aka Don’t Repeat Yourself)

Less code repetition

Easier to make changes

Persistence Ignorance

- POCO
- Domain classes shouldn't be impacted by how they are persisted

Typically required base class or attributes

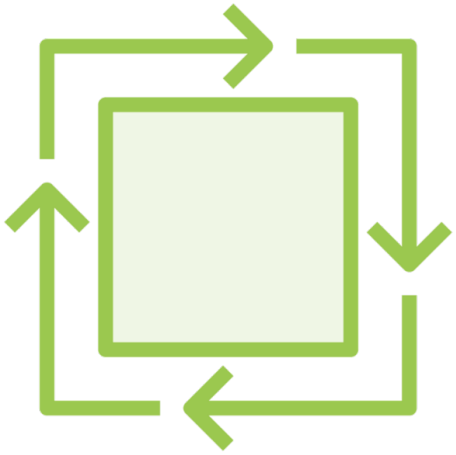
Foundational Patterns

These will come in useful

throughout this entire course!

Understanding Clean Architecture

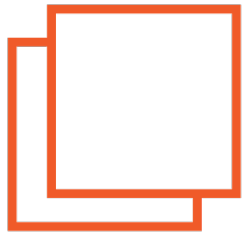
Different Types of Application Architecture



All-in-one architecture

All-in-one Architecture

File → New Project

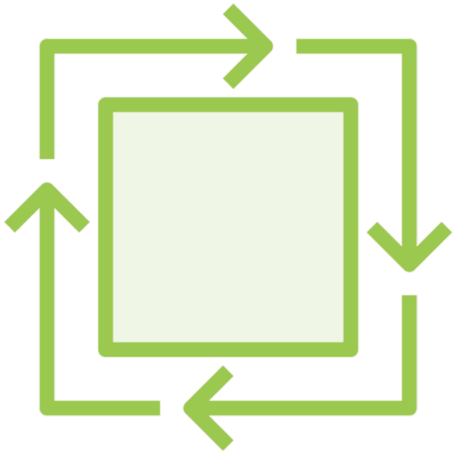


“Layers” are folders

Can be difficult to maintain

Contained typically in one (large) Visual Studio project

Different Types of Application Architecture



All-in-one architecture

Layered architecture

Layered Architecture

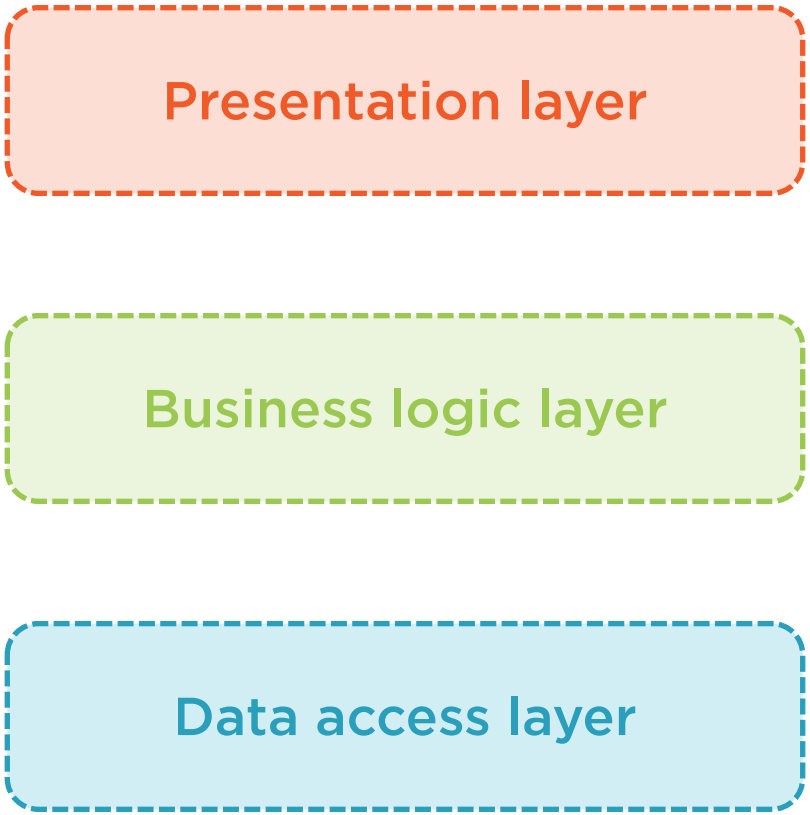
Split according to concern

Promote reuse

Easier to maintain

Pluggable

Typical Layered Architecture

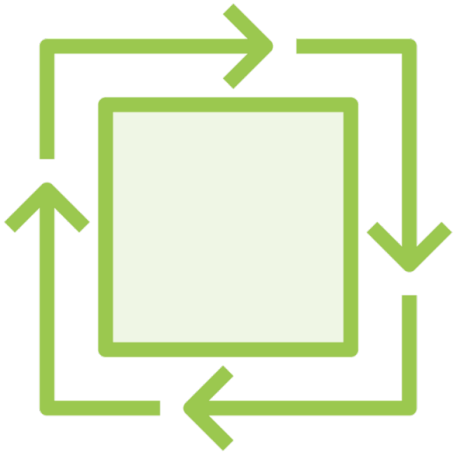


Disadvantages of Layered Architecture

Still “coupling” between layers

Behaves as single application

Different Types of Application Architecture



All-in-one architecture

Layered architecture

Clean architecture

Introducing Clean Architecture

Based on design principles

Separate concerns

Create maintainable and testable application code

Variation on hexagonal and onion architecture

- Introduced in 2012

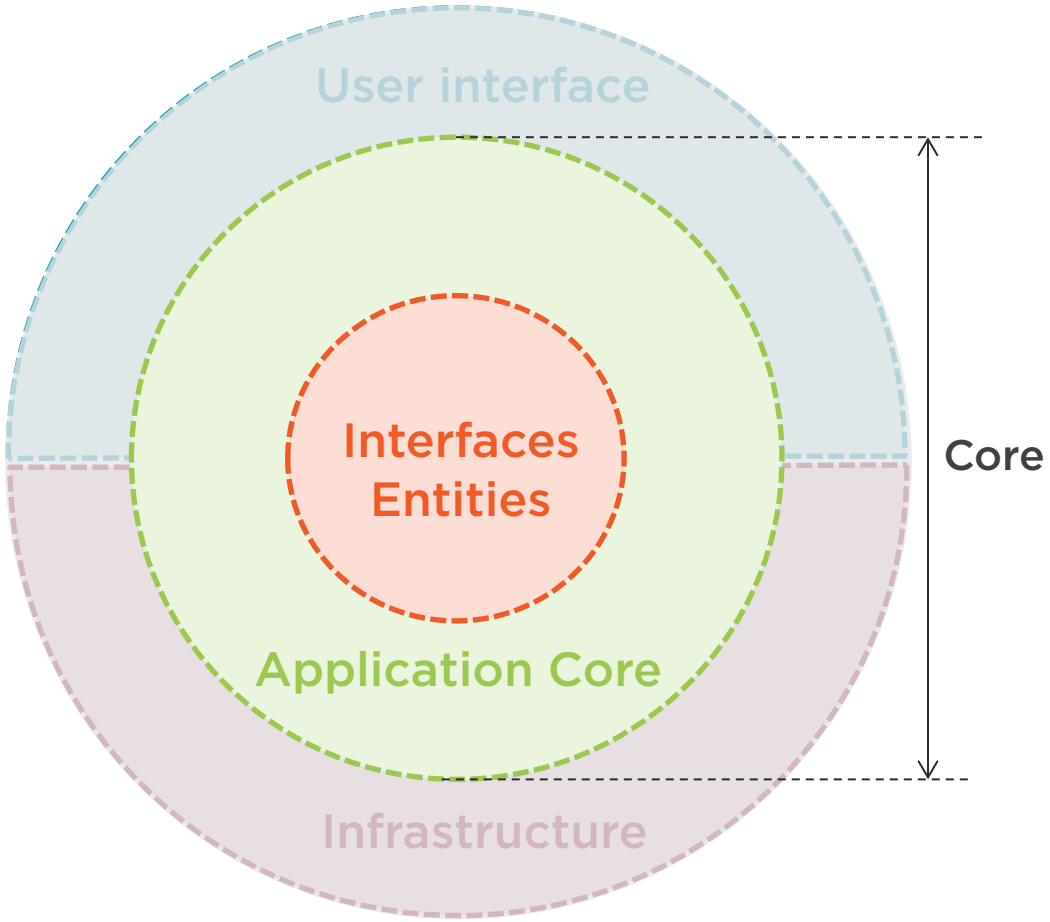
Separation of concerns

Loose coupling

Independent of “external” influences

- UI
- Database

Circular Design

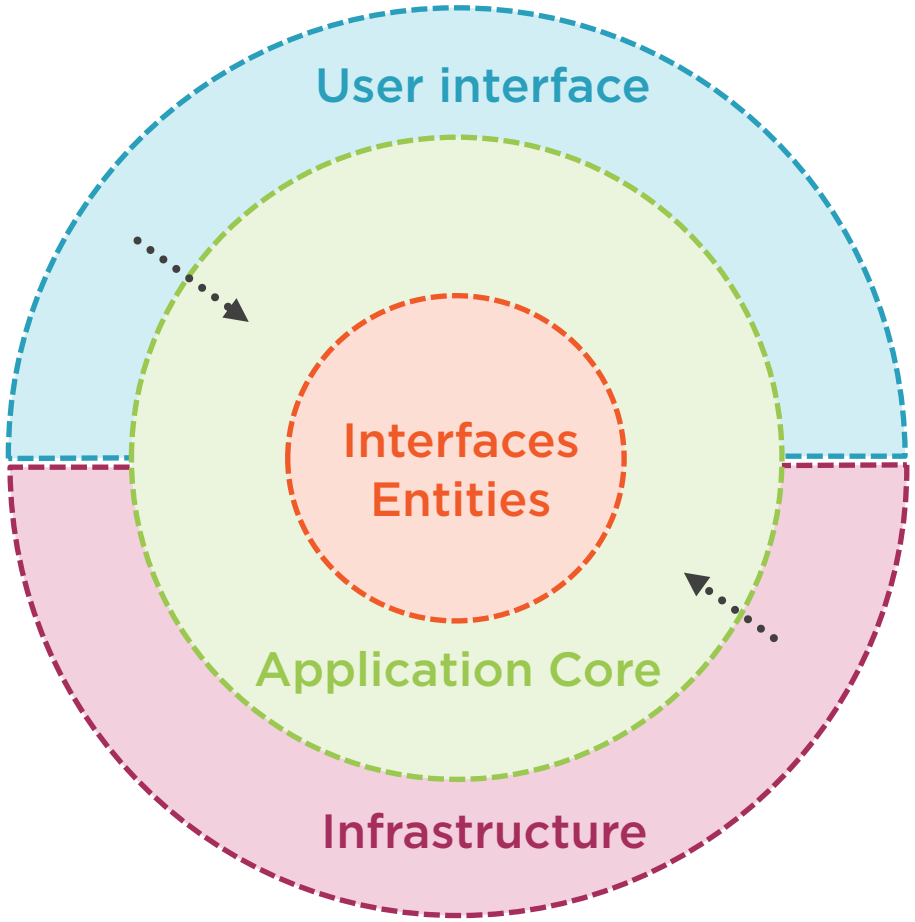


Different circles for different “layers”

Application Core

- Abstractions (high-level)
- Interfaces and entities
- Business logic at the center of the application (use-cases)
- Agnostic to outer circles
- Has no dependencies on external influences

Understanding Clean Architecture



Outer circles are infrastructure (mechanisms)

- Depends on Core
- Implements interfaces from Core

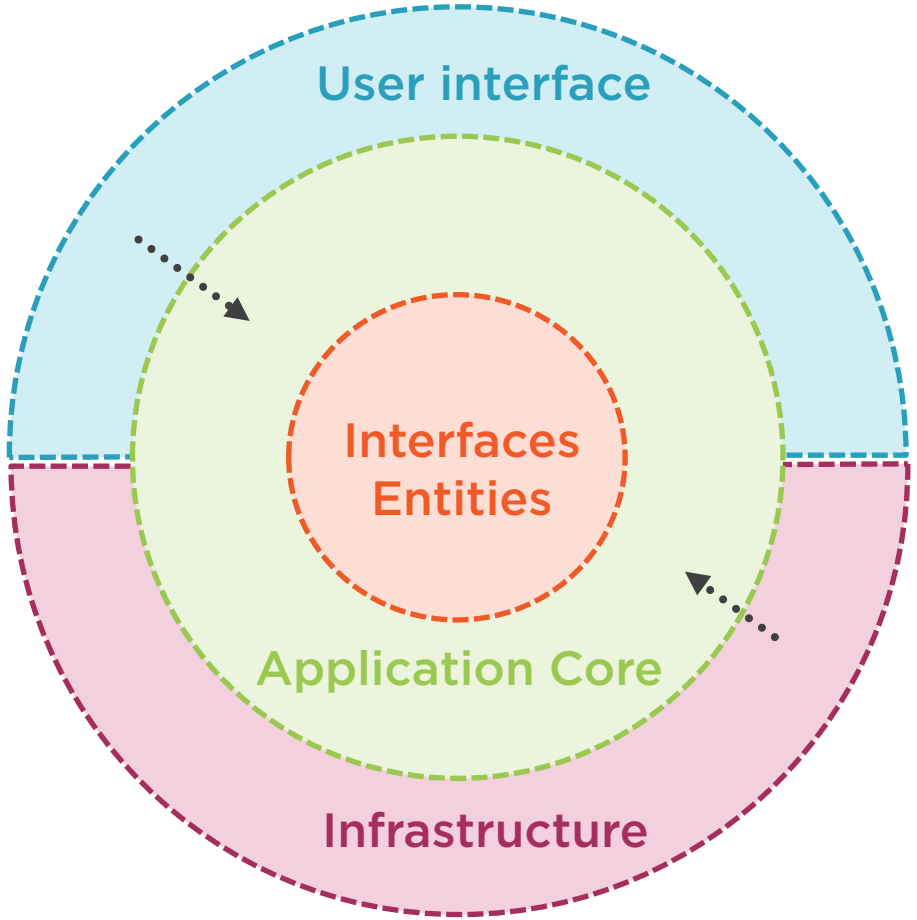
Dependencies are inverted

- Pointing inwards

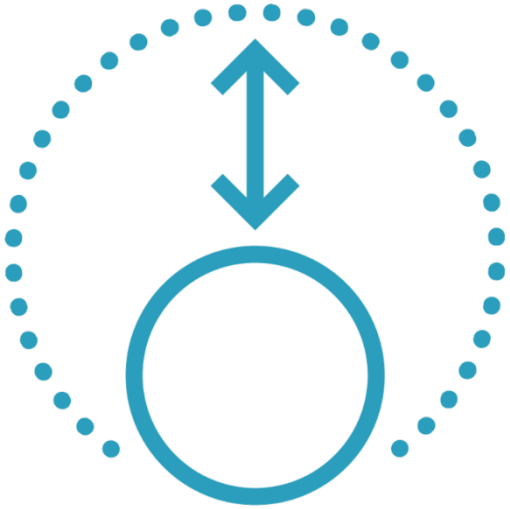
UI

- Depends on Core

Understanding Clean Architecture



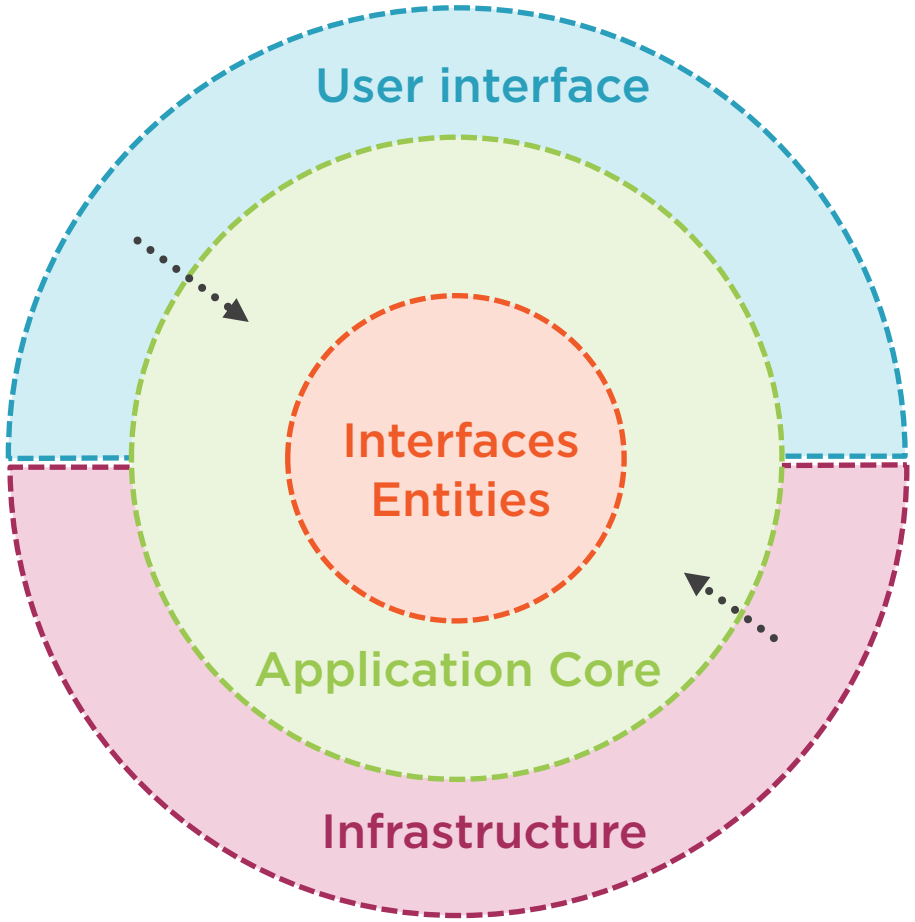
Two Important Principles



Dependency Inversion

Mediator

Who Goes Where?

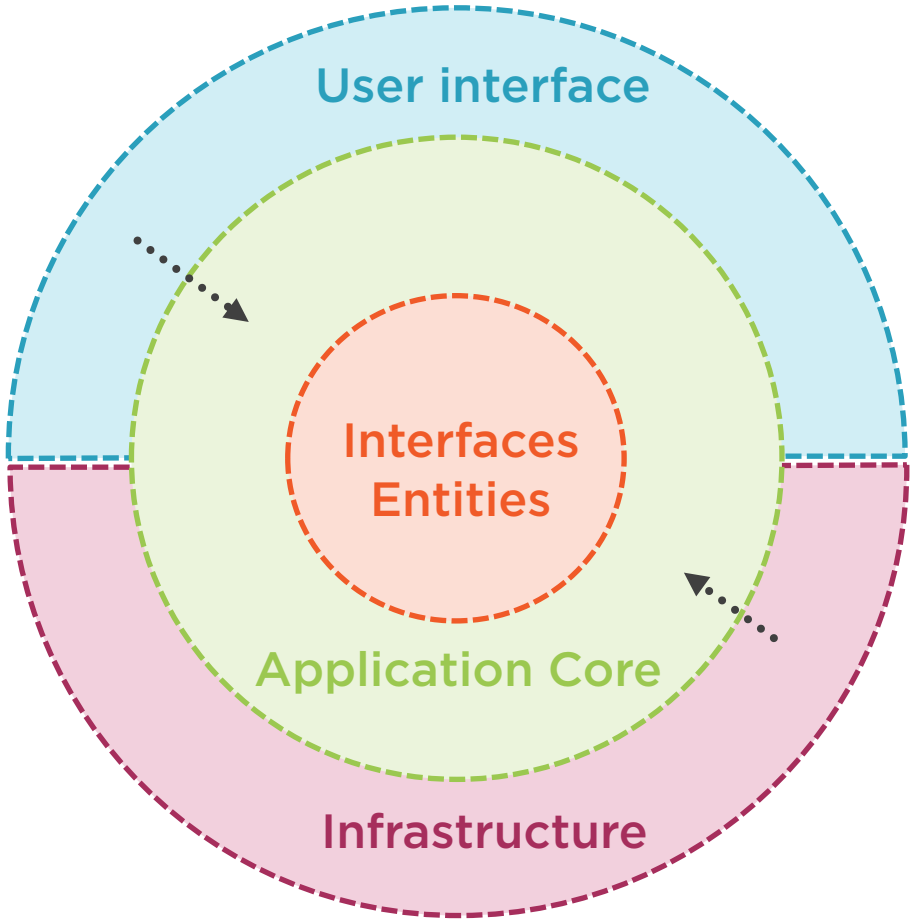


Core

- Entities
- Interfaces
  - Core
  - Infrastructure
- Services
- Exceptions

No dependency to any Infrastructure-related code or package

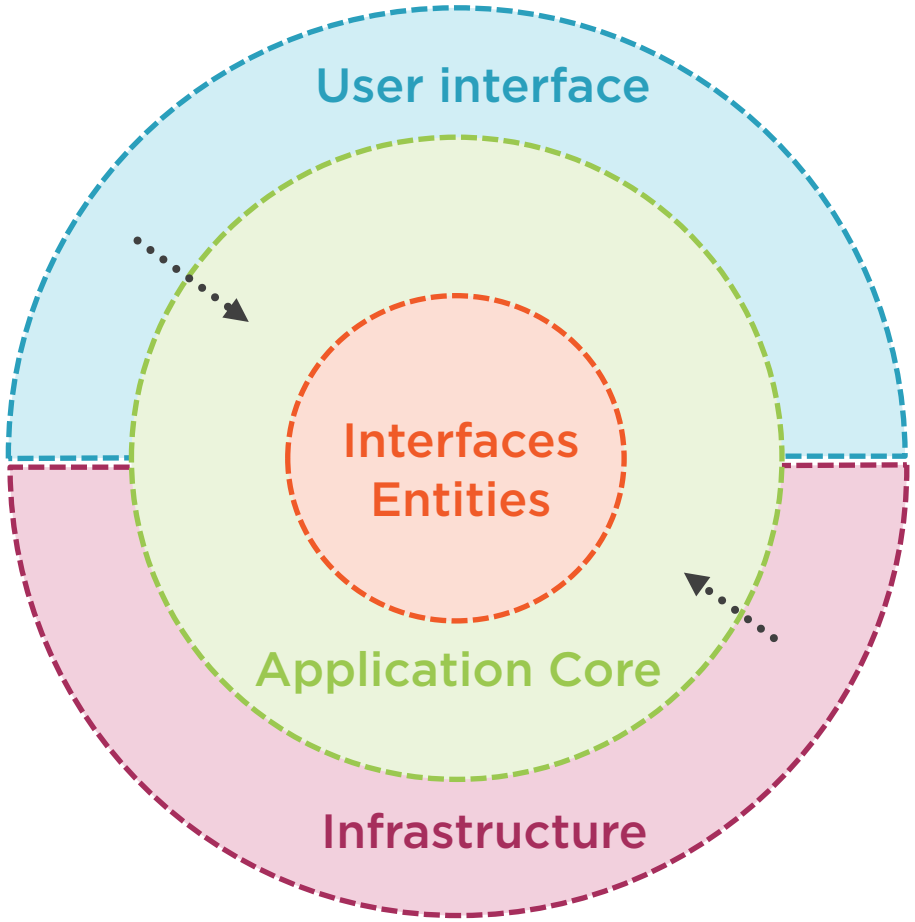
Who Goes Where?



Infrastructure

- Data access (EF Core)
- Logging
- Identity
- API Clients
- File access

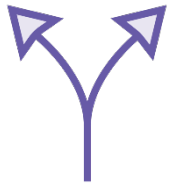
Who Goes Where?



UI

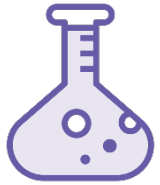
- API/MVC/Razor
- Specific ASP.NET Core items
  - Middleware
  - Filters
- Interact with services through MediatR
  - Loose coupling
  - Lightweight controllers

Clean Architecture Benefits



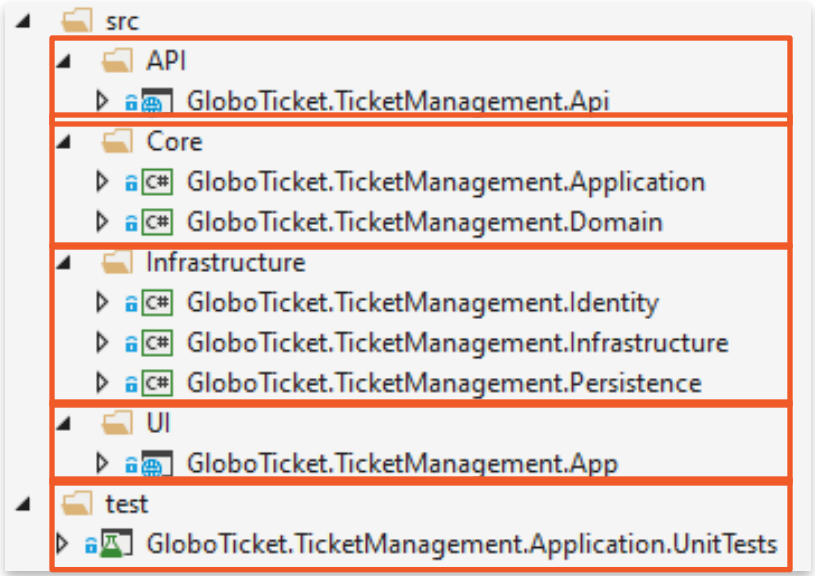
Independent of UI or used frameworks

No knowledge of used database



Testable and maintainable

High-level Code Organization



The end result...

Testable and maintainable application code

Not for every application though!

Summary

Reviewed foundational design principles

Clean architecture relies on these

- Will result in more testable and maintainable applications

Up next:

Creating the application core