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Clean Architecture Essentials

Ivan Paulovich

Betsson Dev'Talk #4
Stockholm - 23rd May 2019

@ivanpaulovich

https://paulovich.net

Ivan Paulovich

Software craftsman and GitHub addicted.
Interested in TDD, SOLID and
Clean Architecture.

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MVP Microsoft® Most Valuable Professional Reconnect

@ivanpaulovich

The “Software Architecture”

Presentation Layer	ASP.NET MVC and Autofac
Business Layer	MediatR and AutoMapper
Data Layer	Entity Framework and Dapper
Database and Messaging	SQL Server and RabbitMQ
IDE and Tools	Visual Studio, Resharper and .NET Framework

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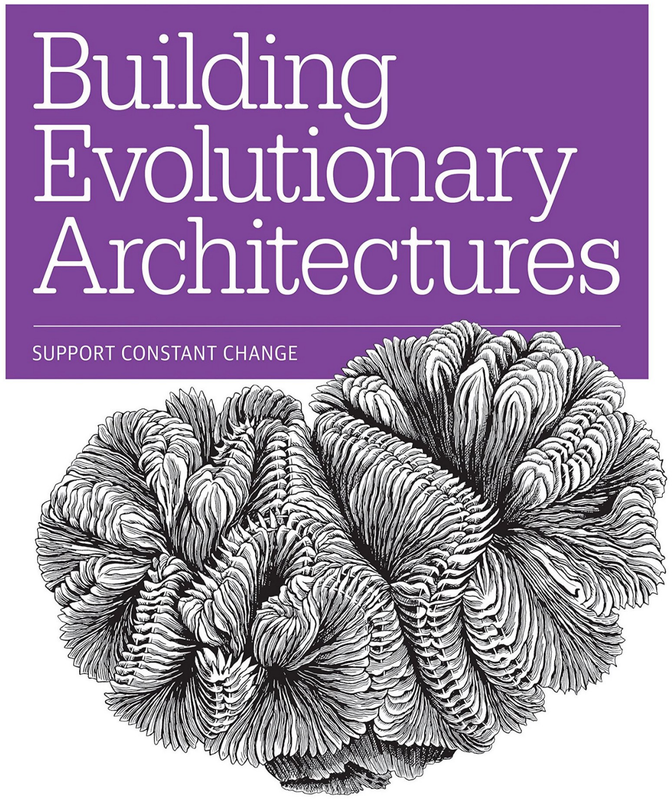
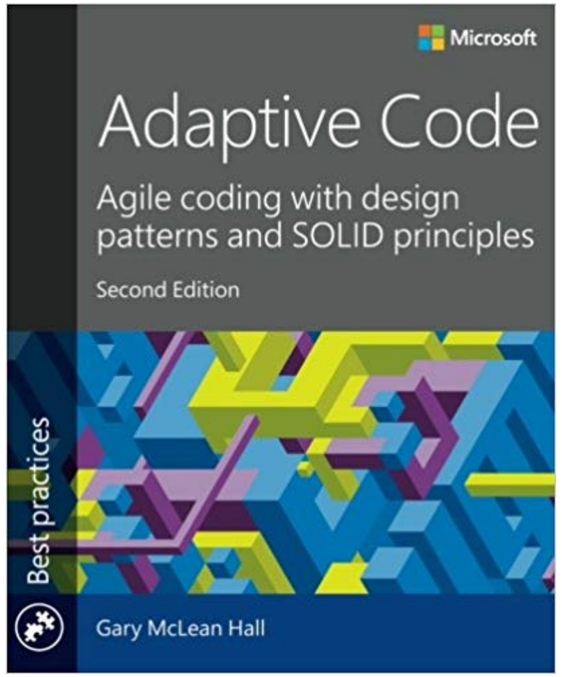
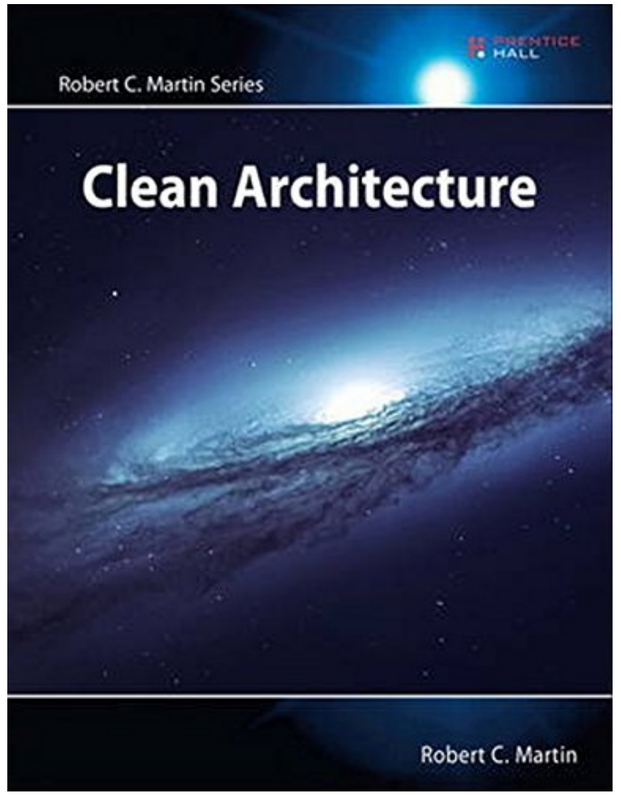
Not a Software Architecture!

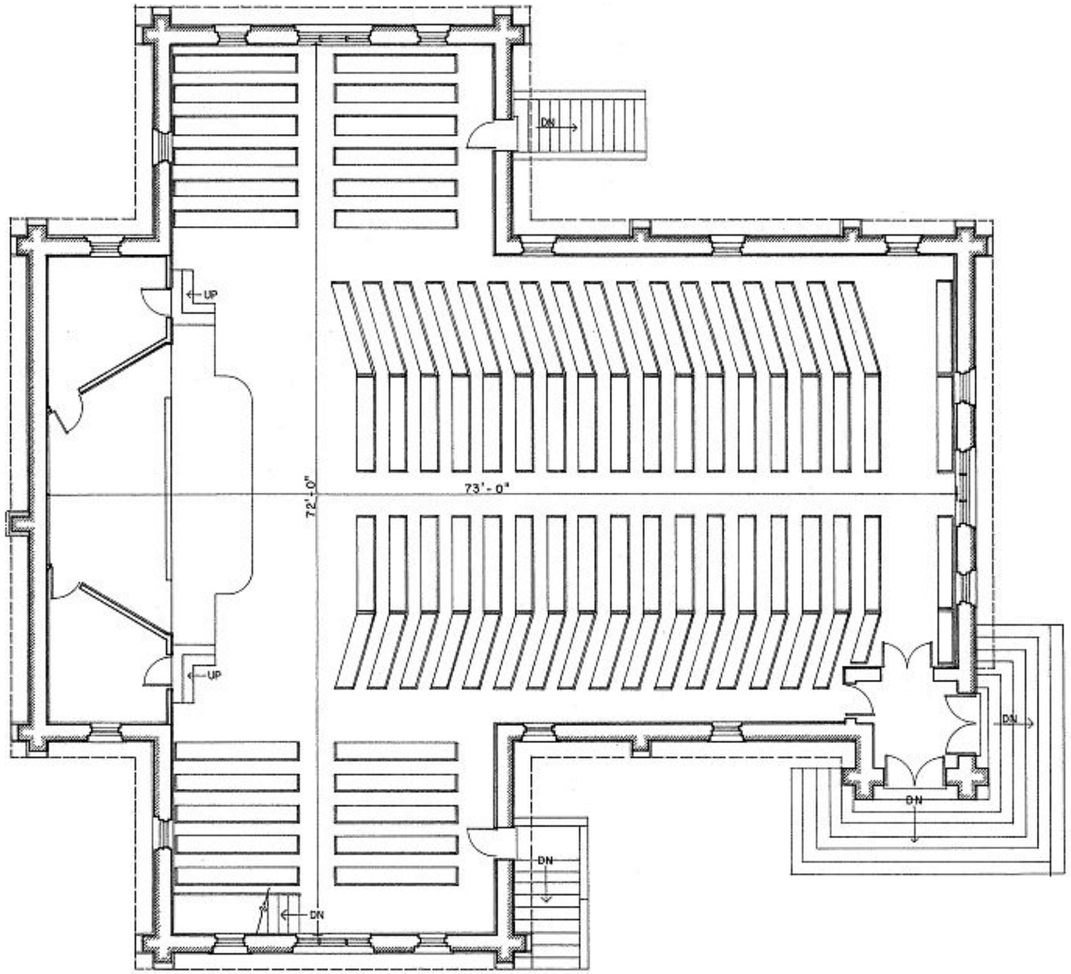
Resources I Like







Architecture is About Usage



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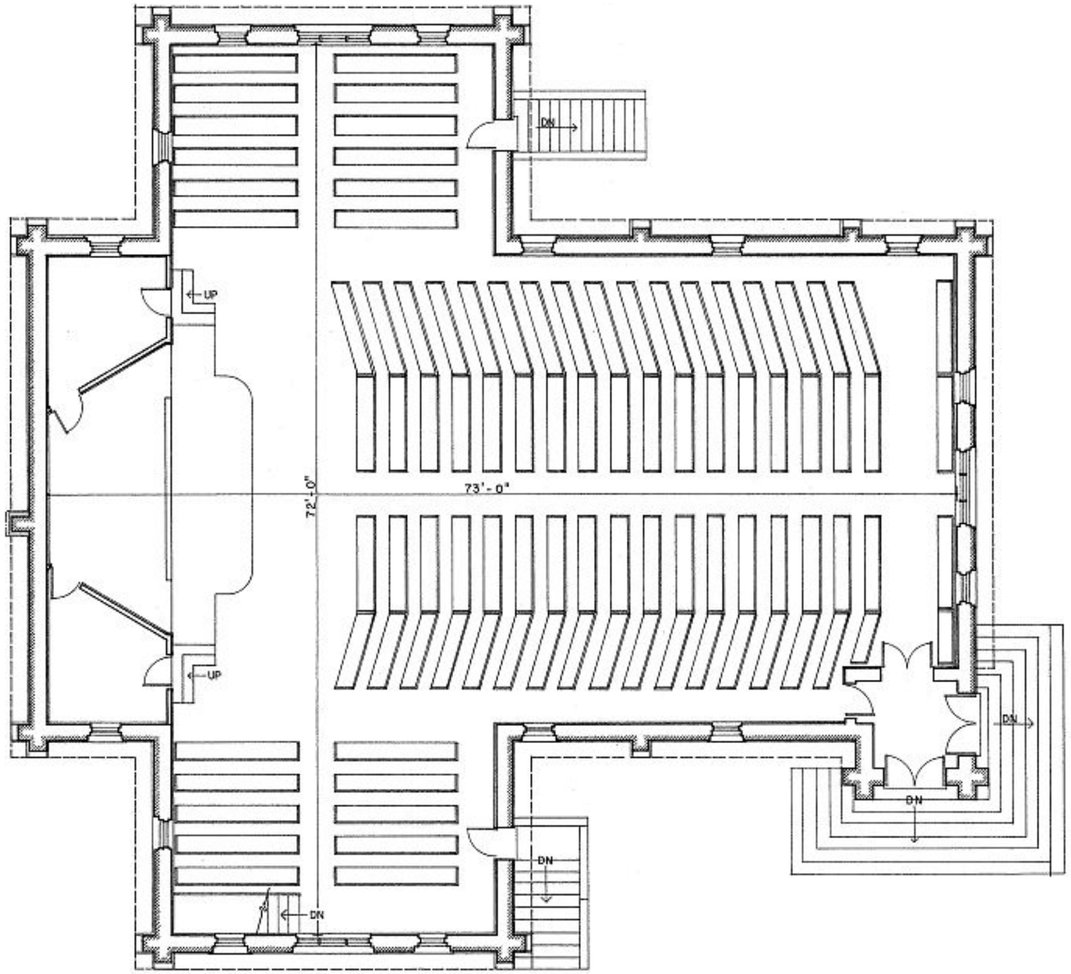

- The floor plan shows where people enter the building and sit. It shows where the focus is.

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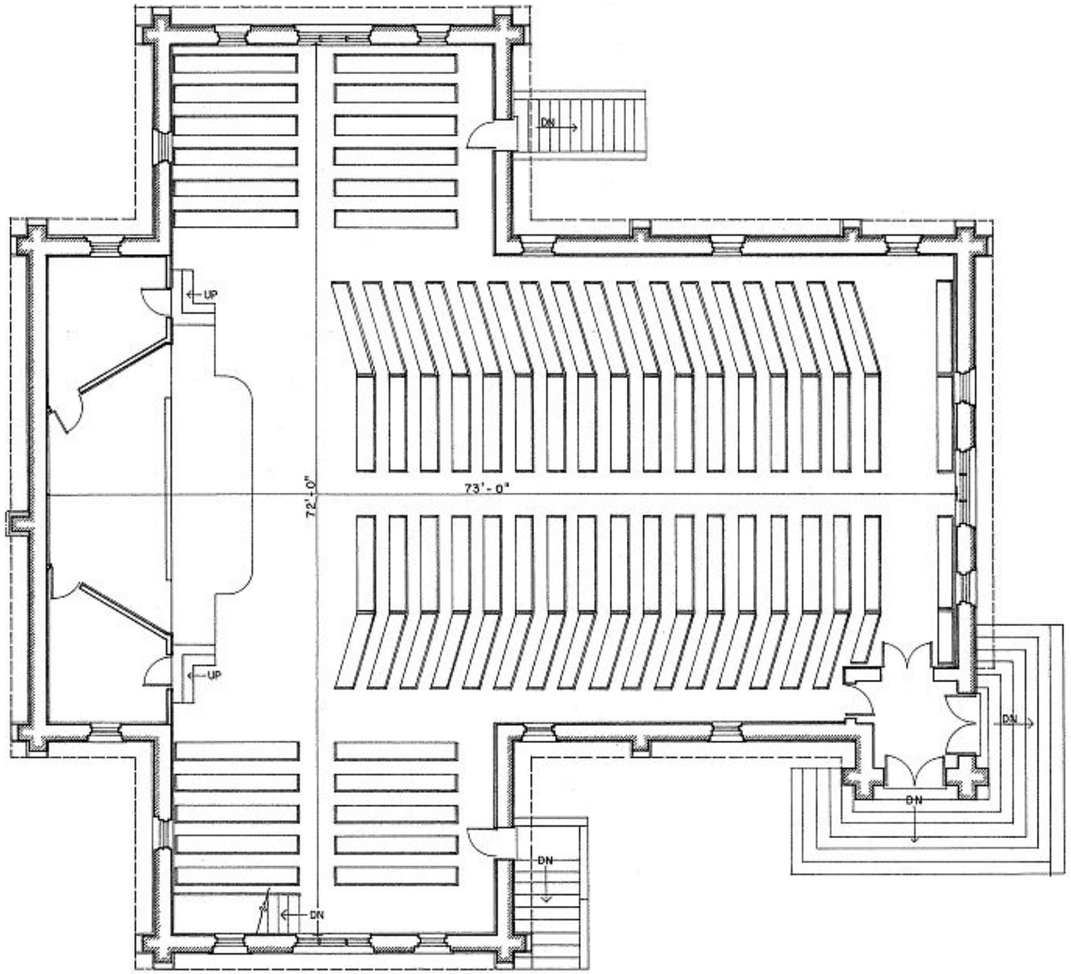

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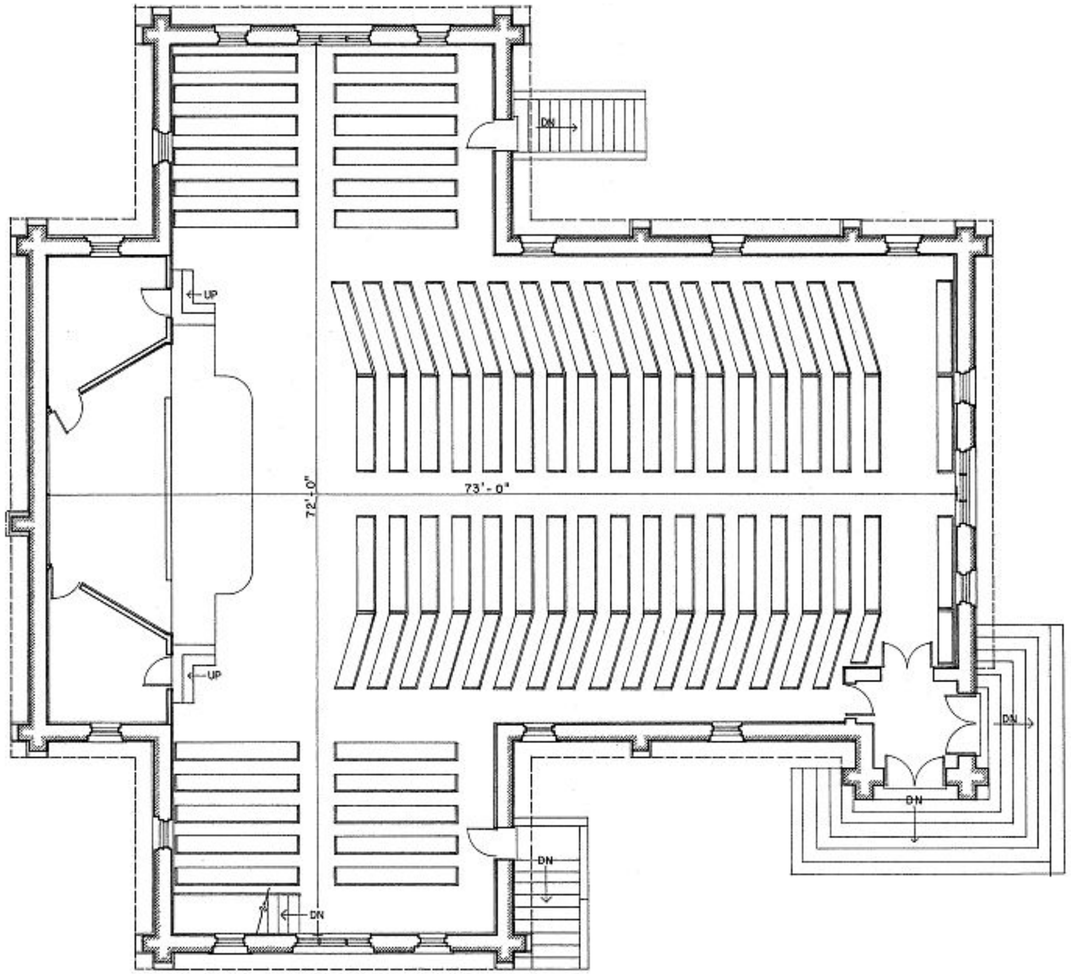

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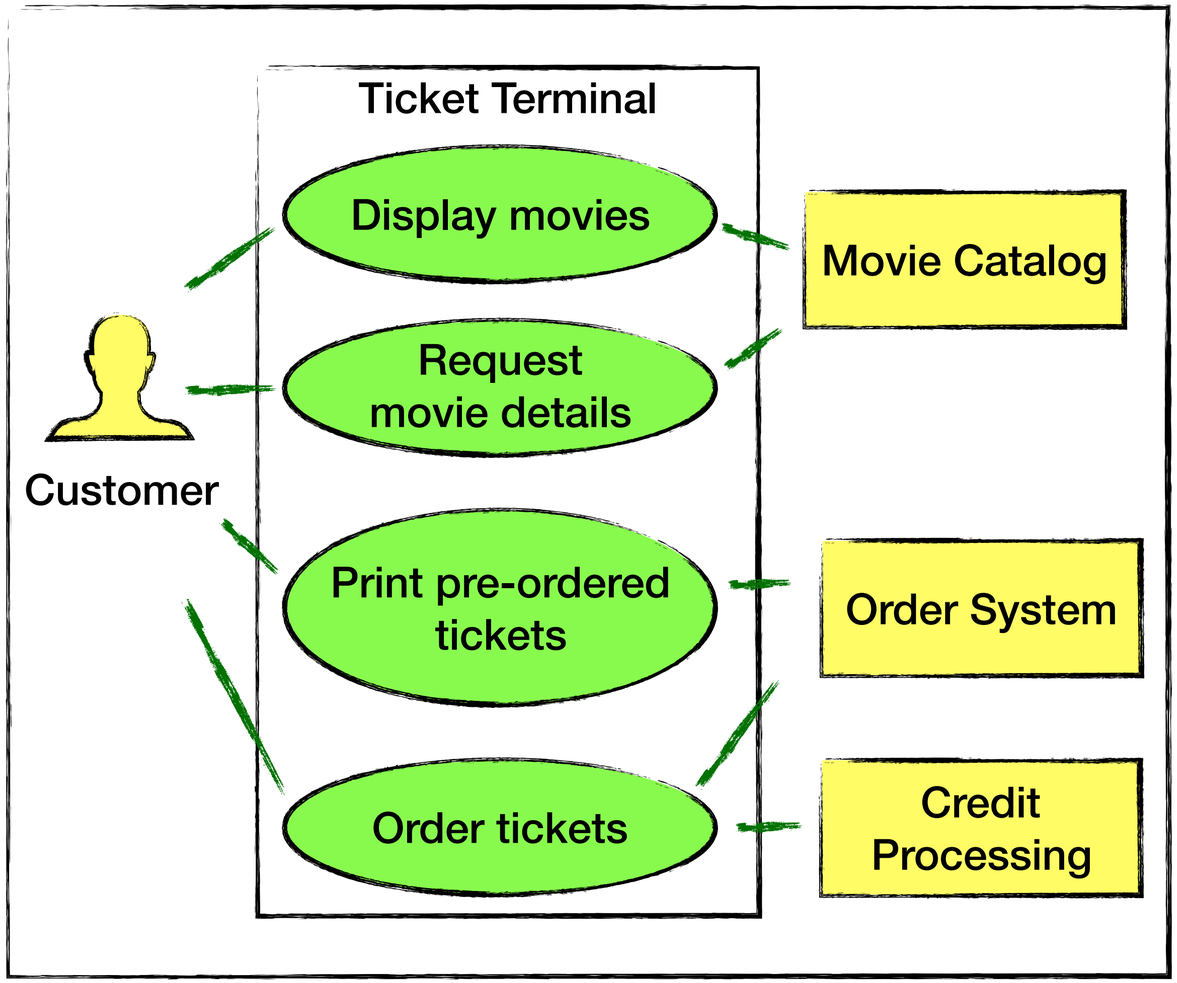
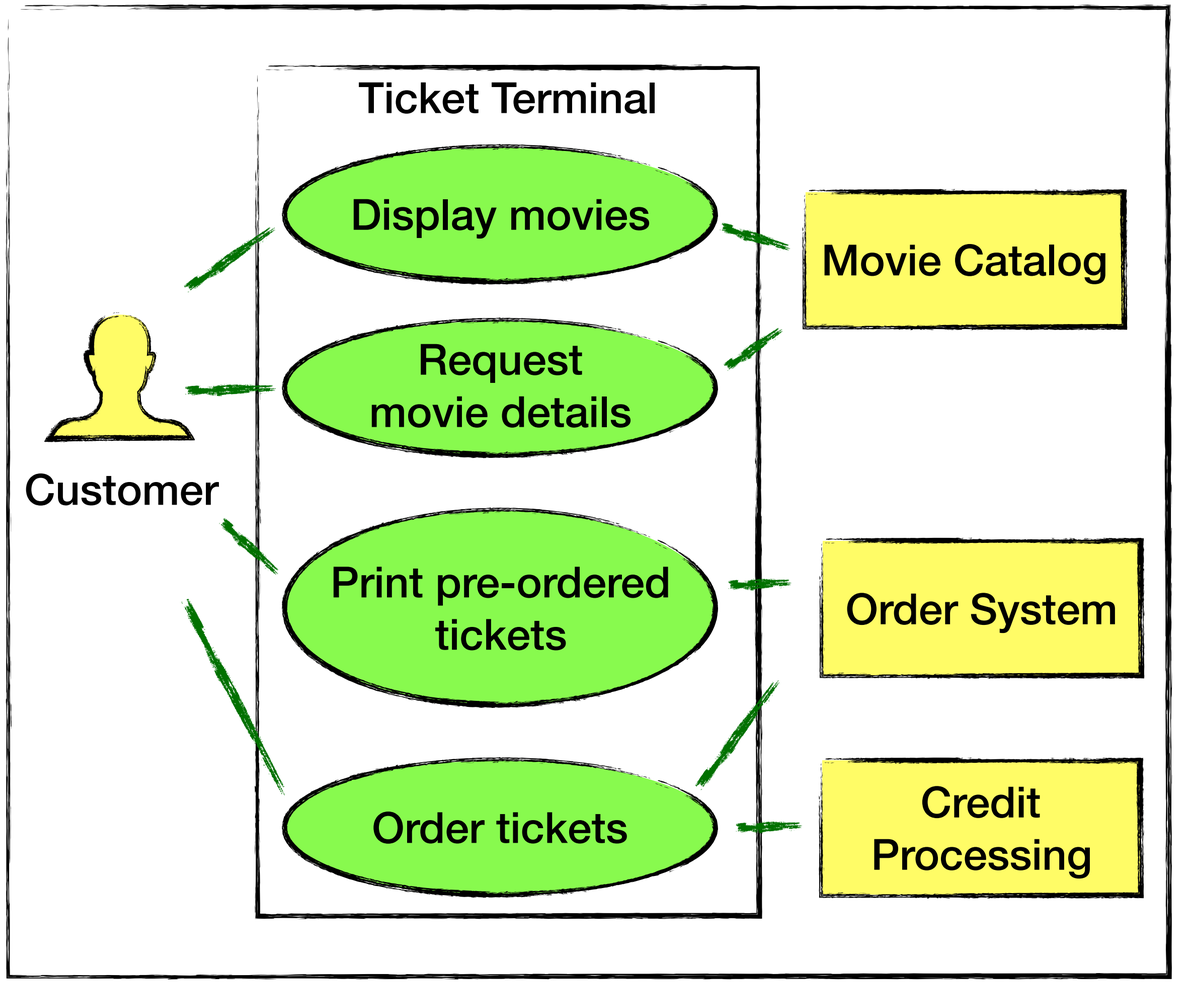
How to make the software architecture scream its usage?

Use Cases

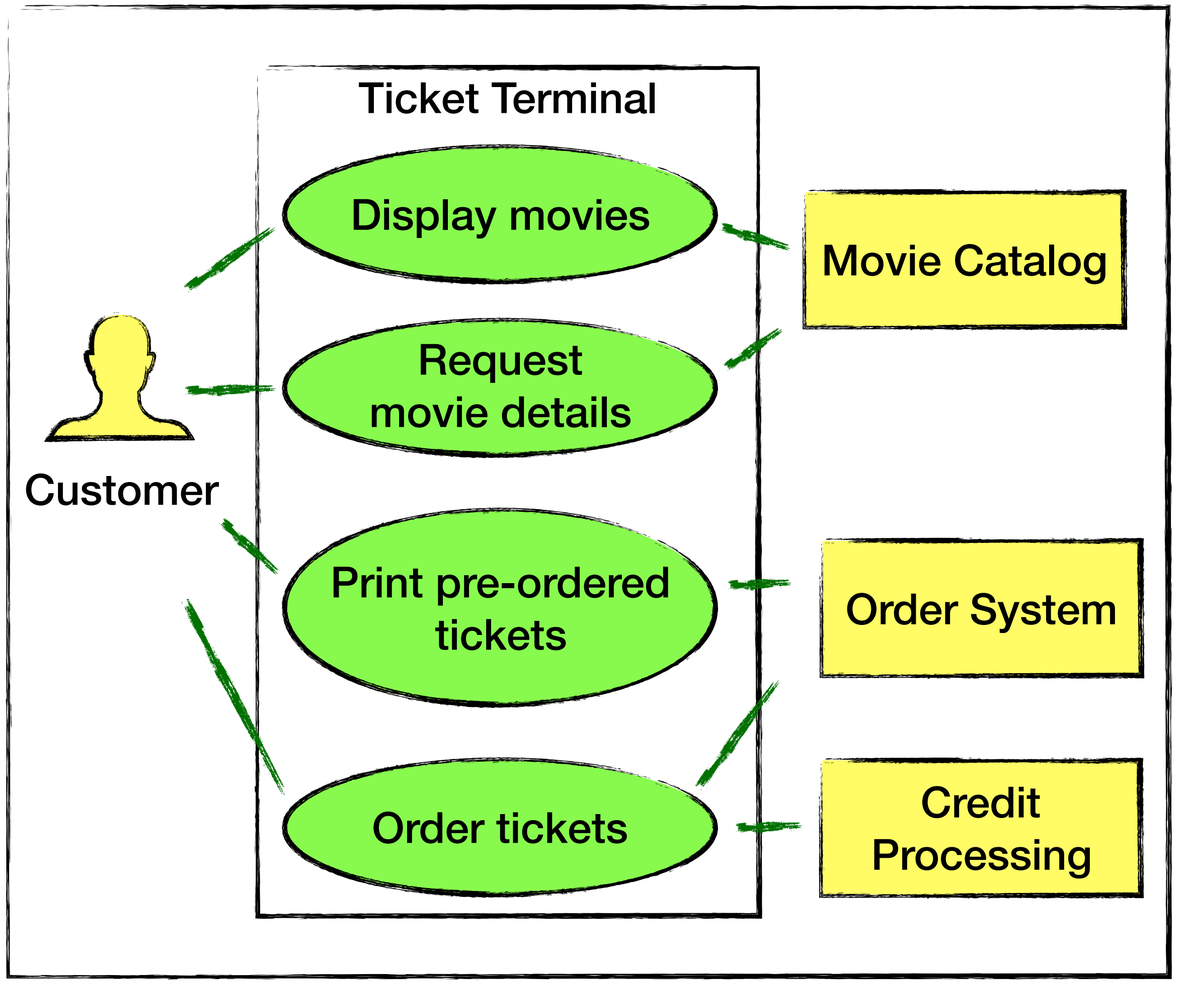

Ticket Terminal
Display movies
Request movie details
Print pre-ordered tickets
Order tickets
Customer
Movie Catalog
Order System
Credit Processing

Use Cases



- Use Cases are delivery independent, they show the intent of a system.

Use Cases



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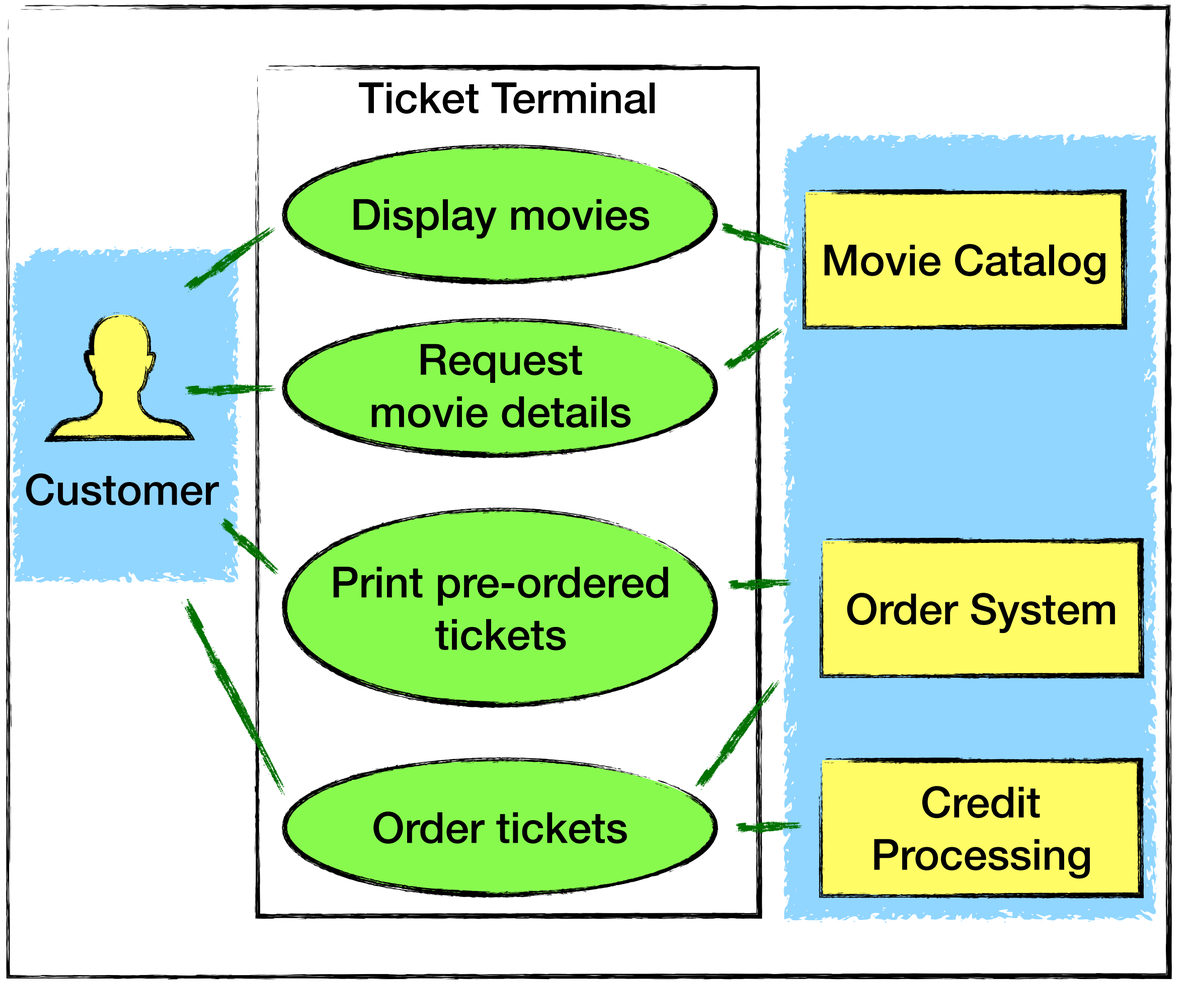
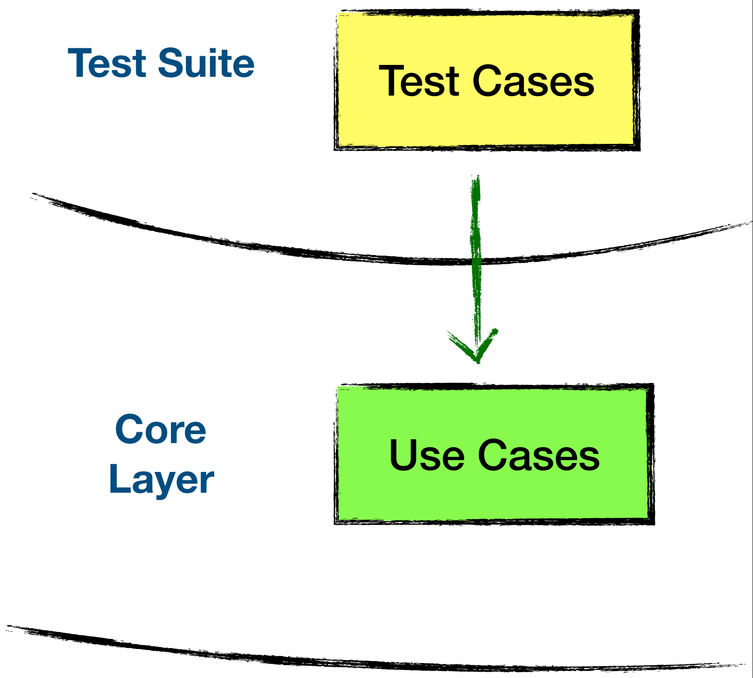


- Use Cases are delivery independent, they show the intent of a system.
- Use Cases are algorithms which interpret the input to generate the output data.
- Primary and secondary actors.

Use Cases Implementation Guided by Tests

- Test Cases should be the first consumers implemented.



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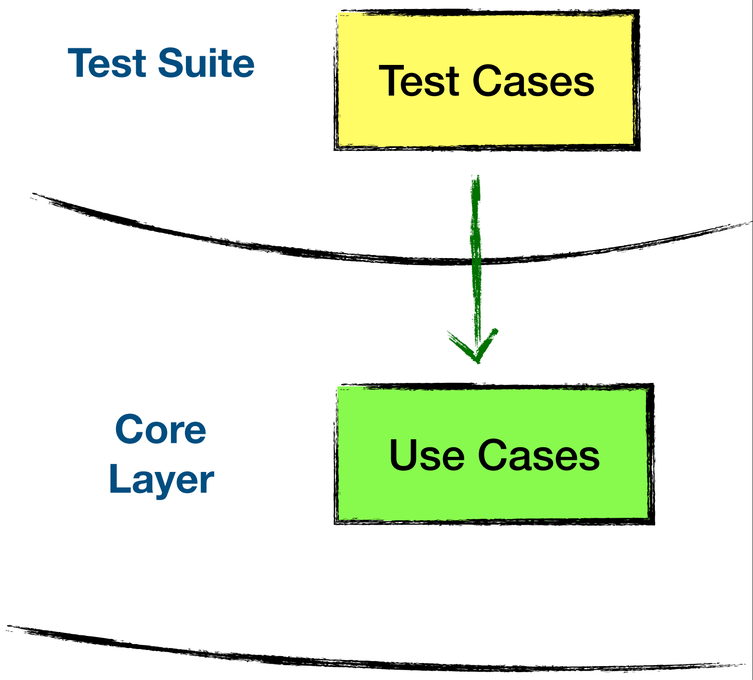

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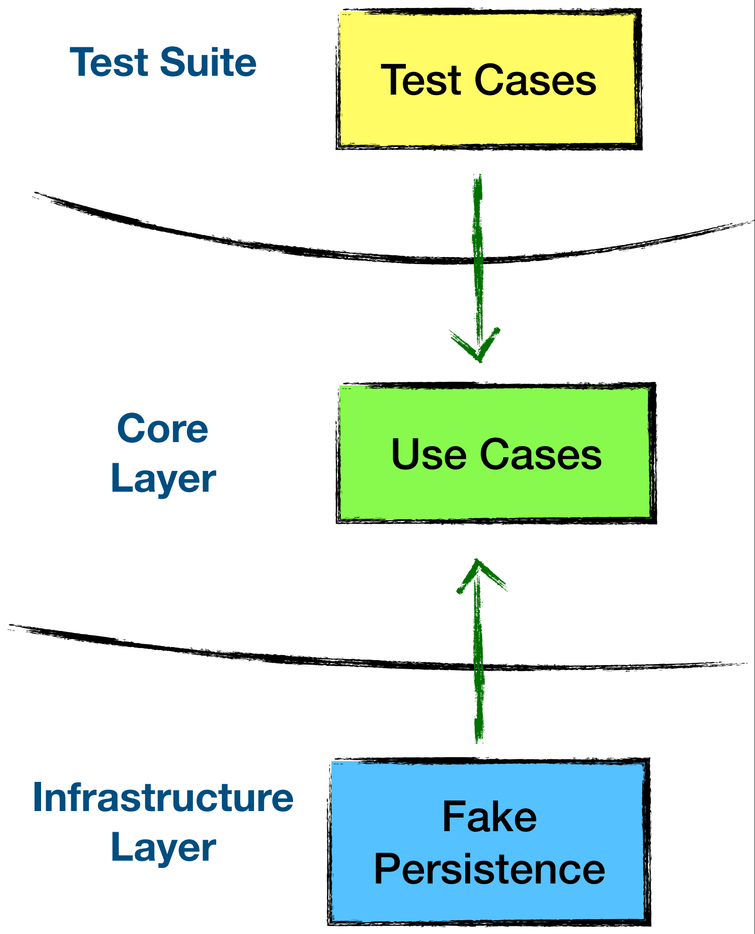
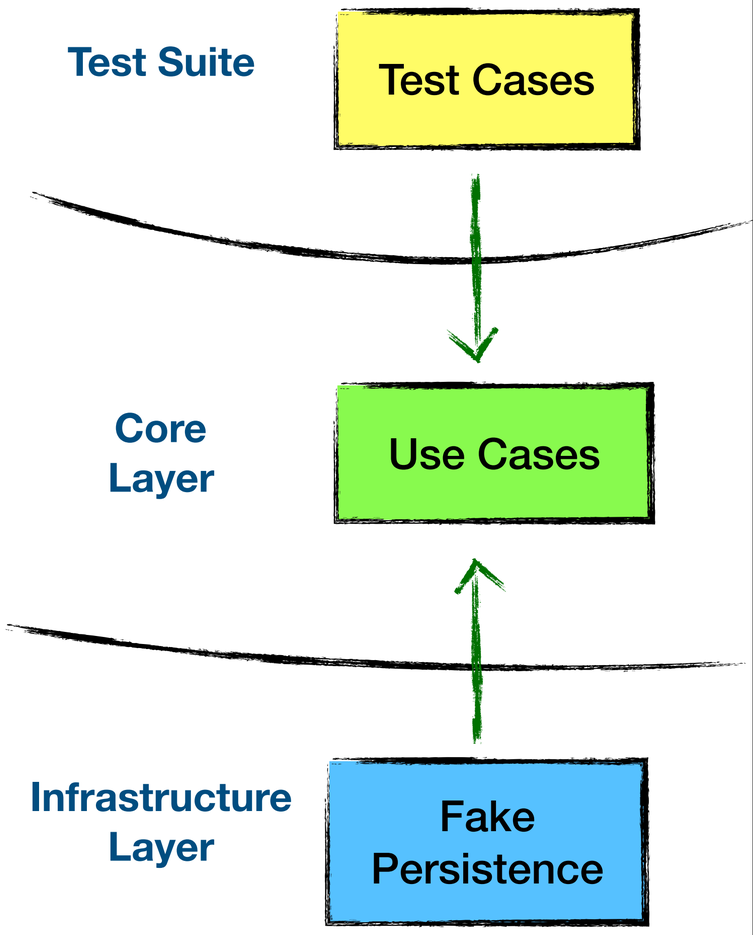


Use Cases Implementation Guided by Tests

- Test Cases should be the first consumers implemented.
- You should design the Use Cases by following the Single Responsibility Principle.
- Fake implementations should be the first delivery mechanisms implemented.
- Test Cases help you design fine grained Use Cases (Interface Segregation Principle).

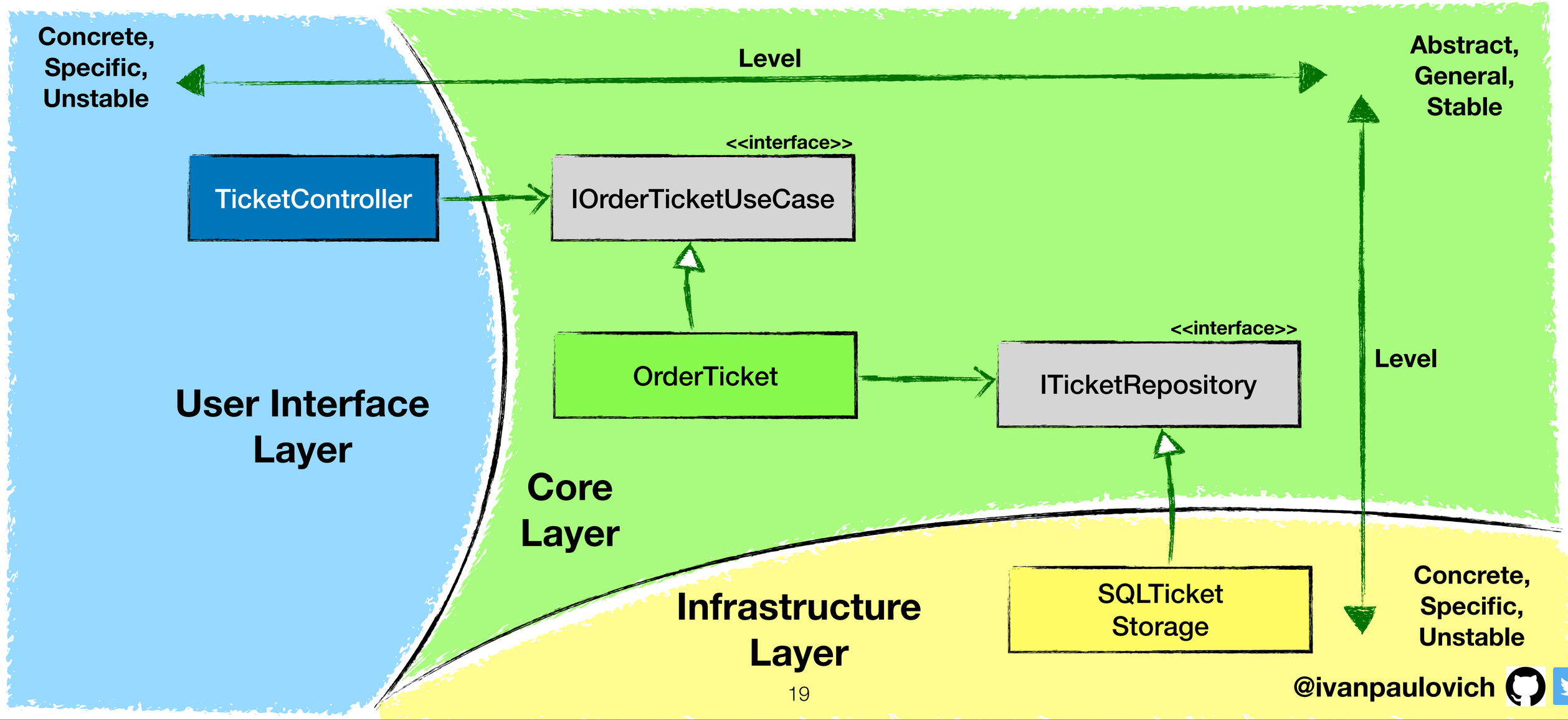


Software Architecture

“A good architecture **allows major decisions to be deferred**. A good architect maximizes the number of **decisions not made**.

Uncle Bob.

Decoupling
User Interface, Use Cases and Repositories



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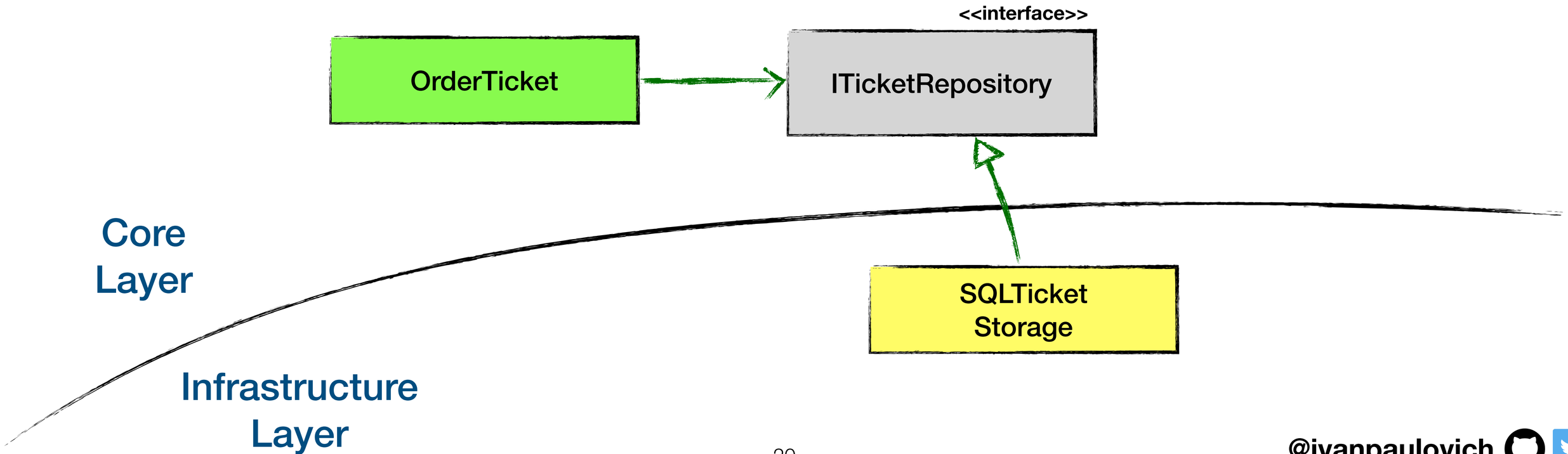
Plugin Architecture

- The dependencies point in the direction of the abstract components.



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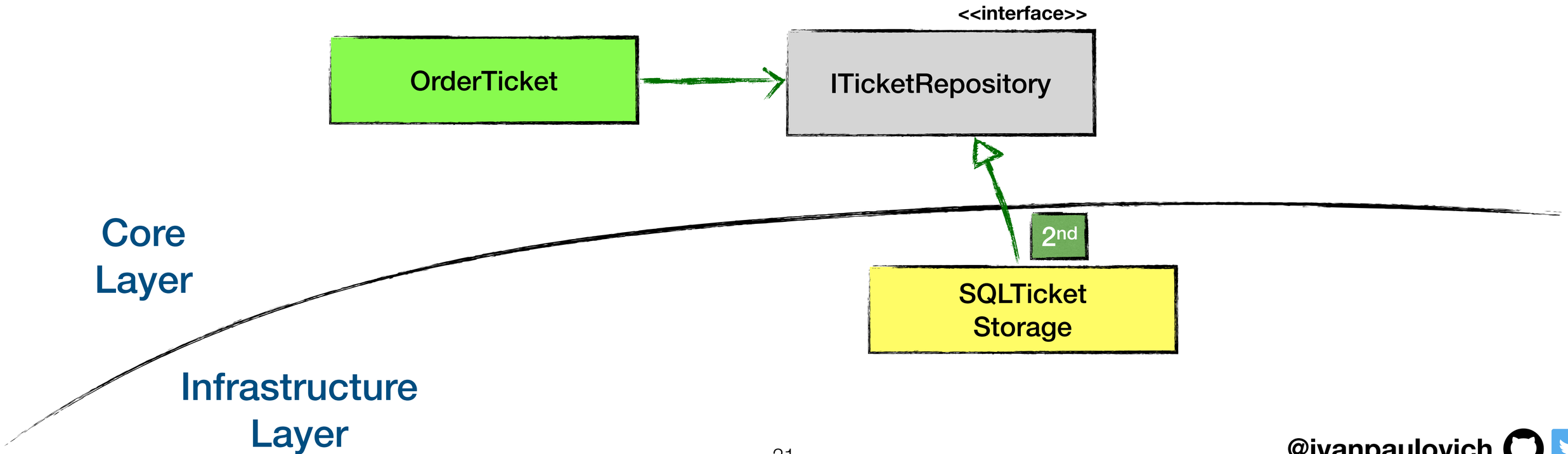

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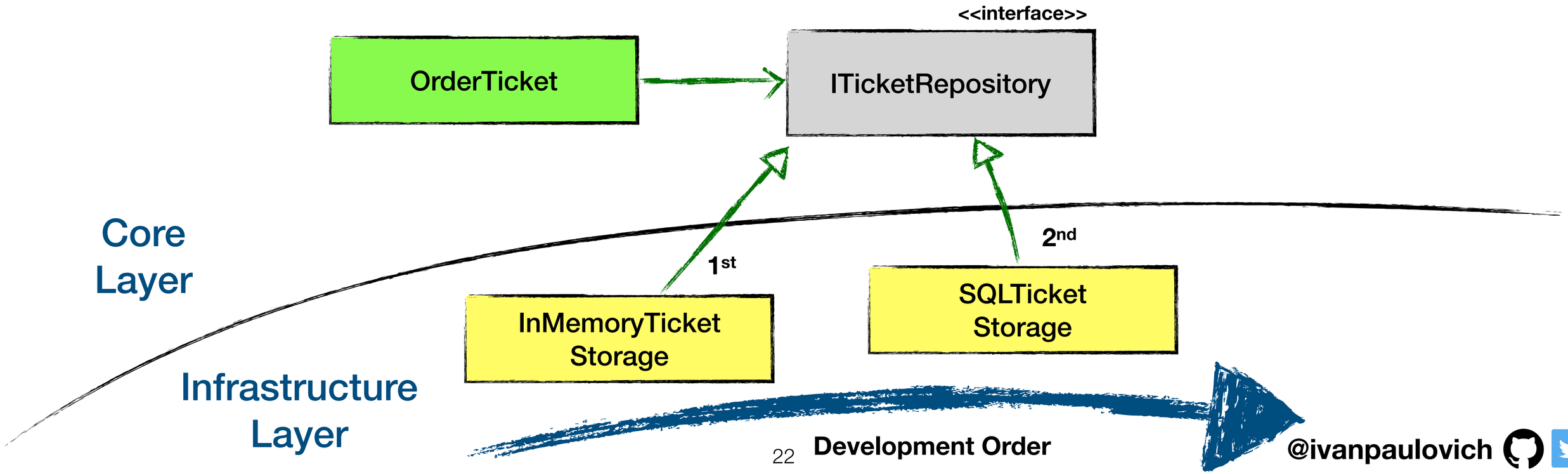
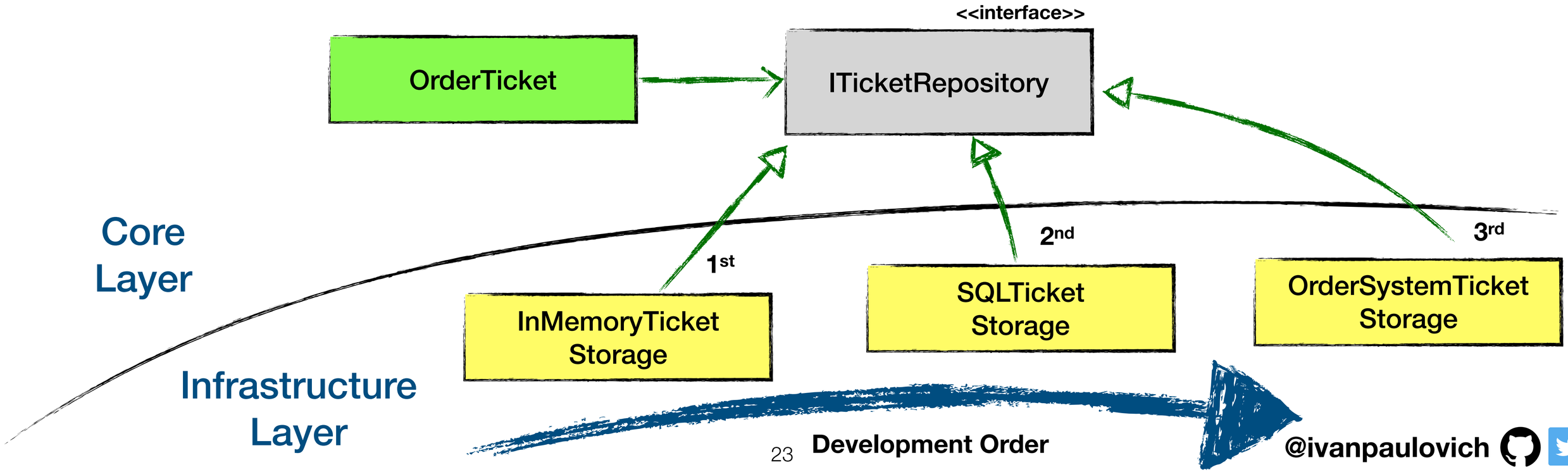


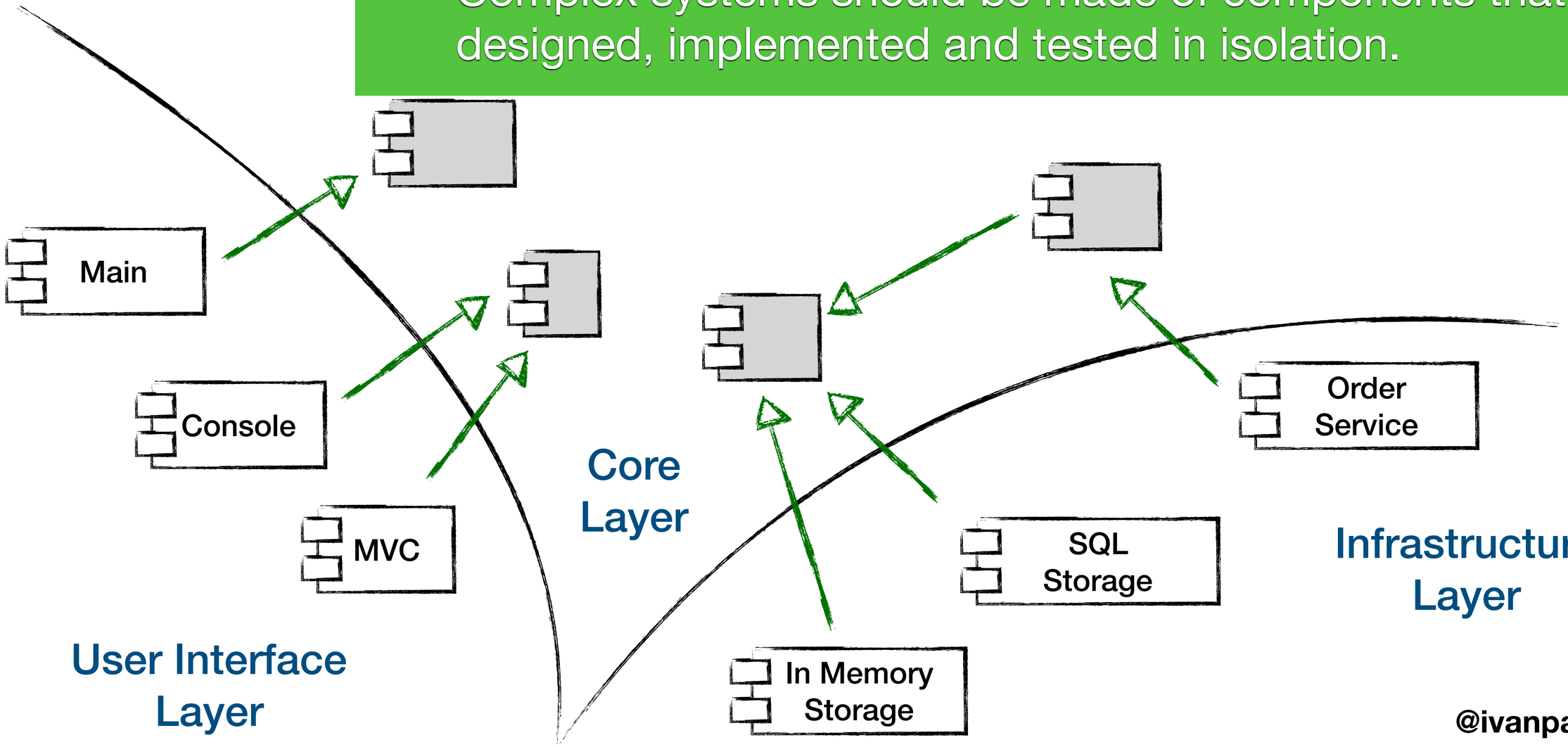
Plugin Architecture

- The dependencies point in the direction of the abstract components.
- First implement the simplest component version!
- Defer decisions. Keep the options open as long as possible!



High Level Design

- Complex systems should be made of components that are designed, implemented and tested in isolation.



High Level Design

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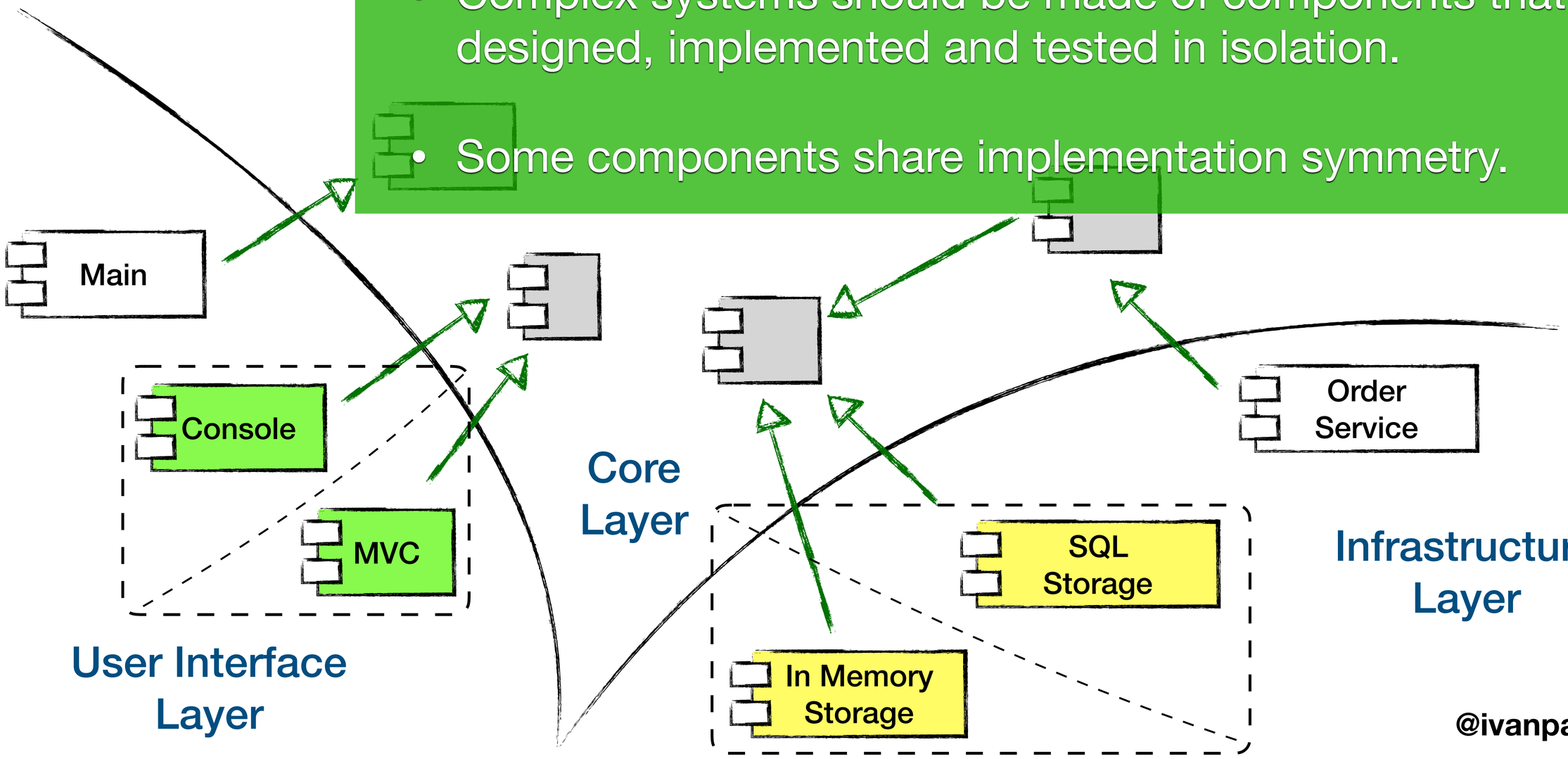
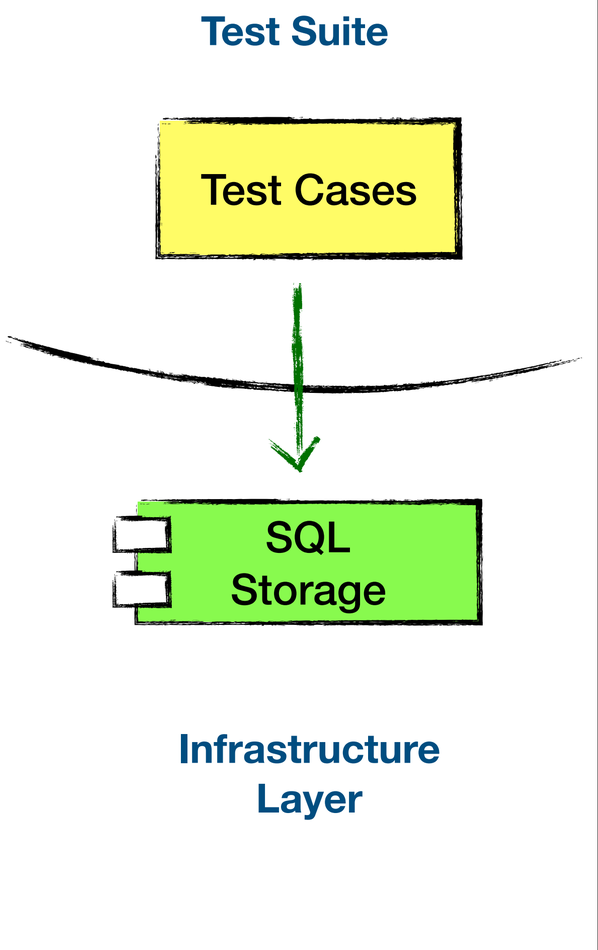
- Some components share implementation symmetry.



Components Overview

1. Components are designed to fulfill the Core needs and are implemented and tested in isolation.



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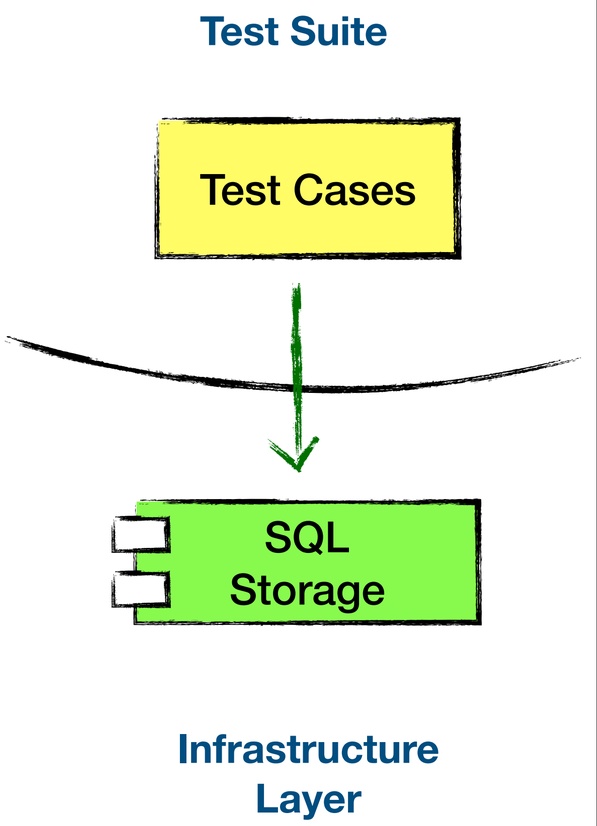

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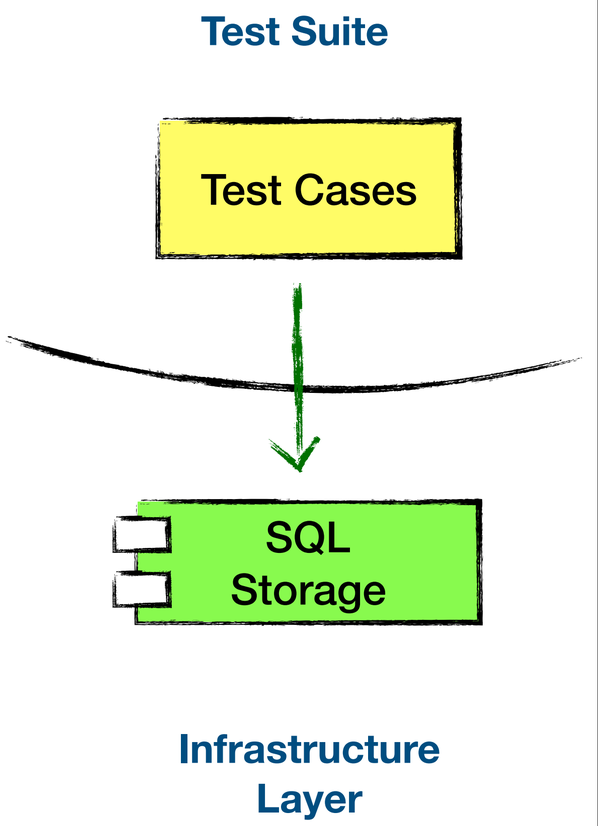
1. Components are designed to fulfill the Core needs and are implemented and tested in isolation.
2. Components could be replaced, upgraded or decommissioned with minimum Core business impact.
3. Good components are loosely coupled.



Frameworks are *Details*

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- Application code called by frameworks should be under control.
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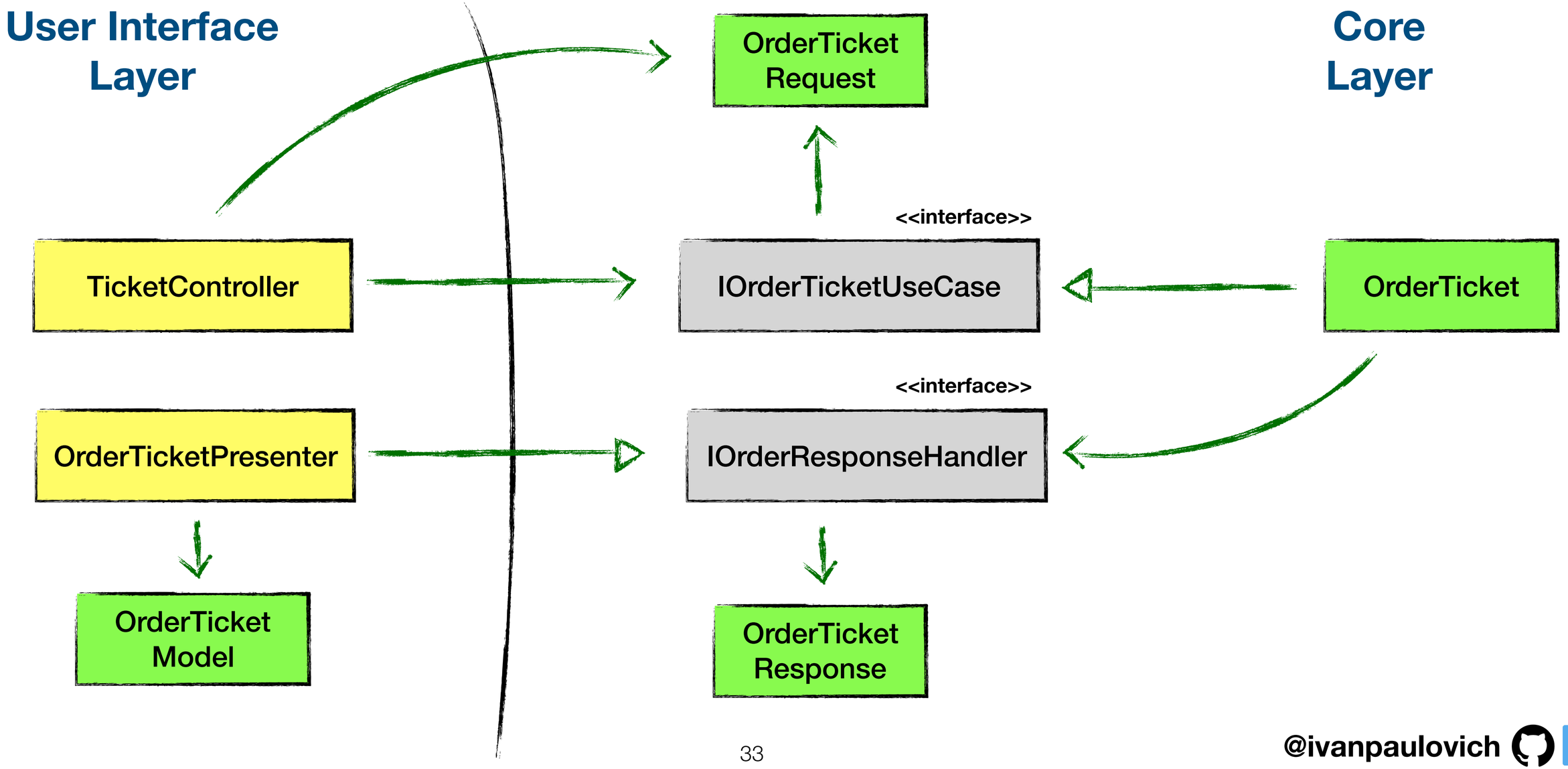
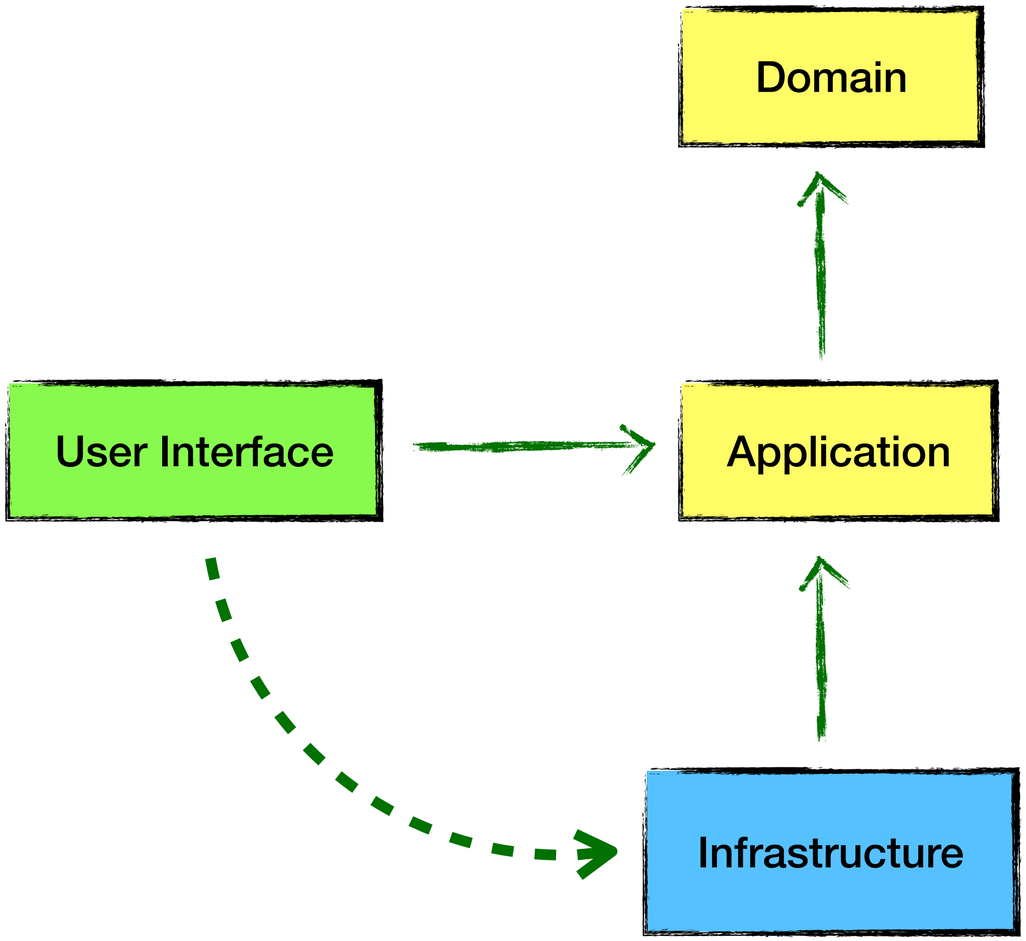
- The .NET Framework is a detail.
- Keep outside the application: Reflection, Linq, Entity Framework, MVC, Data Annotations, WCF.

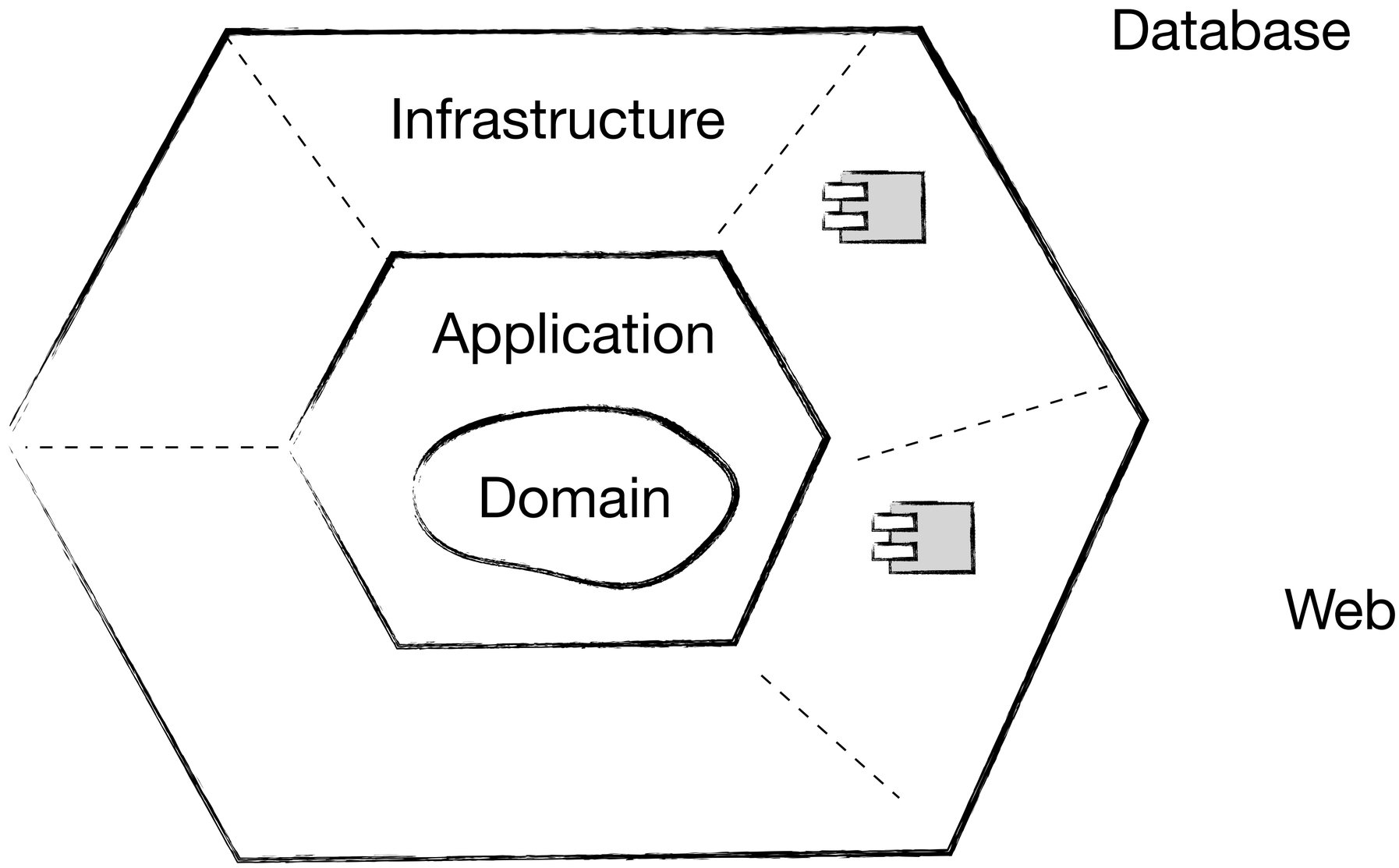
The UI is a *detail*



Layered Diagram



Ports and Adapters



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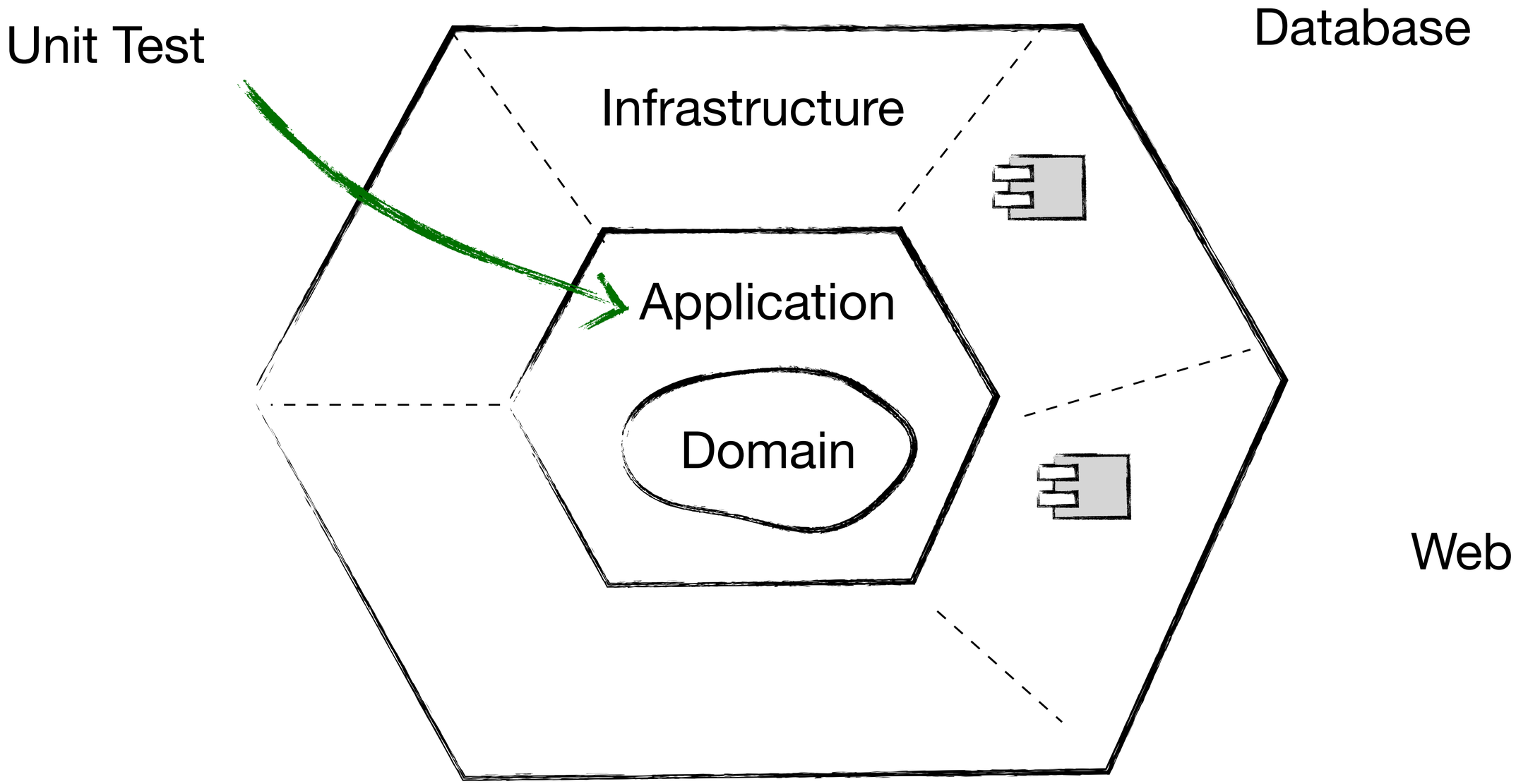

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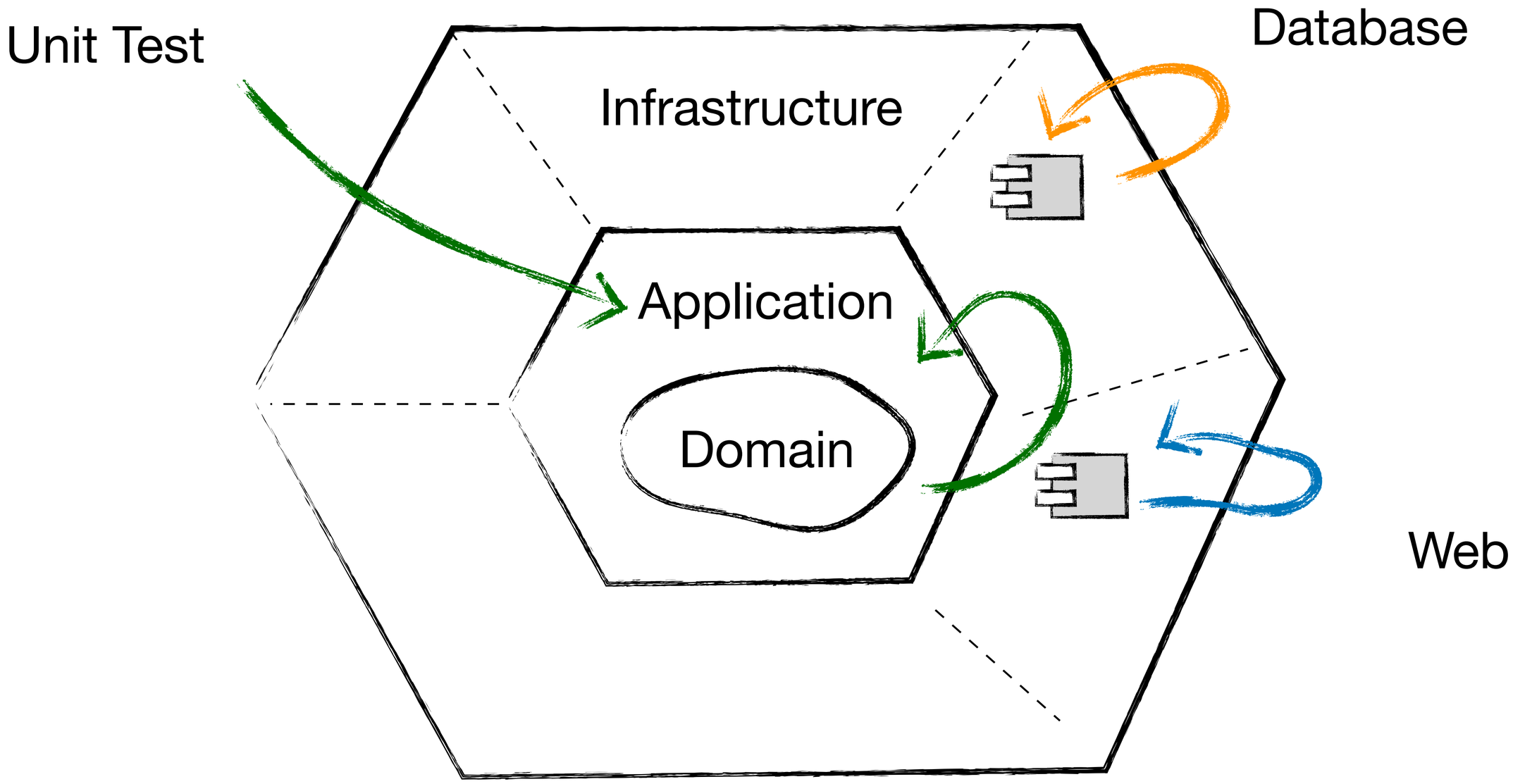

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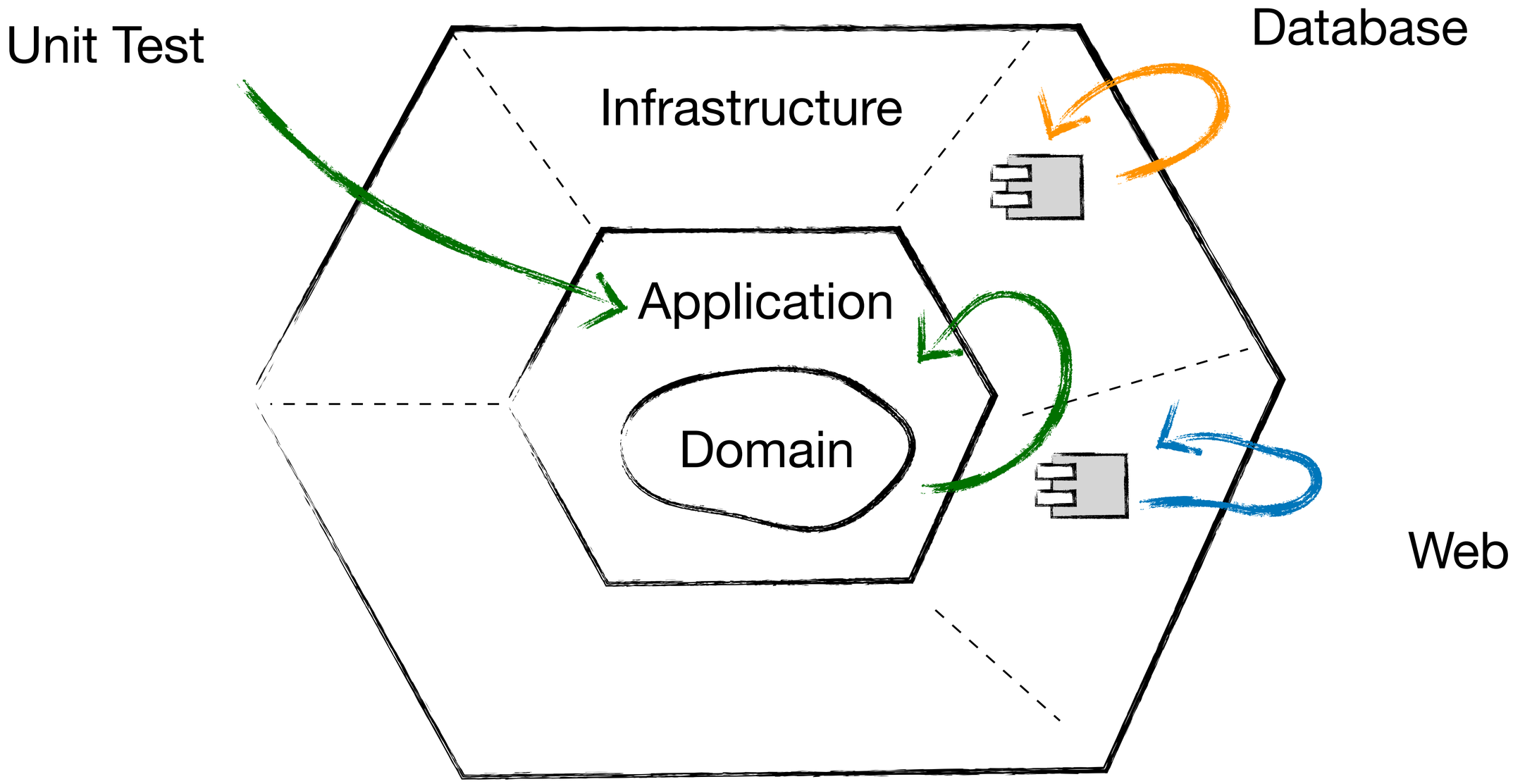

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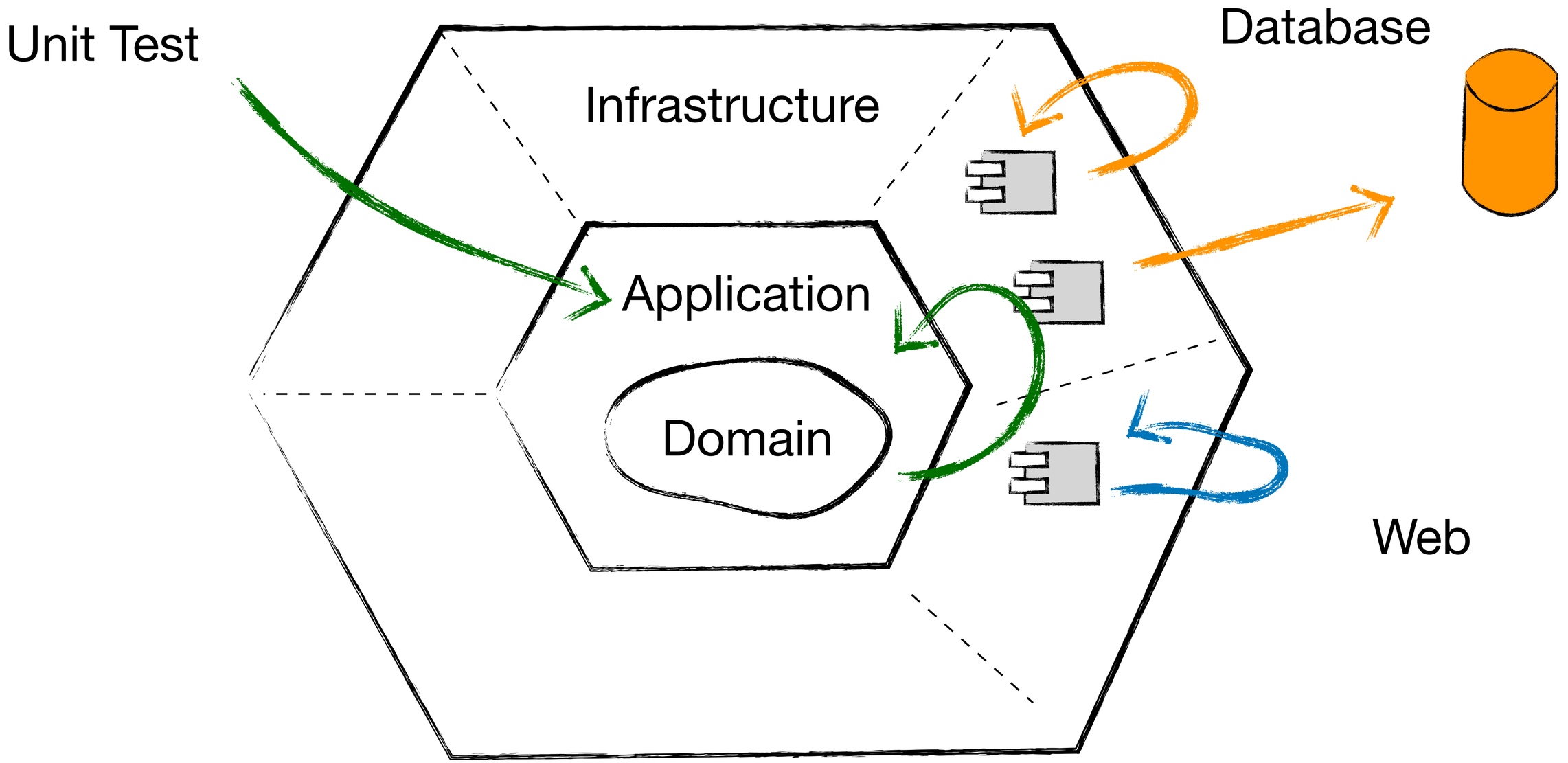

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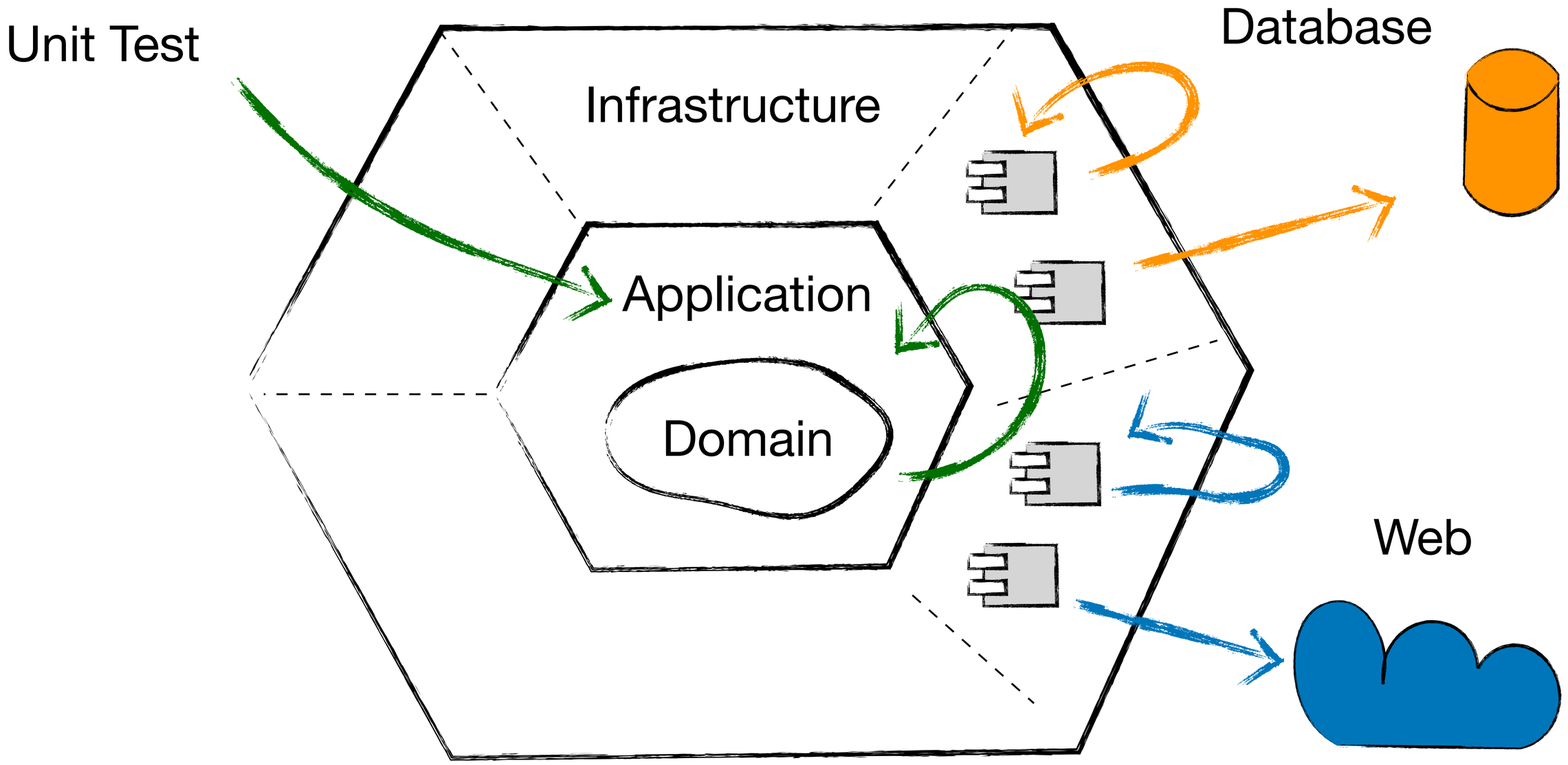

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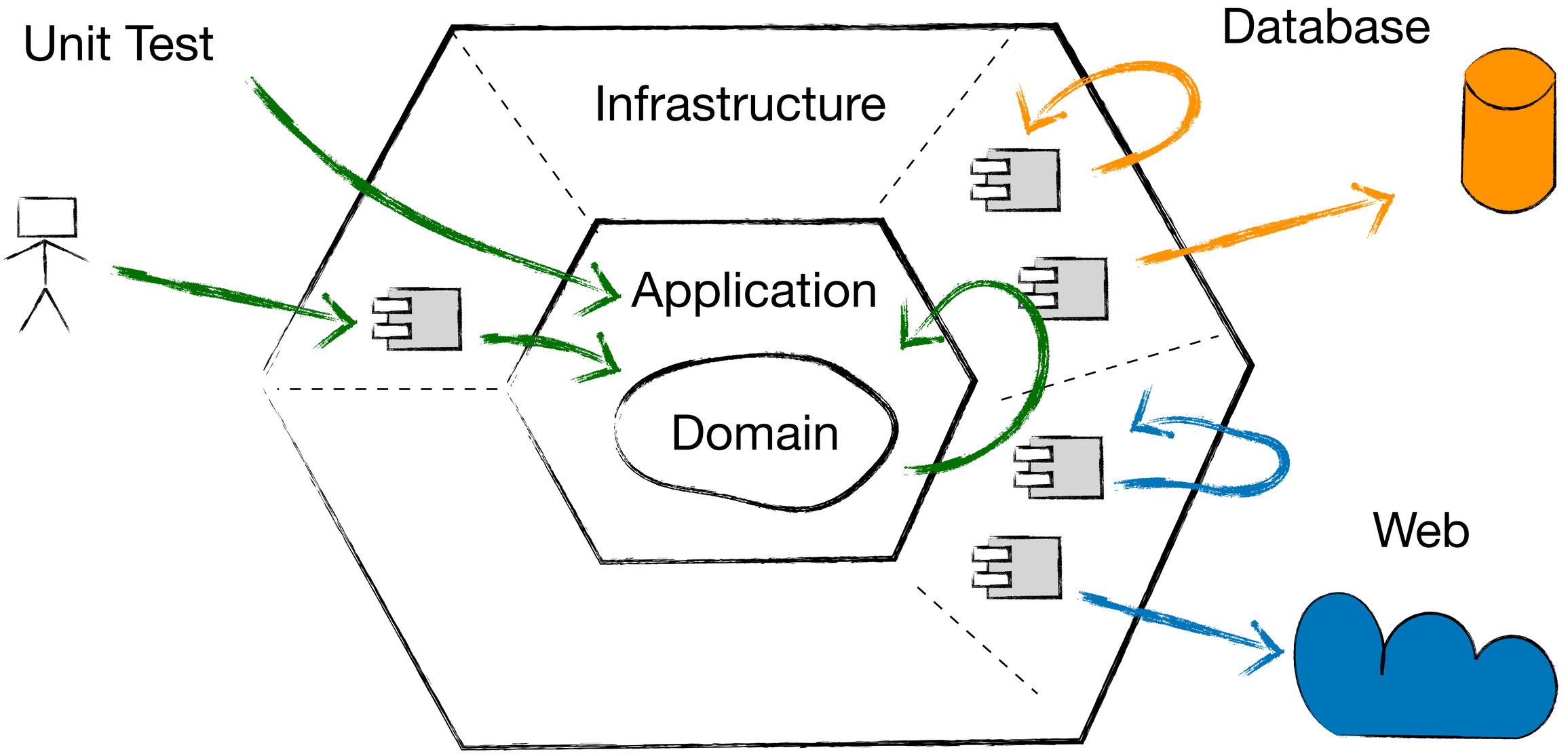

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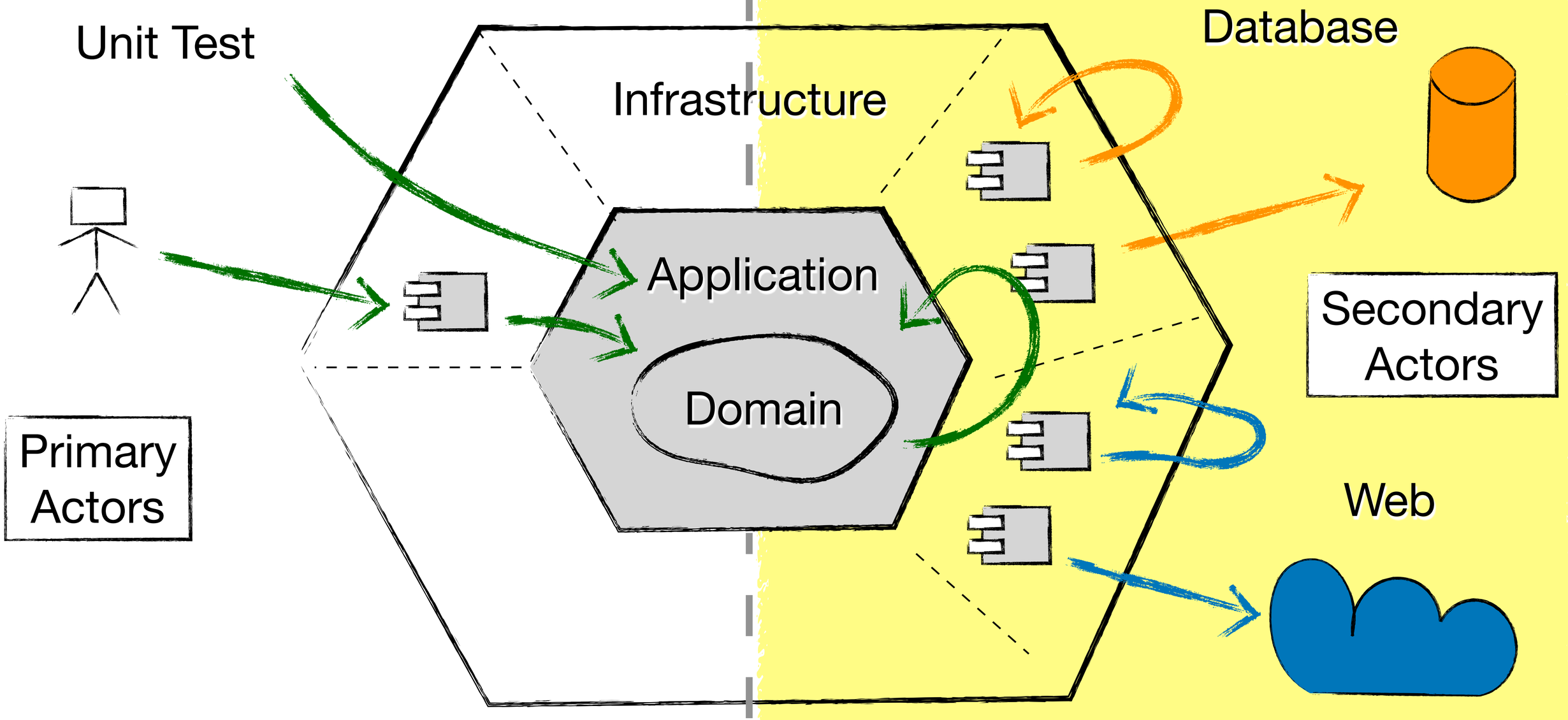
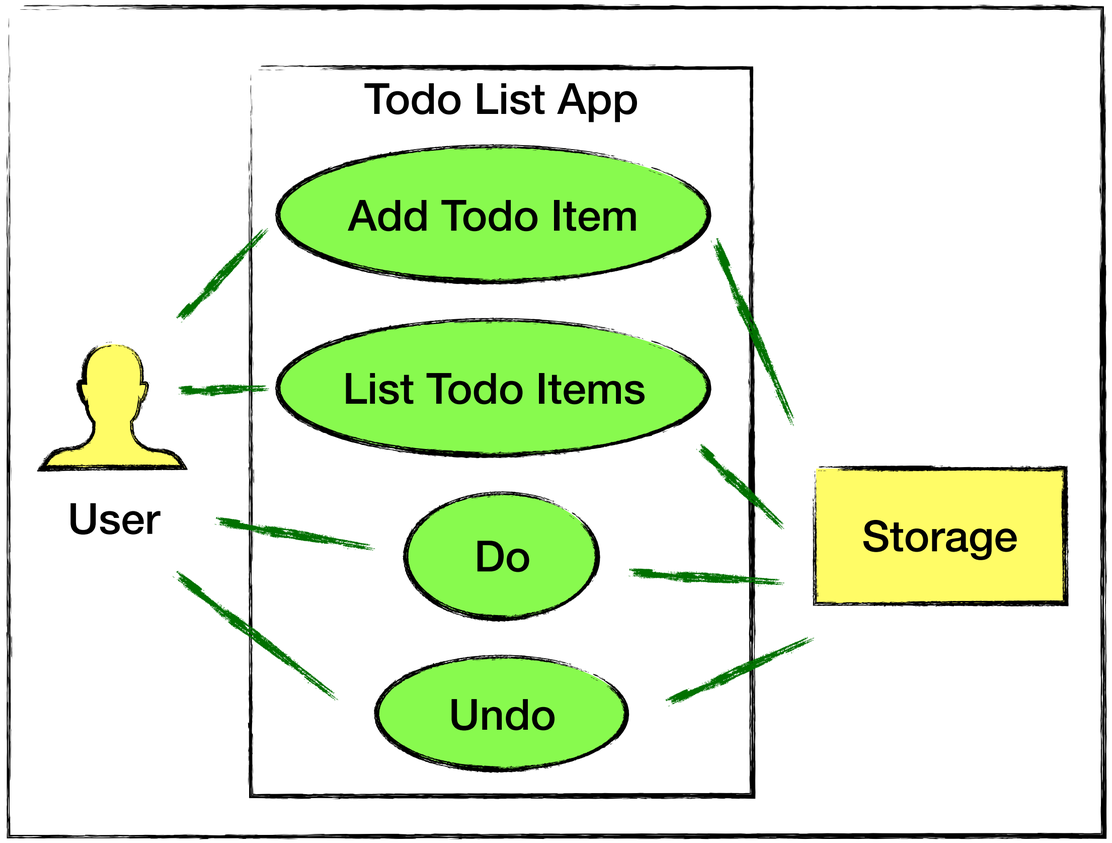


Evolutionary Architecture Definition:

An evolutionary architecture supports guided, incremental changes as a first principle across multiple dimensions.

Sample Application



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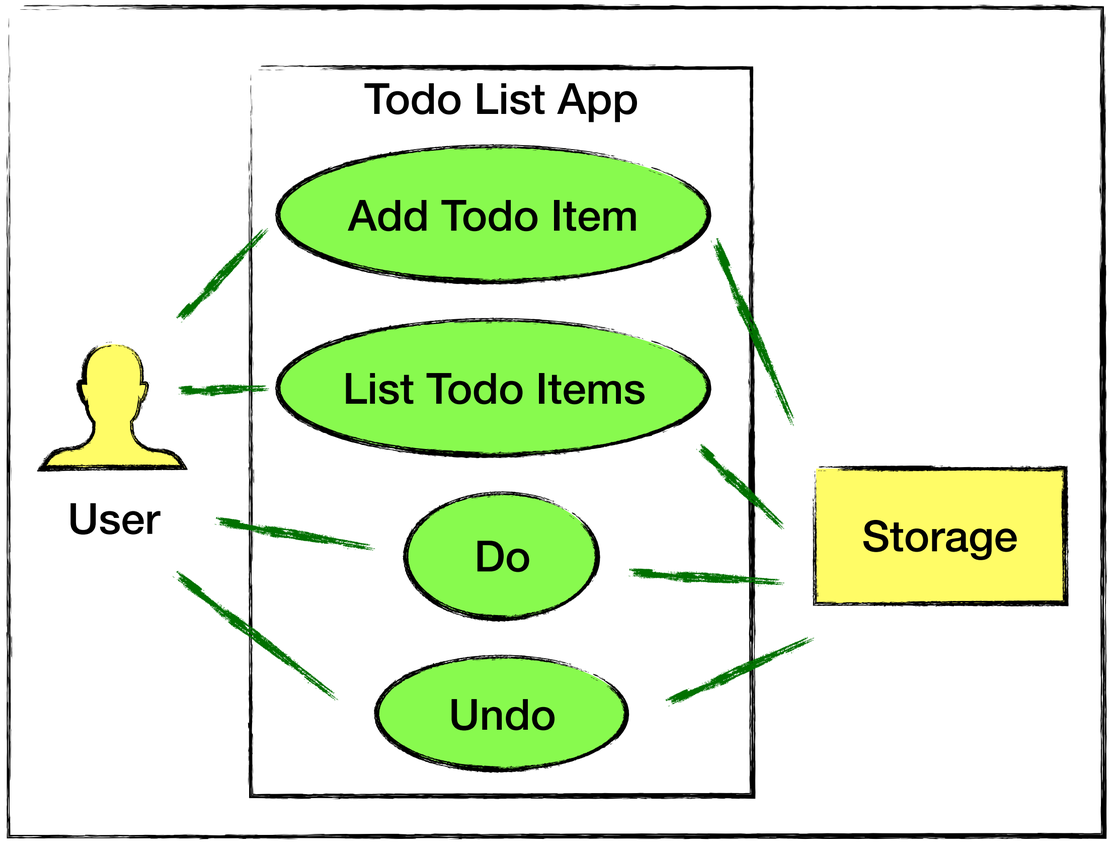
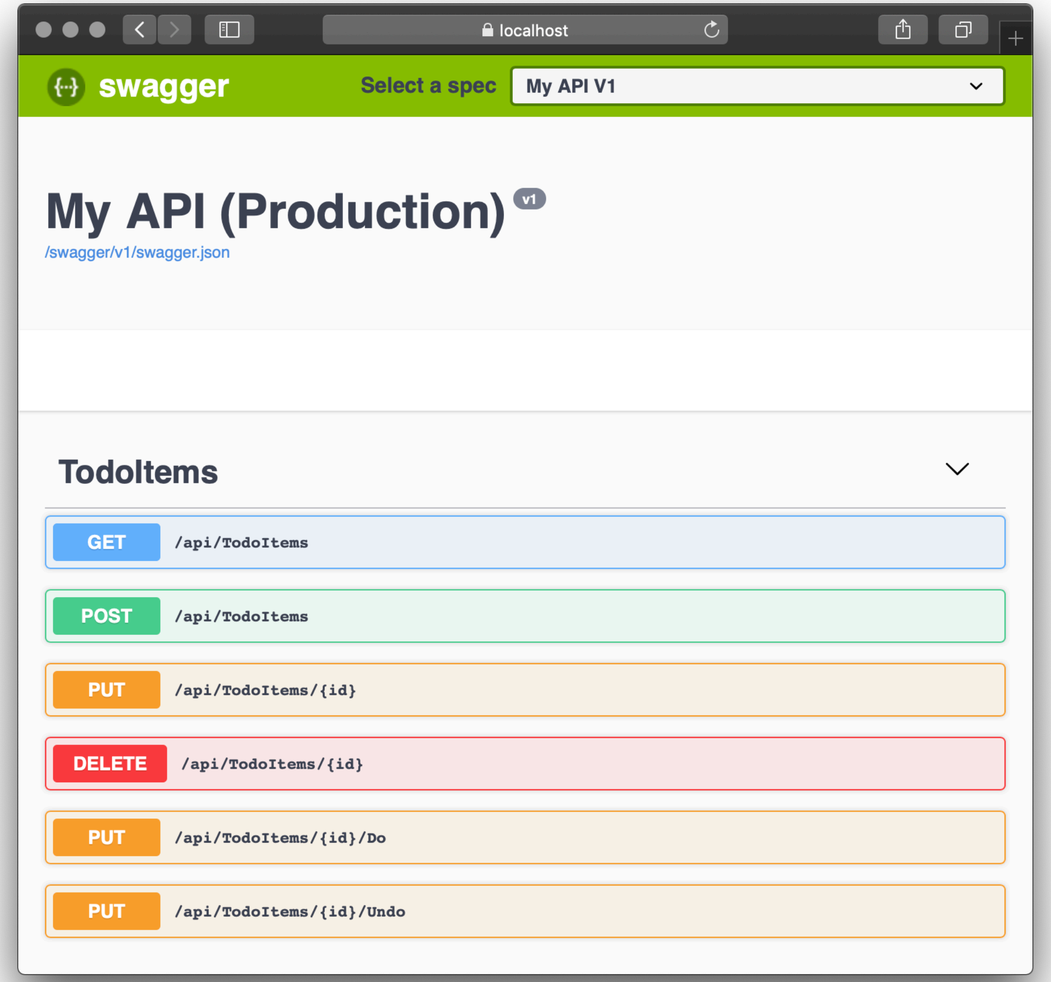
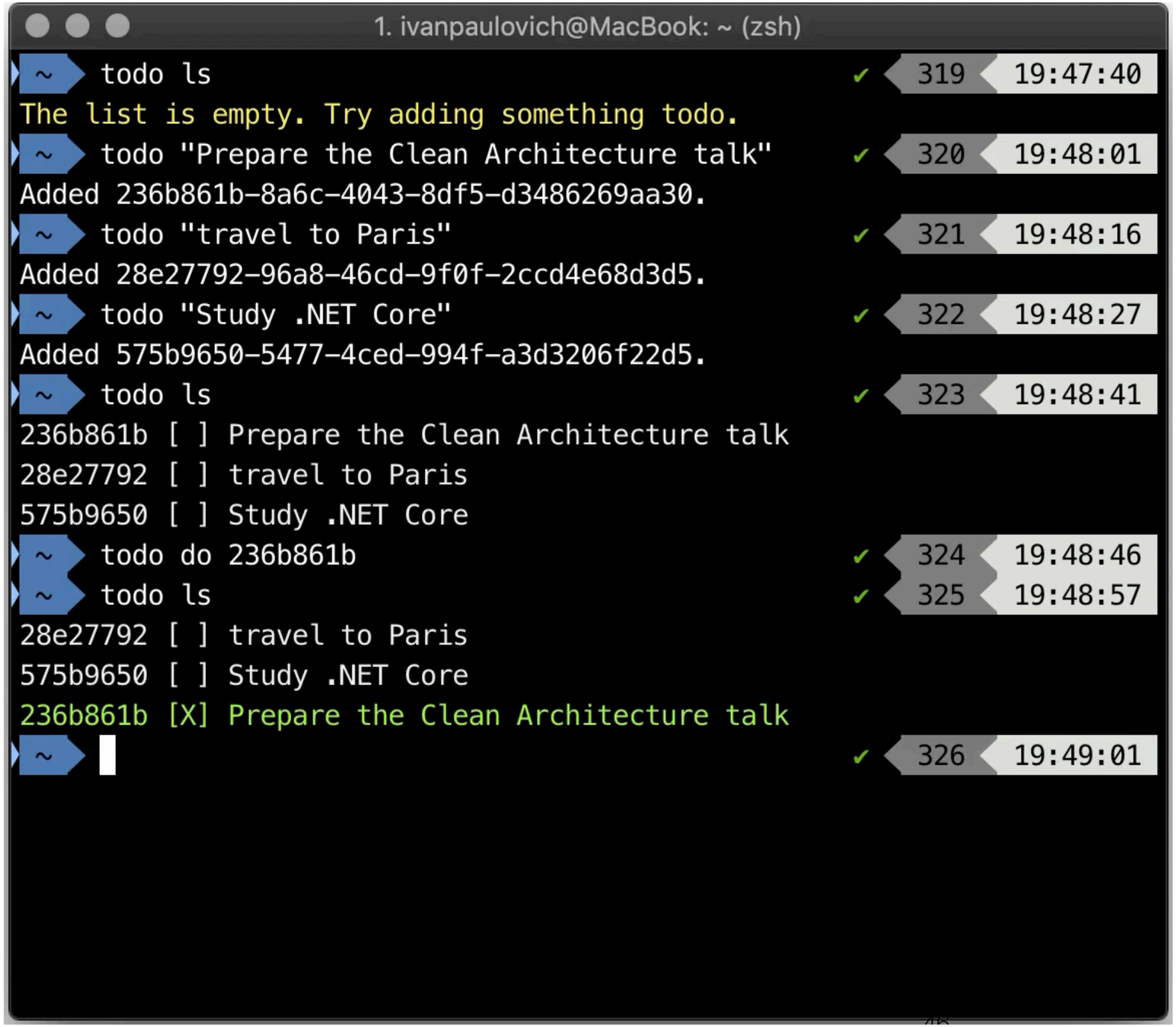






✅ Commad-Line Task management with storage on your GitHub 🔥

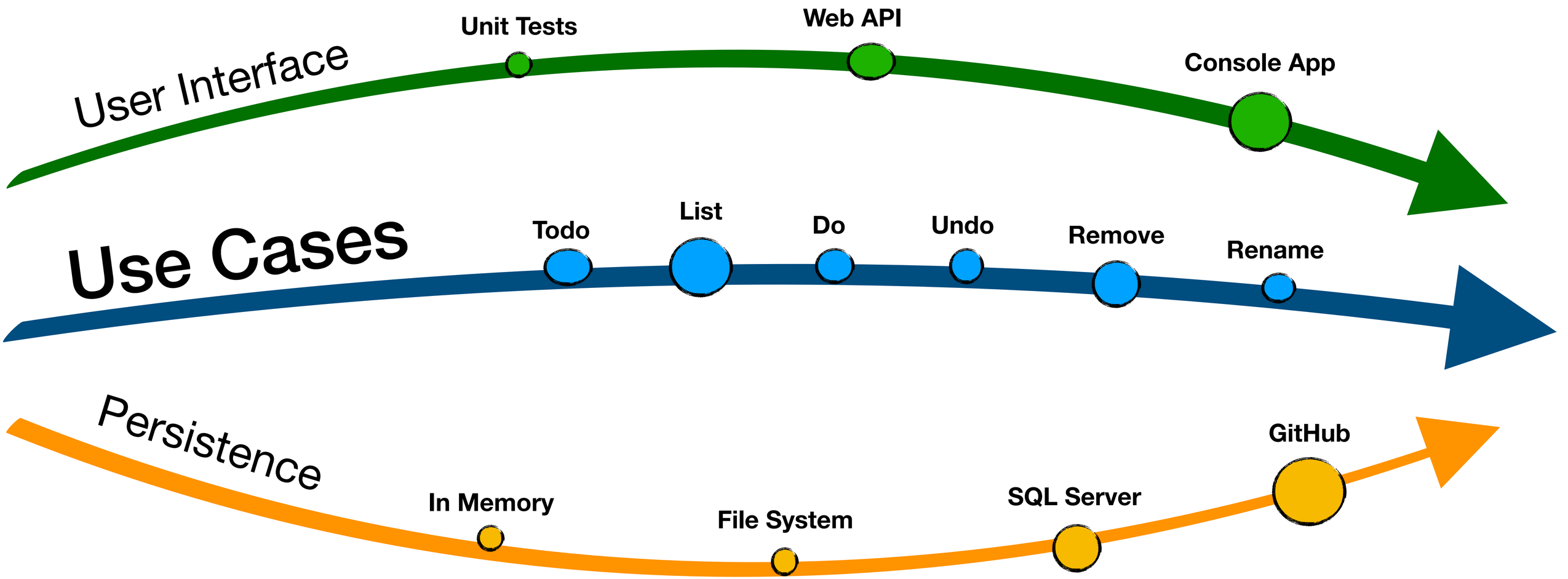
$ dotnet tool install -g todo

nuget v1.0.41 1.2k build passing

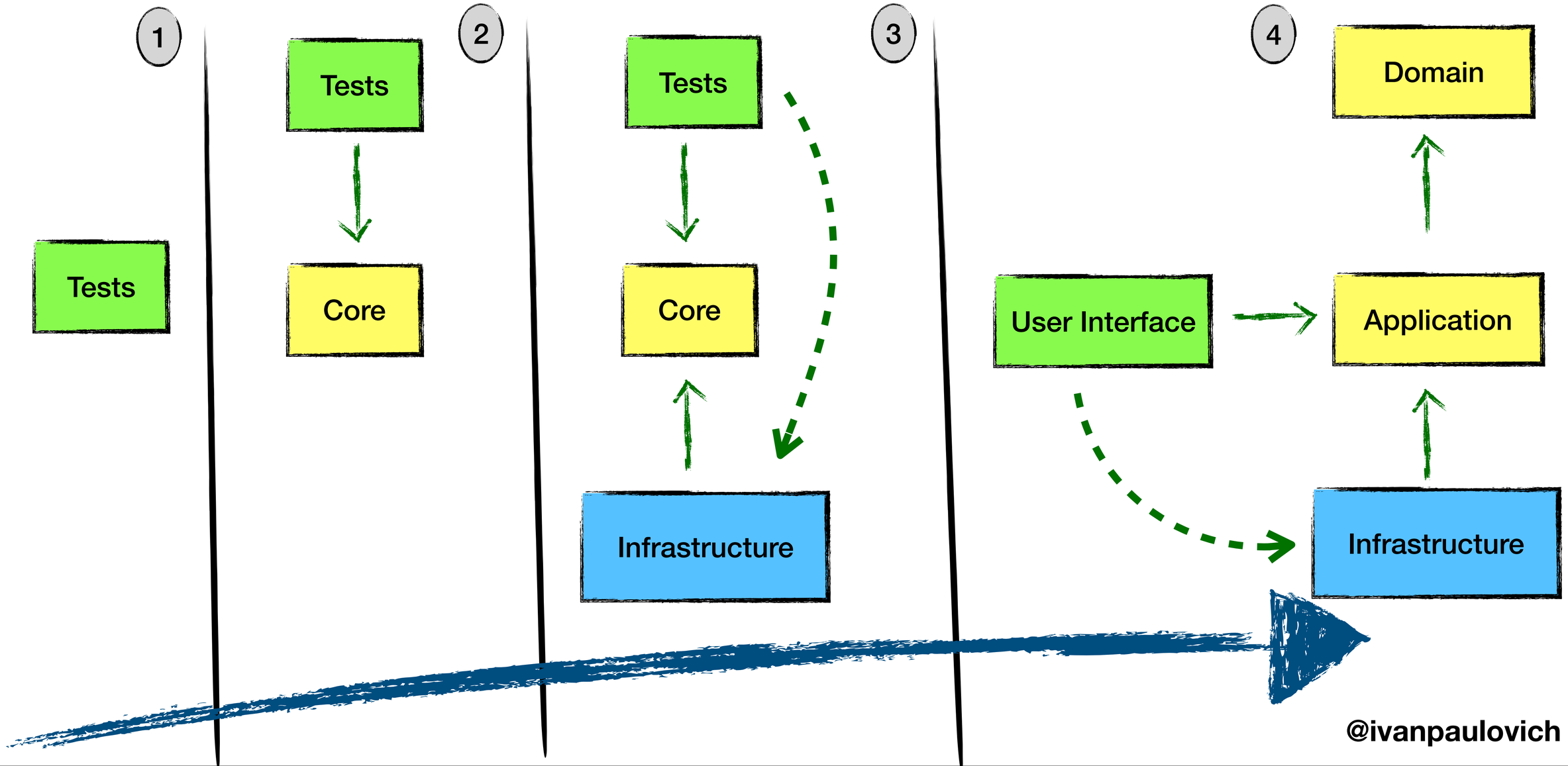
https://github.com/ivanpaulovich/todo

@ivanpaulovich

Evolutionary Architecture In Action



Packages on the software lifetime



Wrapping up Clean Architecture

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- Defer decisions by implementing the simplest component first.

Fork me on GitHub

✓ coding the `todo` CLI tool

Ivan Paulovich
ivanpaulovich

Edit profile

Software craftsman and speaker. TDD, DDD and SOLID on daily basis. Interested in Event Sourcing, CQRS, Hexagonal, Clean Architecture, Docker and Cloud

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ivan@paulovich.net
https://paulovich.net

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todo
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C# ★ 63 8

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C# ★ 139 19

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C# ★ 424 91

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An Hexagonal Architecture service template with DDD, CQRS, TDD and SOLID using .NET Core 2.0. All small features are testable and could be mocked. Adapters could be mocked or exchanged.
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