The DDD Layered Architecture

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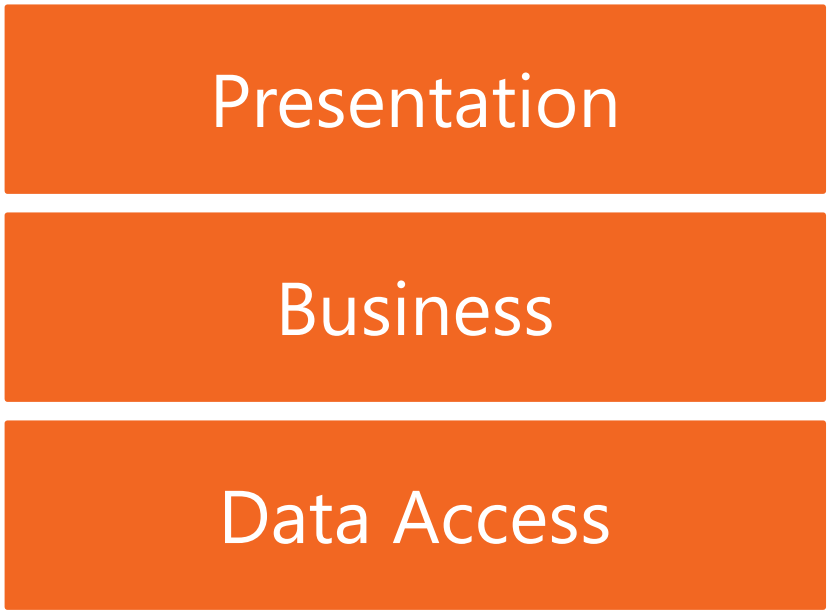
Layered Architecture
revisits the classic 3-tier architecture



Key Points

Layers and Tiers

Segmentation of a Software System

Domain Layer

Patterns for Organizing the Business Logic

Other Layers

From Presentation to Persistence

Spaghetti **vs**. Lasagna

Notably long and thin pasta which requires ad hoc tools to be served and experience to be eaten.

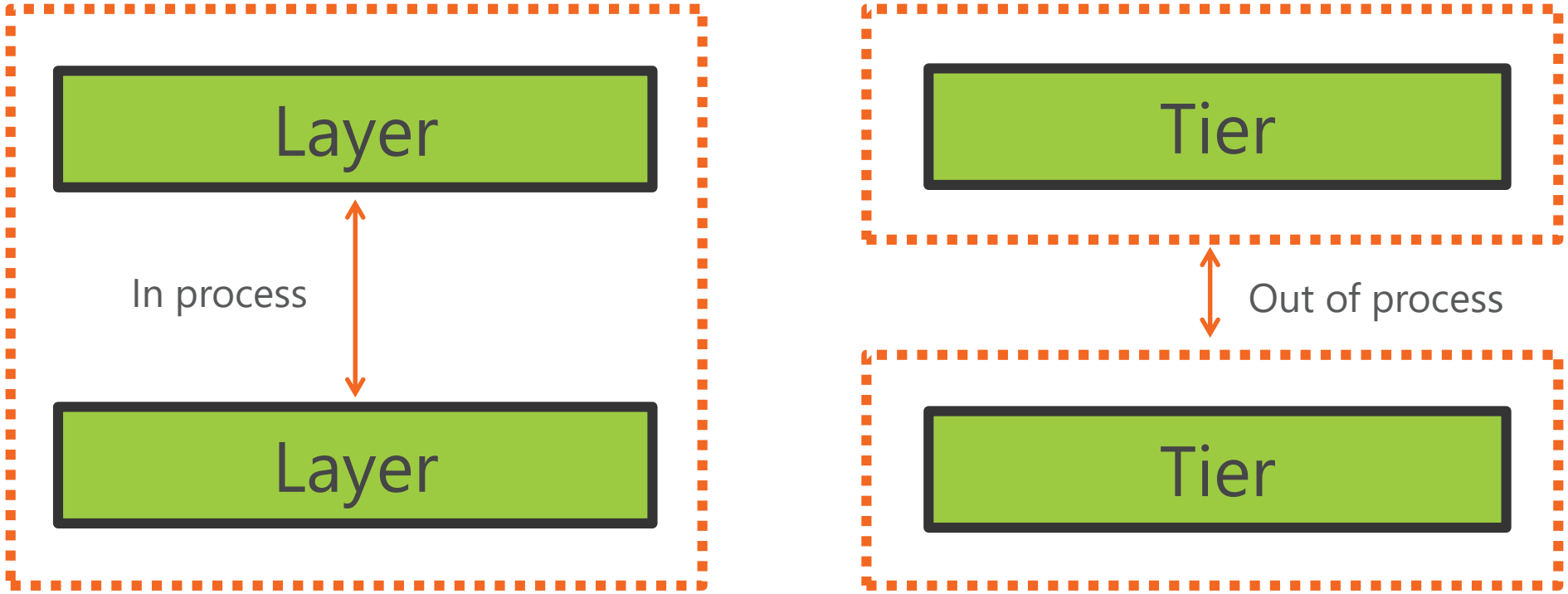
Layered block of noodles and toppings easy to cut in pieces to serve and eat.

Spaghetti-code vs. Lasagna-code

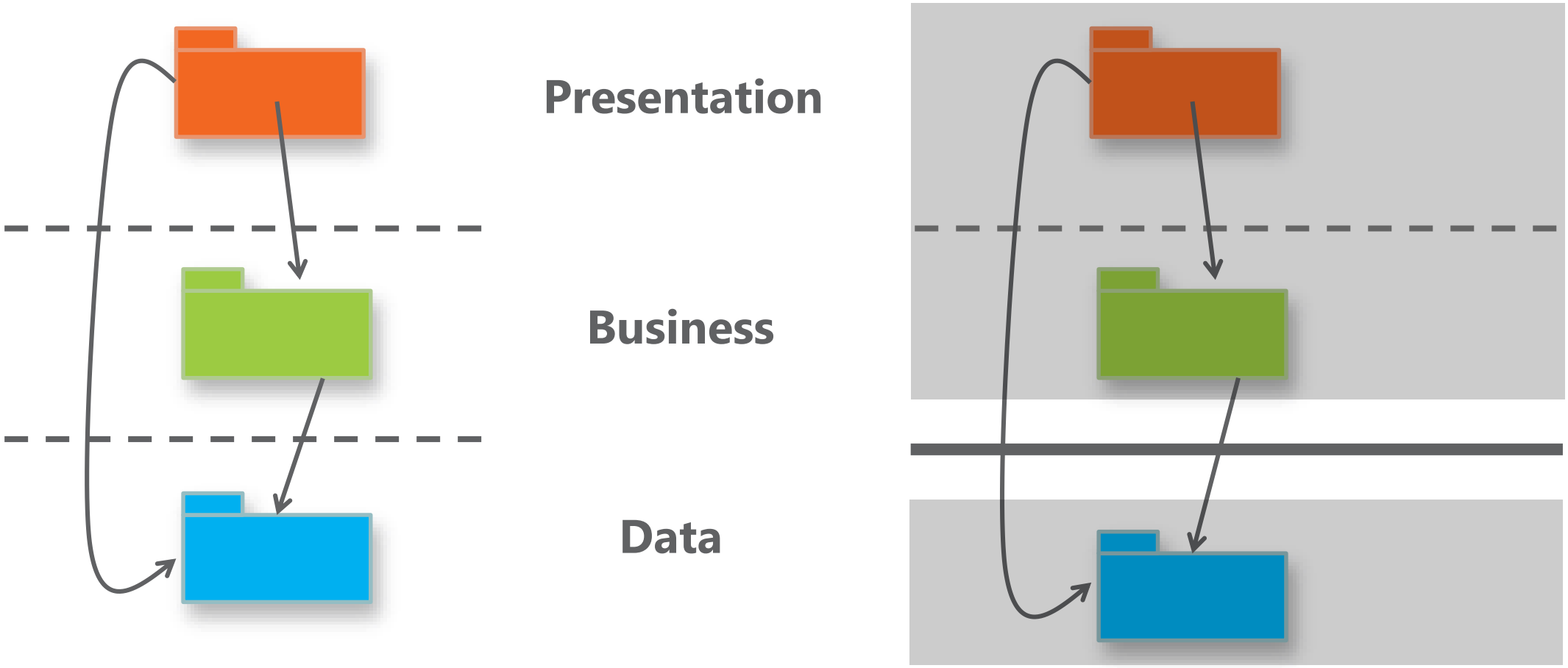
Messy tangle of instructions leading nowhere near to any flicker of solid software.

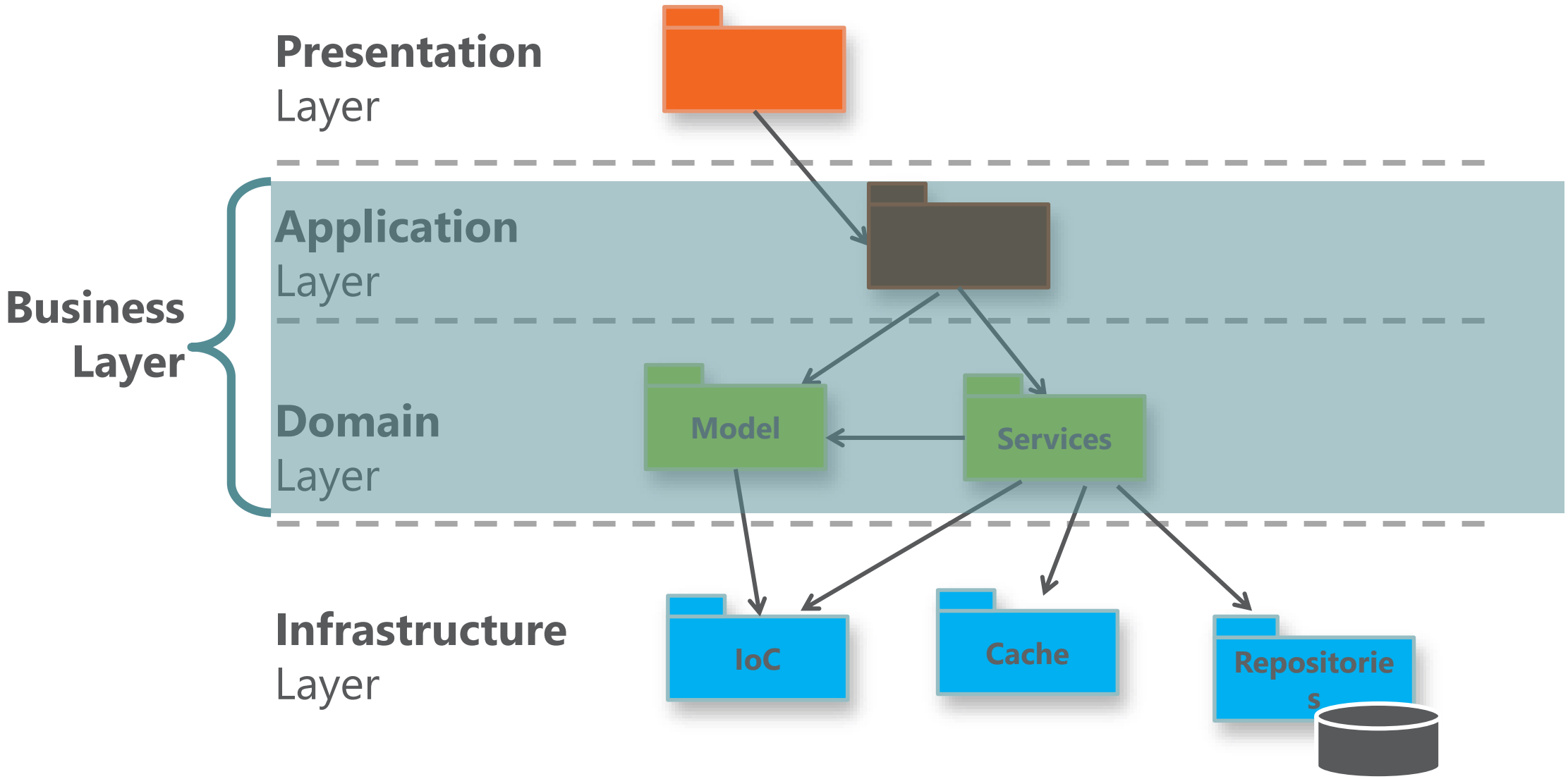
Layered block of modules easy to cut vertically and/or horizontally and easy to deploy.

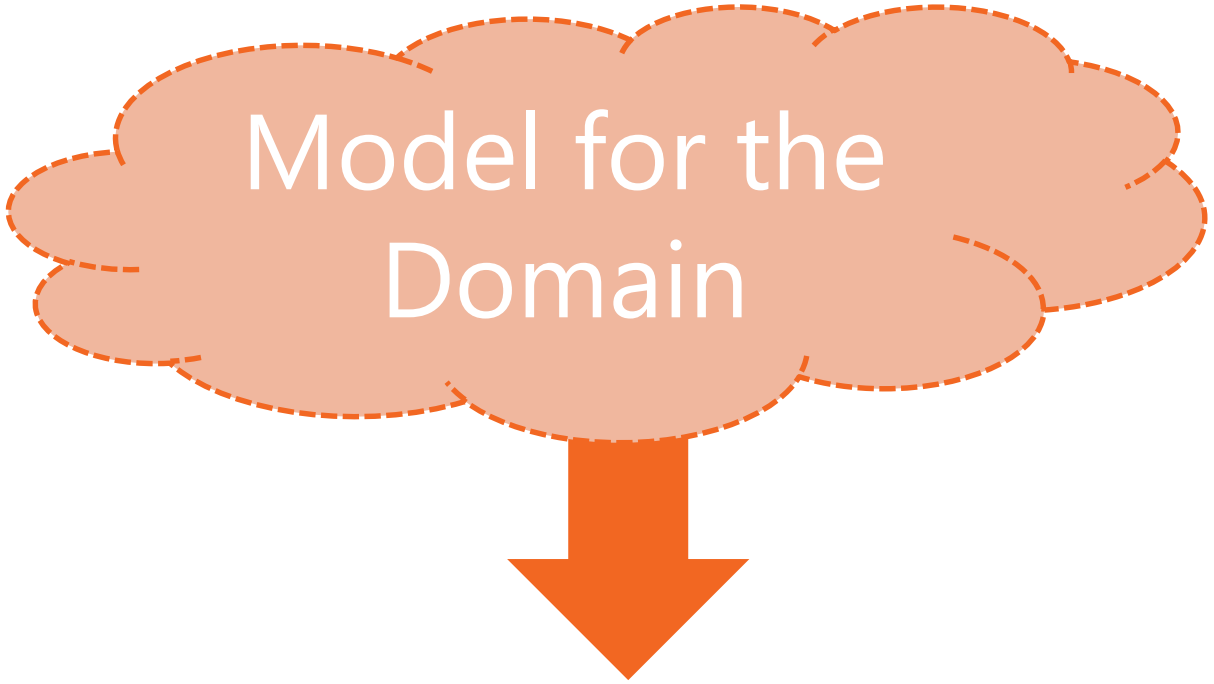
Segments of Code

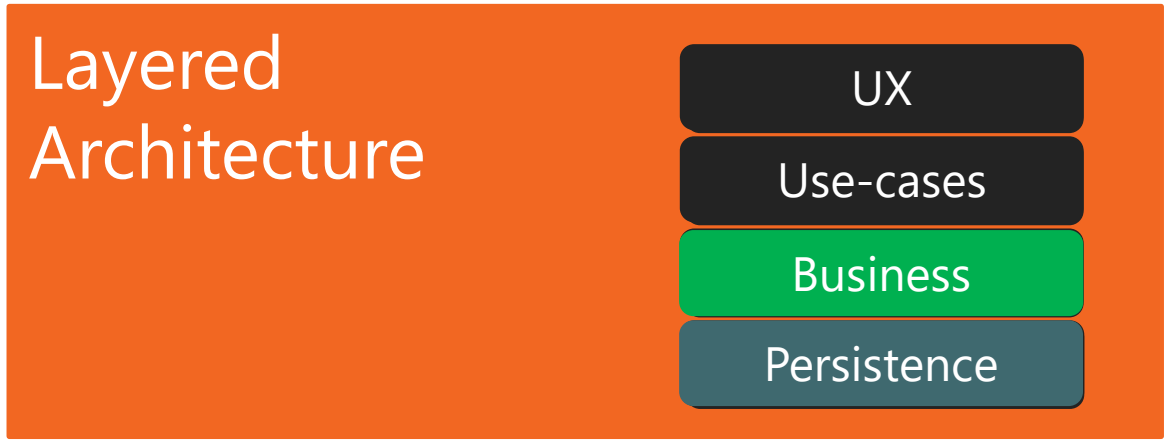


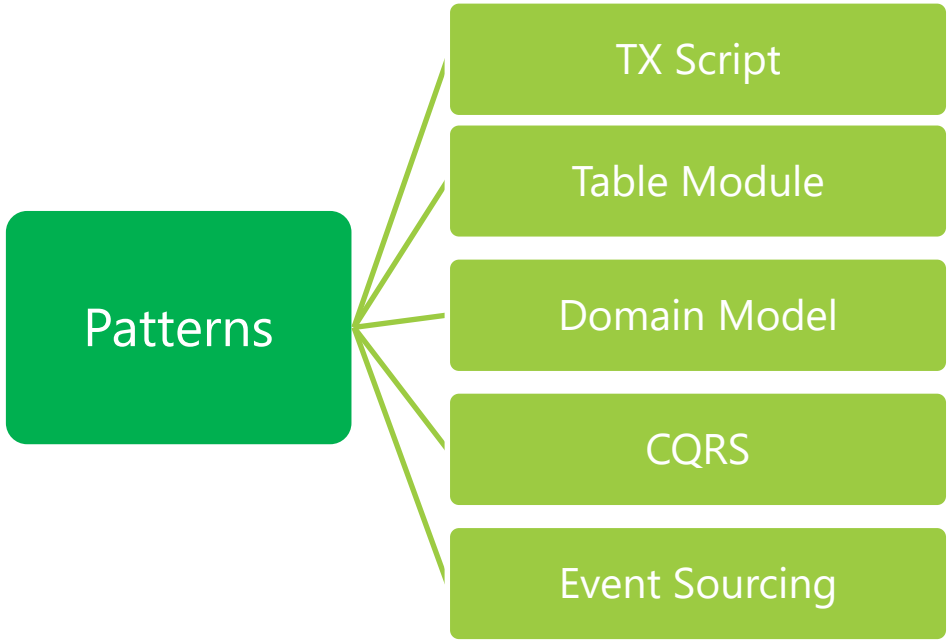
Classic 3-tier

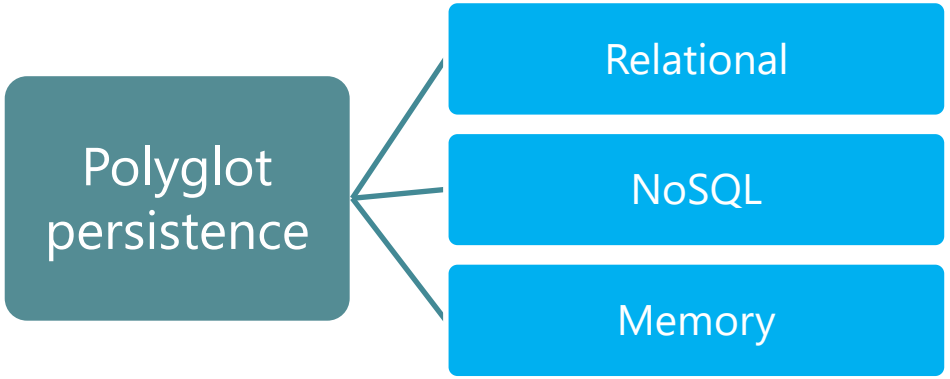


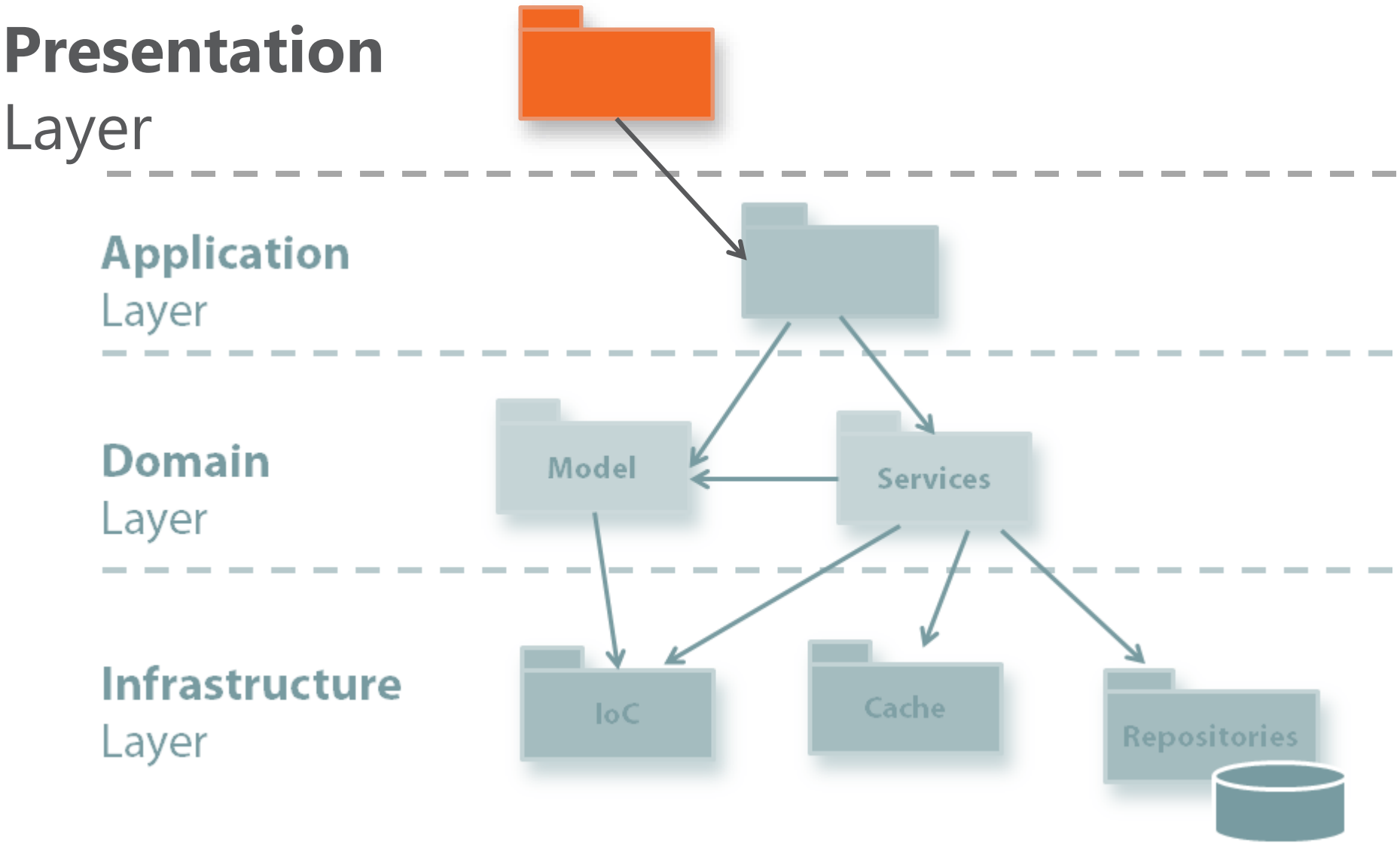


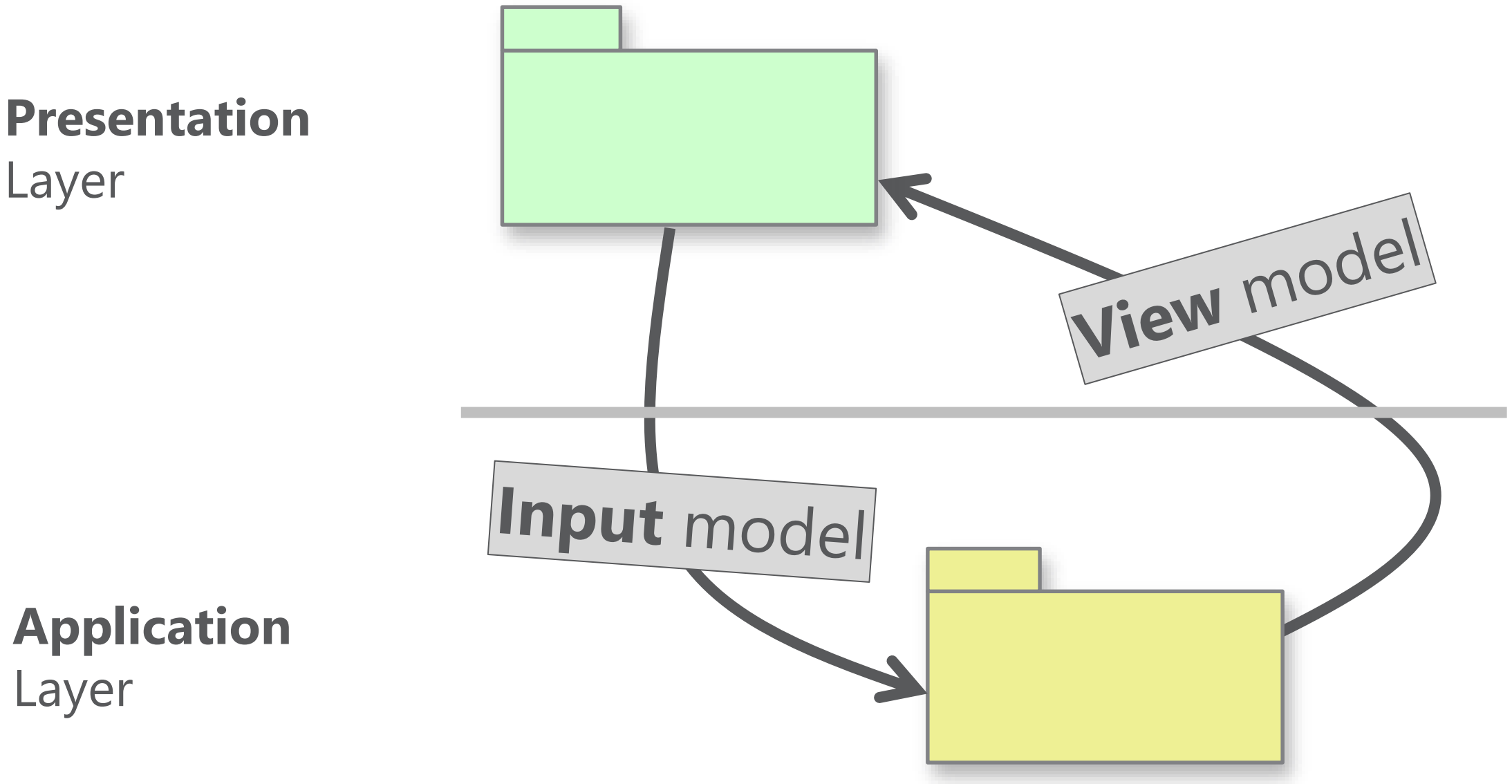












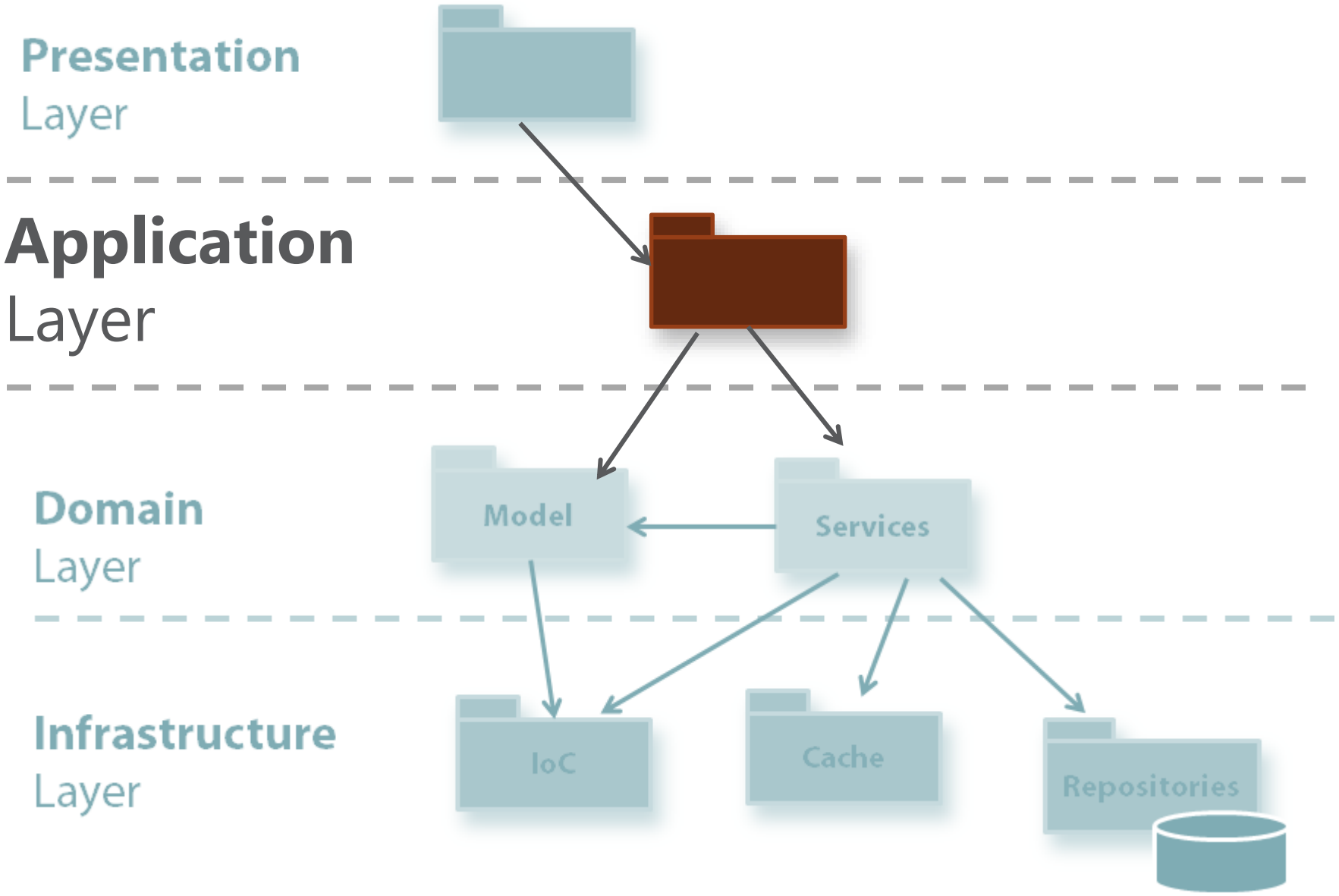
Most Critical Part of Modern Applications

Responsible for providing the **user interface** to accomplish any required tasks.

Responsible for providing an effective, smooth and pleasant **user experience**.

Attributes of Presentation Layer

- Task-based
- Device-friendly
- User-friendly
- Faithful to real-world processes



Fifty Shades of Gray Areas

Where does code that formats data for presentation purposes really belong?

You said that. It's clearly a presentation concern.

To me, it sounds more like a business logic aspect.

Data is data and the database returns the data.

The Application Layer

Reports to the presentation

Serves ready-to-use data in the required form

Orchestrates tasks triggered by presentation elements

Use-cases of the application's frontend

Doubly-linked with presentation

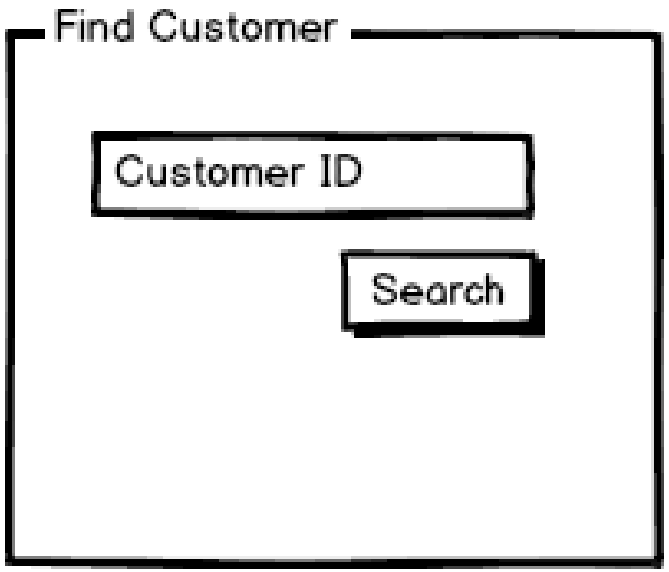
Possibly extended or duplicated when a new frontend is added

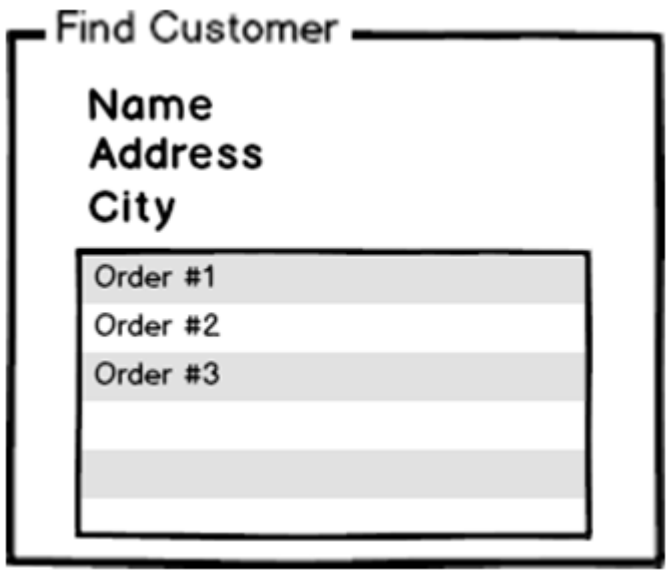
```
public class HomeController
{
    private readonly IHomeApplicationService _service;
    public HomeController(IHomeApplicationService service)
    {
        _service = service;
    }
    public ActionResult Index()
    {
        var model = _service.FillHomePage( /* input model */ );
        return View(model);
    }
    ...
}
```

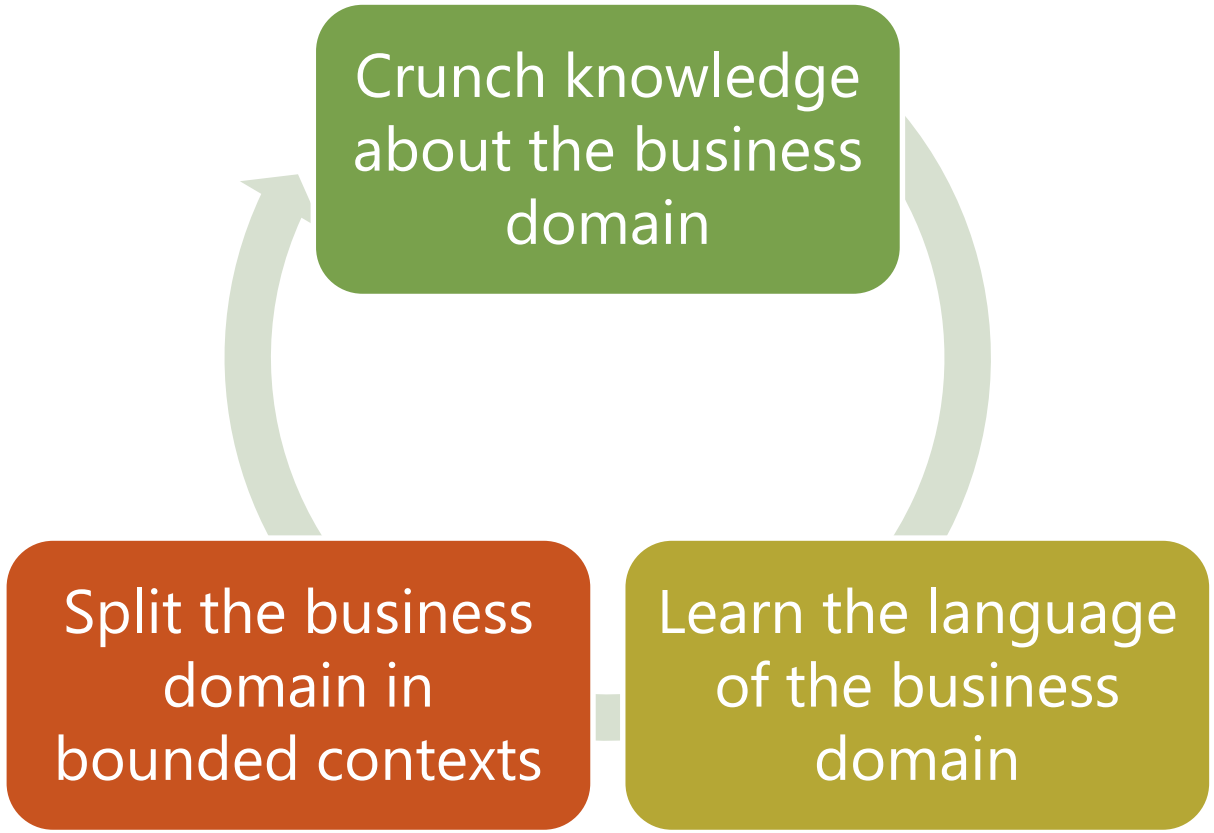
Orchestrator

```
public class InputModel
{
   string Id {get; set;}
}
public class CustomerService
{
   ViewModel Search(InputModel m);
}
```

```
public class ViewModel
{
   string Name {get; set;}
   string Address {get; set;}
   string City {get; set;}
   IList<OrderDto> Orders {get; set;}
}
```







What's Next?

It’s all about implementing all business rules and organizing the business logic.

Business Logic—An Abstract Definition

Application Logic

Dependent on use-cases

- Application entities
- Application workflow components

Domain Logic

Invariant to use-cases

- Business entities
- Business workflow components

Business Logic—DDD Definition

Application Logic

Dependent on use-cases

- Data transfer objects
- Application services

Domain Logic

Invariant to use-cases

- Domain model
- Domain services

BUSINESS RULE

Statements that detail the implementation of a business process or describe a business policy to be taken into account.

PATTERNS for organizing the business logic

Domain logic is all about baking business rules into the code

Common Patterns

TX SCRIPT

TABLE MODULE

DOMAIN MODEL

Transaction Script **Pattern**

System actions

- Each procedure handles a single task

Logical transaction

- end-to-end from presentation to data

Common subtasks

- split into bounded sub-procedures for reuse

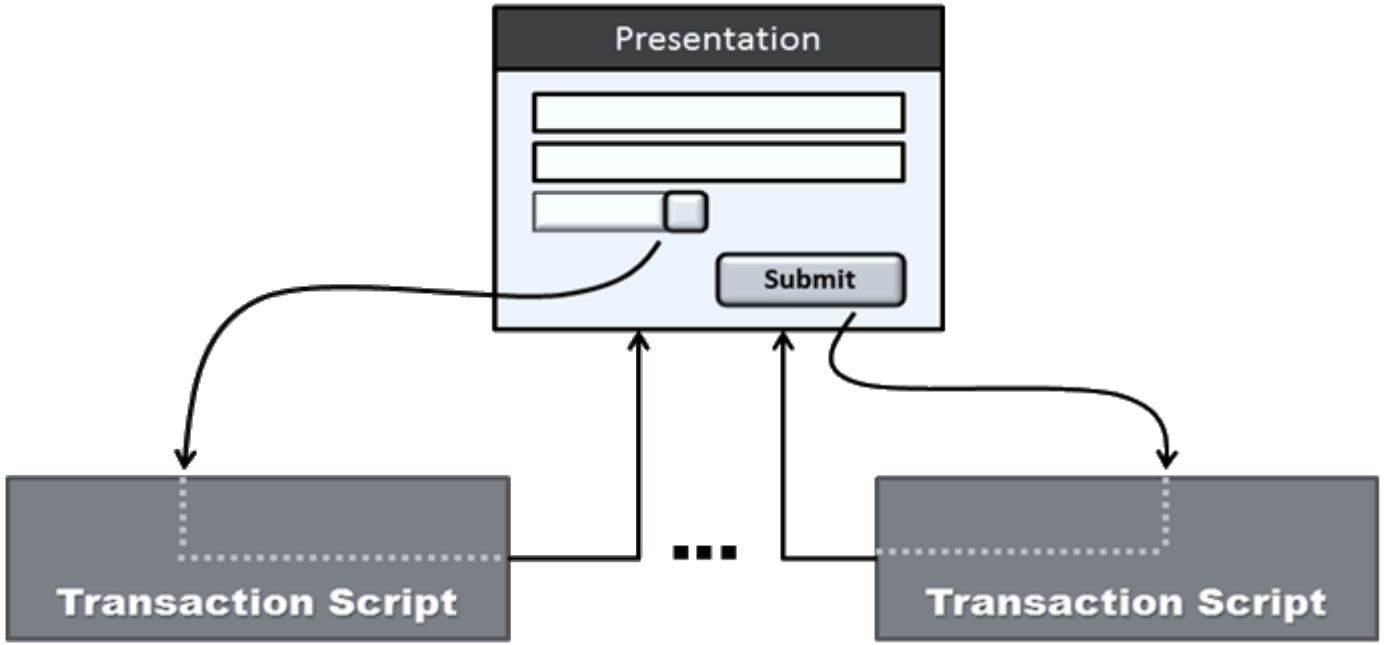


Table Module **Pattern**

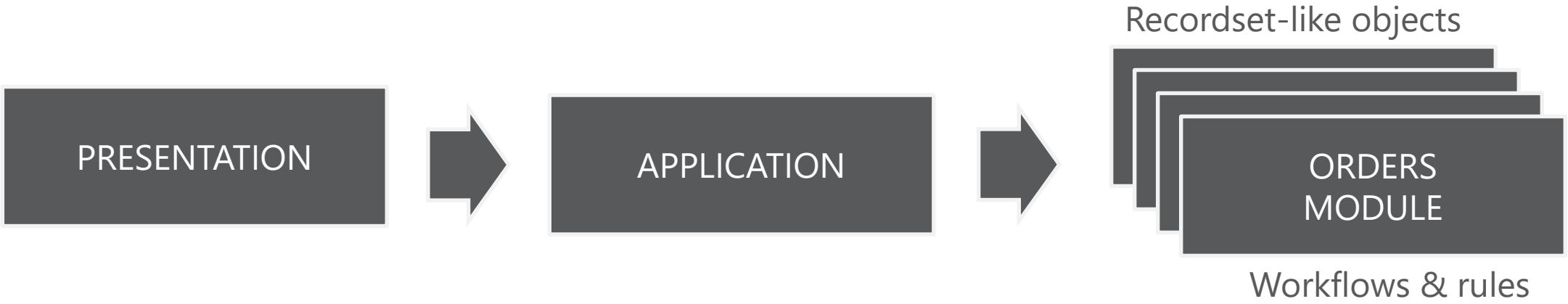
One module per table in the database

Module contains all methods that will process the data

- Both queries and commands

May limit modules to "significant" tables

- Tables with only outbound foreign-key relationships



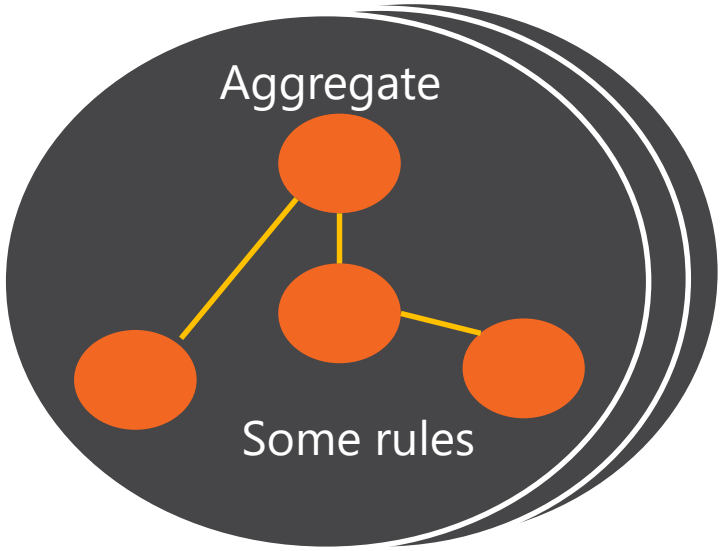
Domain Model **Pattern**

Aggregated objects

- Data and behavior

Persistence agnostic

Paired with domain services



Workflows & rules

Domain Layer

Logic invariant to use-cases

- Domain model
- Domain services

Not necessarily
an implementation of the **Domain Model** pattern

Takes care
of persistence tasks

Domain Model

Models for the business domain	**Object-oriented entity model**
	Functional model
Guidelines for classes in an entity model	**DDD conventions** (factories, value types, private setters)
	Data and behavior
Anemic model	**Plain data containers** Behavior and rules **moved** to domain services

Domain Services

Pieces of domain logic that don't fit into any of the existing entities

Classes that group logically related behaviors

- Typically operating on multiple domain entities

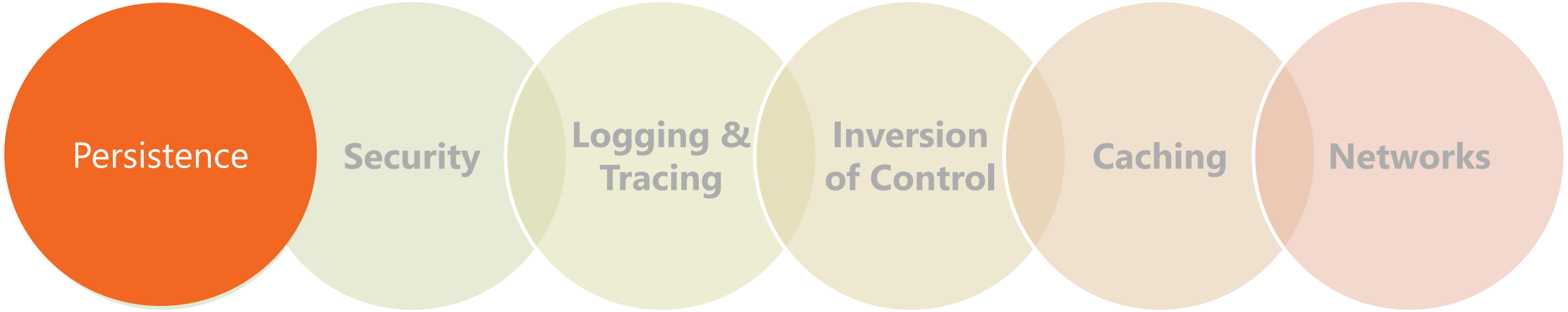
Implementation of processes that

- Require access to the persistence layer for reads and writes
- Require access to external services

Infrastructure (software)

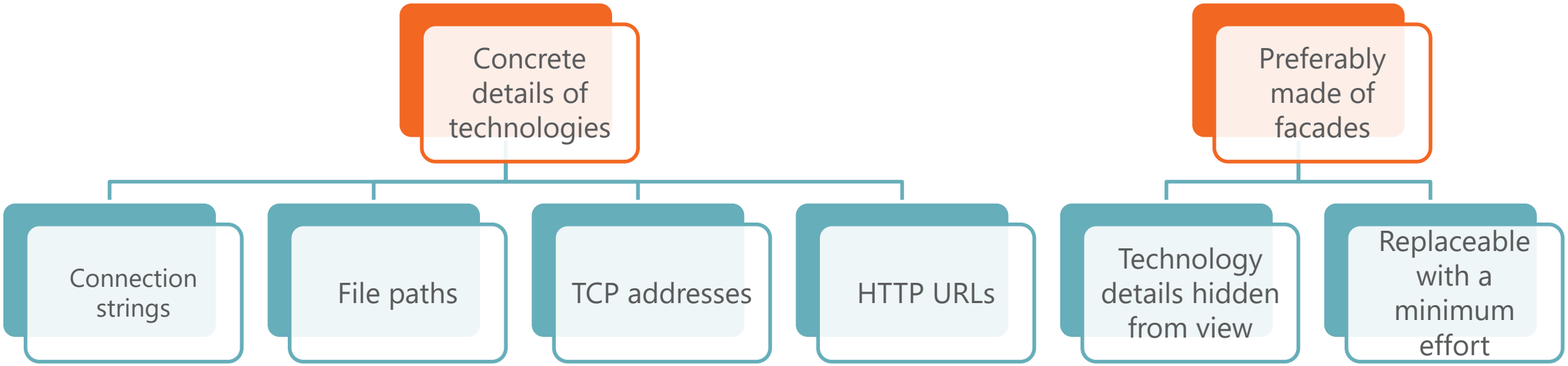
Set of the fundamental facilities needed for the operation of a software system.

Fundamental Facilities of Software Systems



Down Where Technologies Belong

Necessary to fuel the system



Not binding the system to specific products

What's Next?