# DI Why?

## Getting a Grip on Dependency Injection

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## Typical Introduction

```
private void BuildMainWindow()
{
    var builder = new ContainerBuilder();

    builder.RegisterType<SQLReader>().As<IPersonReader>()
        .SingleInstance();

    builder.RegisterSource(
        new AnyConcreteTypeNotAlreadyRegisteredSource());

    IContainer Container = builder.Build();

    Application.Current.MainWindow =
        Container.Resolve<PeopleViewerWindow>();
}
```

## What Is Dependency Injection?

- Dependency Injection is a software design pattern that allows a choice of component to be made at run-time rather than compile time.
    - Wikipedia 2012

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- Dependency injection is a software design pattern that allows the removal of hard-coded dependencies and makes it possible to change them, whether at run-time or compile-time.
  - Wikipedia 2013

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- Dependency injection is a software design pattern that implements inversion of control and allows a program design to follow the dependency inversion principle. The term was coined by Martin Fowler.
  - Wikipedia 2014

## What Is Dependency Injection?

- In software engineering, dependency injection is a software design pattern that implements inversion of control for software libraries, where the caller delegates to an external framework the control flow of discovering and importing a service or software module. Dependency injection allows a program design to follow the dependency inversion principle where modules are loosely coupled. With dependency injection, the client part of a program which uses a module or service doesn't need to know all its details, and typically the module can be replaced by another one of similar characteristics without altering the client.
    - Wikipedia 2015

## What Is Dependency Injection?

- In software engineering, dependency injection is a software design pattern that implements inversion of control for resolving dependencies. A dependency is an object that can be used (a service). An injection is the passing of a dependency to a dependent object (a client) that would use it. The service is made part of the client's state.[1] Passing the service to the client, rather than allowing a client to build or find the service, is the fundamental requirement of the pattern.
  - Wikipedia 2016

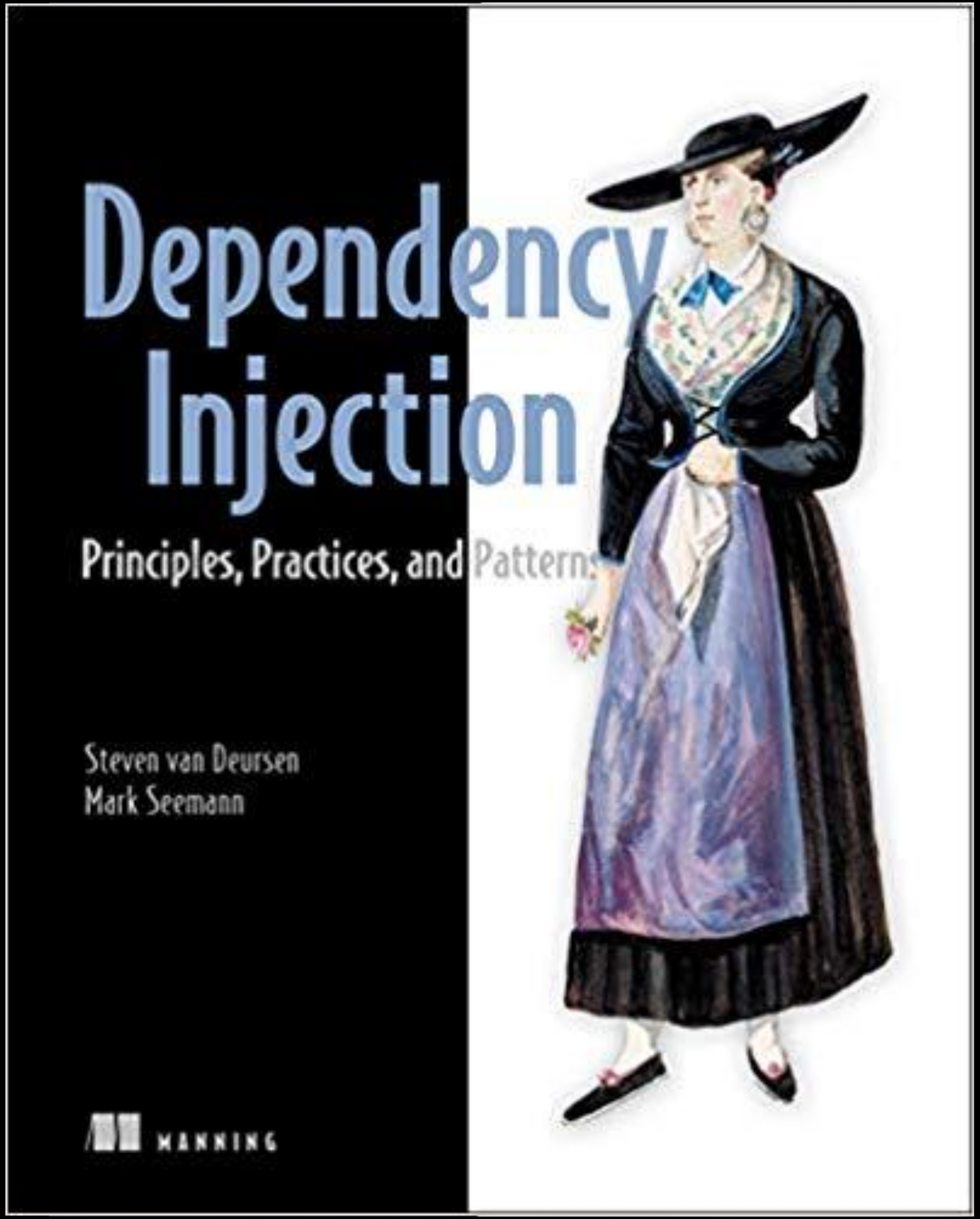
## What Is Dependency Injection?

- Dependency Injection is a set of software design principles and patterns that enable us to develop loosely coupled code.

  - Mark Seemann

## Dependency Injection
Principles, Practices, and Patterns

- Mark Seemann
- Steven van Deursen



## Primary Benefits

- Extensibility
- Parallel Development
- Maintainability
- Testability
- Late Binding

- Adherence to S.O.L.I.D. Design Principles.

## Extensibility

Code can be extended in ways not explicitly planned for.

## Parallel Development

Code can be developed in parallel with less chance of merge conflicts.

## Maintainability

Classes with clearly defined responsibilities are easier to maintain.

## Testability

Classes can be unit tested,
i.e., easily isolated from other classes
and components for testing.

## Late Binding

Services can be swapped with other services without recompiling code.

## SOLID Principles

- Single Responsibility Principle (SRP)
- Open/Closed Principle (OCP)
- Liskov Substitution Principle (LSP)
- Interface Segregation Principle (ISP)
- Dependency Inversion Principle (DIP)

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## Dependency Injection Concepts

- DI Design Patterns
  - Constructor Injection
  - Property Injection
  - Method Injection
  - Ambient Context
  - Service Locator
- Dimensions of DI
  - Object Composition
  - Interception
  - Lifetime Management

## Dependency Injection Containers

- C# Containers
  - Autofac
  - Ninject

- Frameworks w/ Containers
  - ASP.NET Core
  - Angular
  - Prism

  and many others

## Application Layers

View

- PeopleViewerWindow

Presentation

- PeopleViewModel

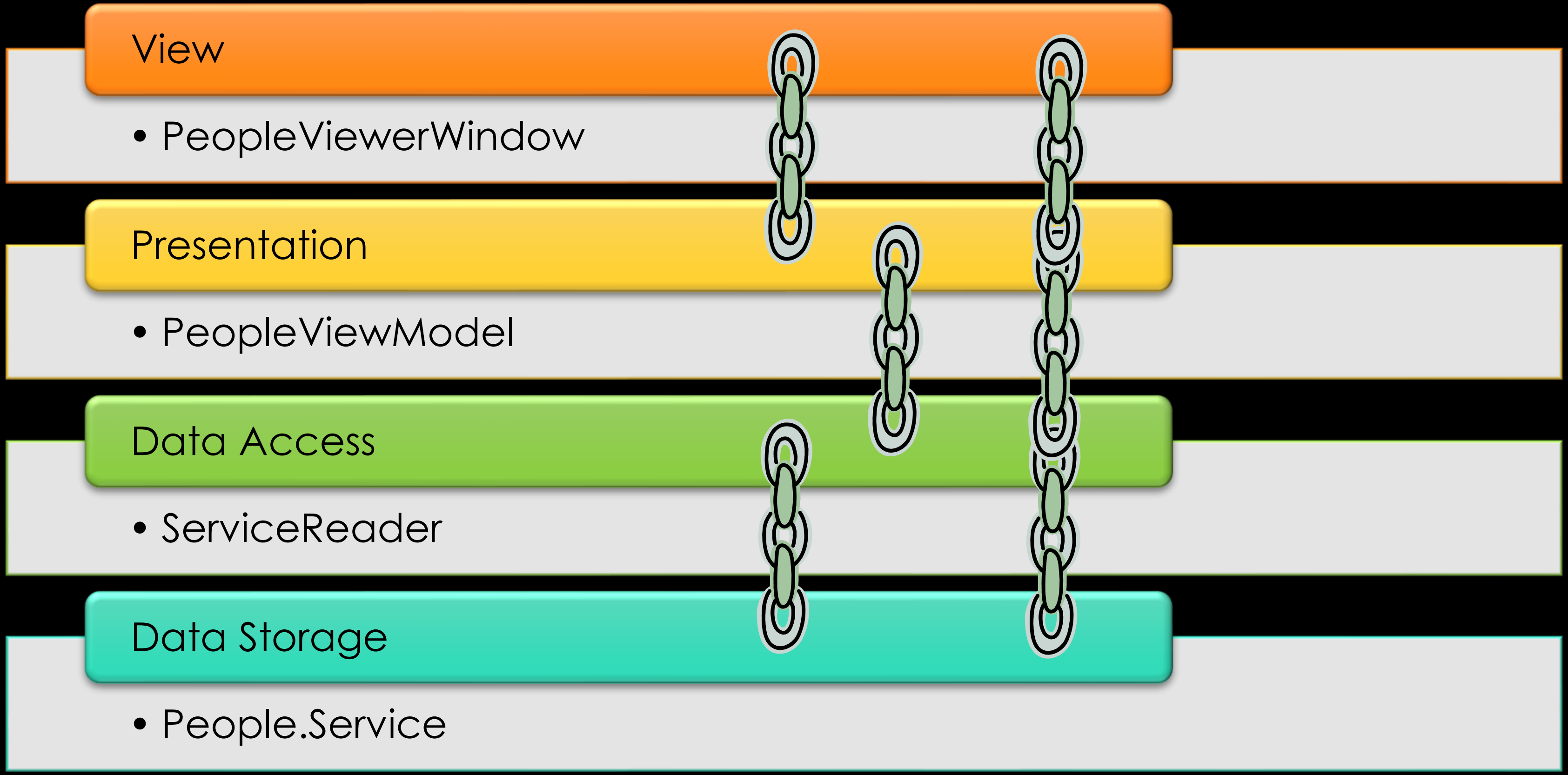
Data Access

- ServiceReader

Data Storage

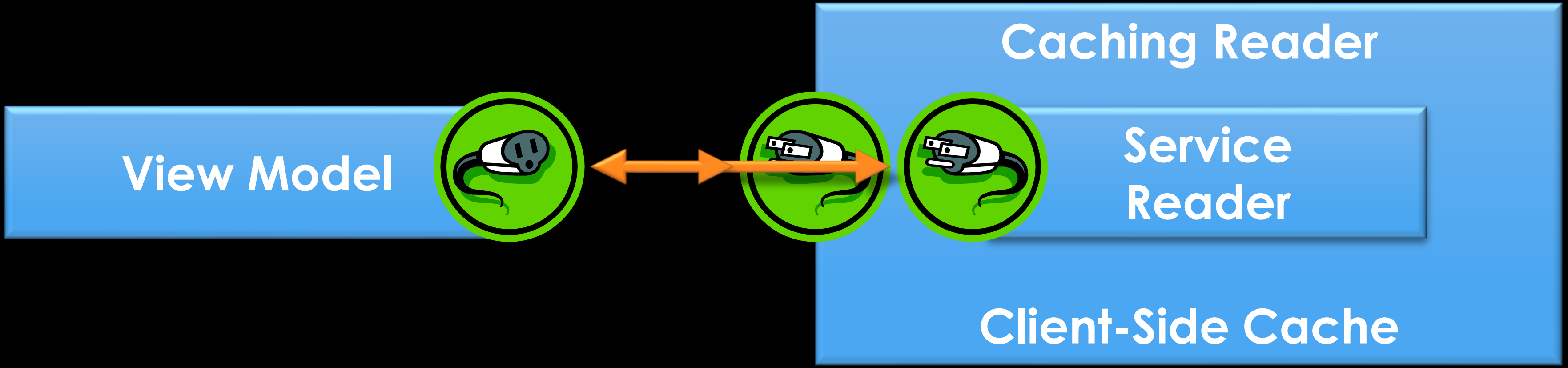
- People.Service

# Tight Coupling

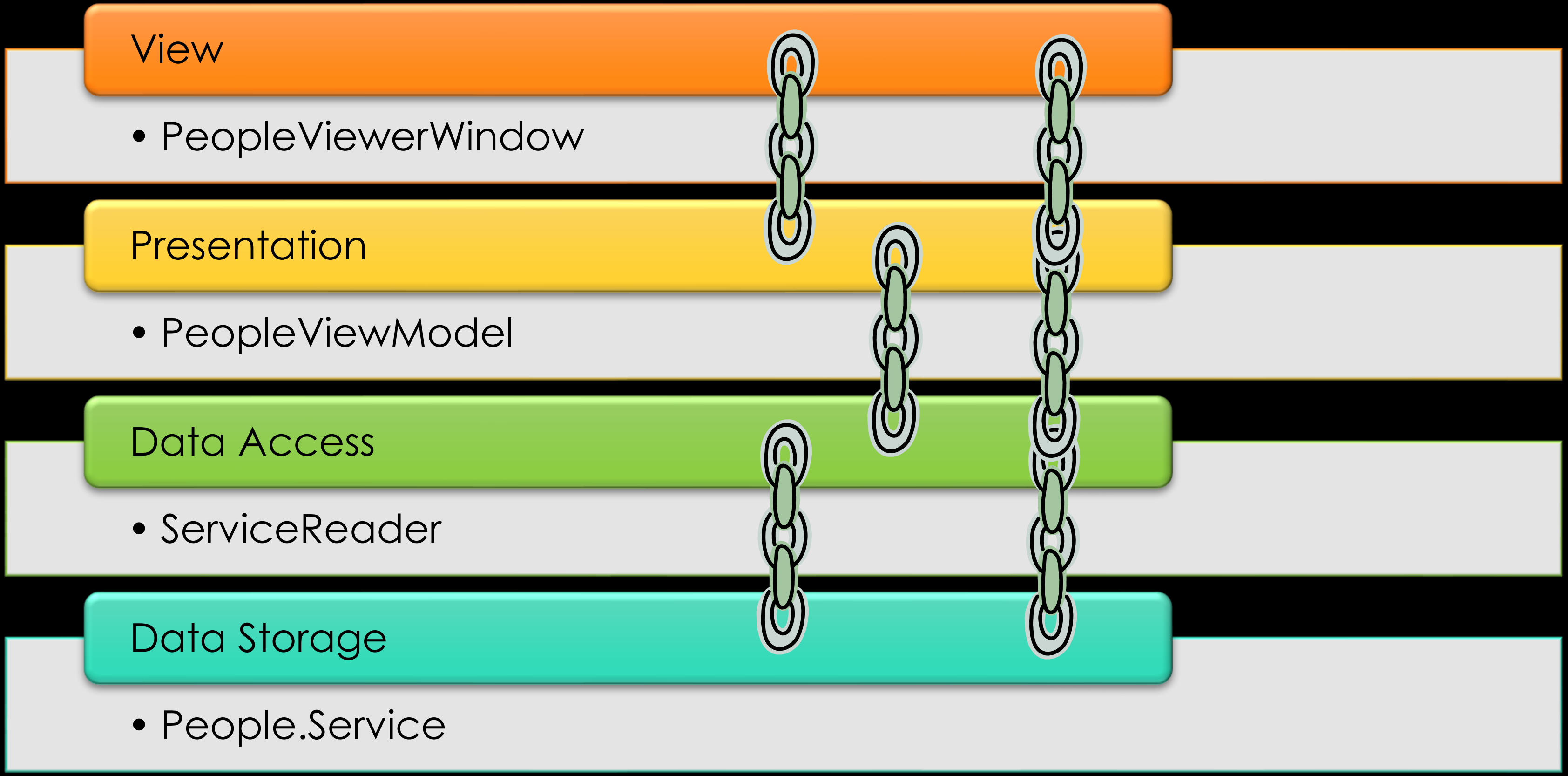


## Creating a Caching Reader

The Decorator Pattern



# Loose(r) Coupling



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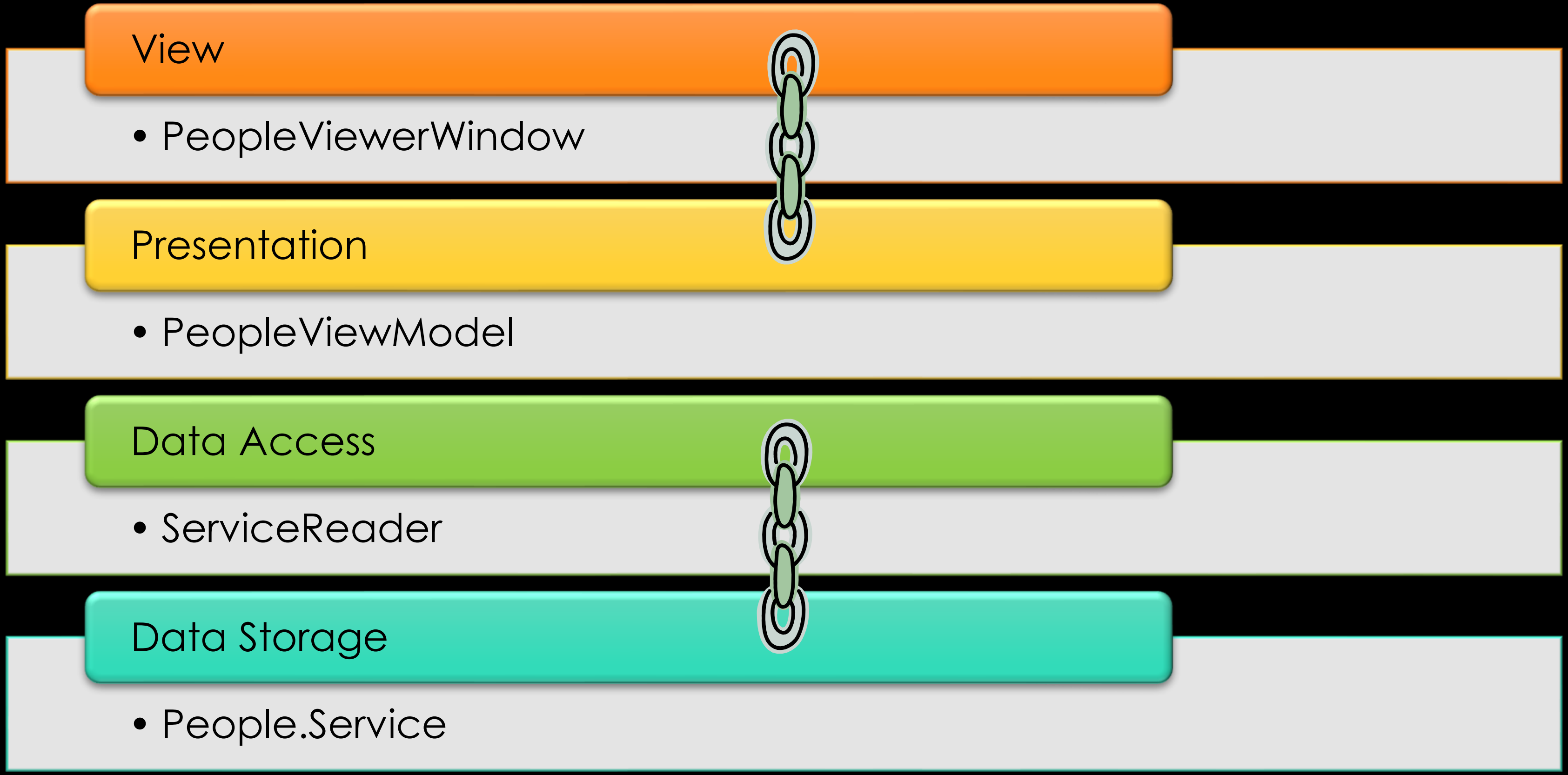

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## Thank You!

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https://github.com/jeremybytes/dependency-injection-net9