



Leveling Up Dependency Injection in C#

1: Basics

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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

What Is Dependency Injection?

- 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

What Is Dependency Injection?

- 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

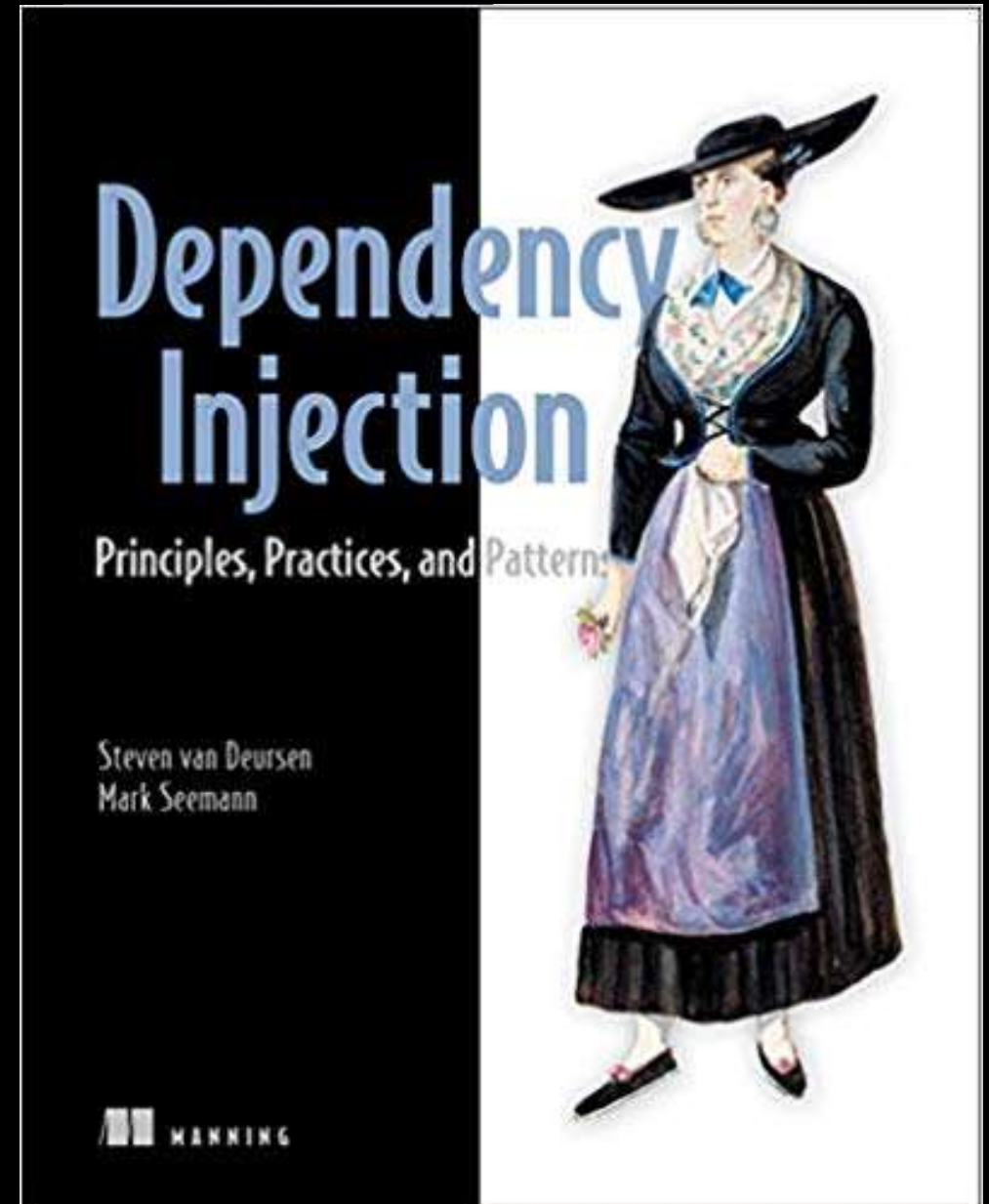
What Is Dependency Injection?

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

Dependency Injection

Principles, Practices, and Patterns

- Mark Seeman
- Steven van Deursen



Primary Benefits

- Extensibility
 - Parallel Development
 - Maintainability
 - Testability
 - Late Binding
-
- Adherence to S.O.L.I.D. Design Principles.



Benefits – Extensibility

Code can be extended in ways not explicitly planned for.



Benefits – Parallel Development

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



Benefits – Maintainability

Classes with clearly defined responsibilities
are easier to maintain.



Benefits – Testability

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



Benefits – Late Binding

Services can be swapped with other services without recompiling code.

Benefits – SOLID Principles

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

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
 - Ninject
 - Autofac
 - Unity
 - Castle Windsor
 - Spring.NET
 - Frameworks w/ Containers
 - ASP.NET Core
 - Angular
 - Prism
- and many others

Application Layers

View

- PeopleWindow

View Model

- MainWindowViewModel

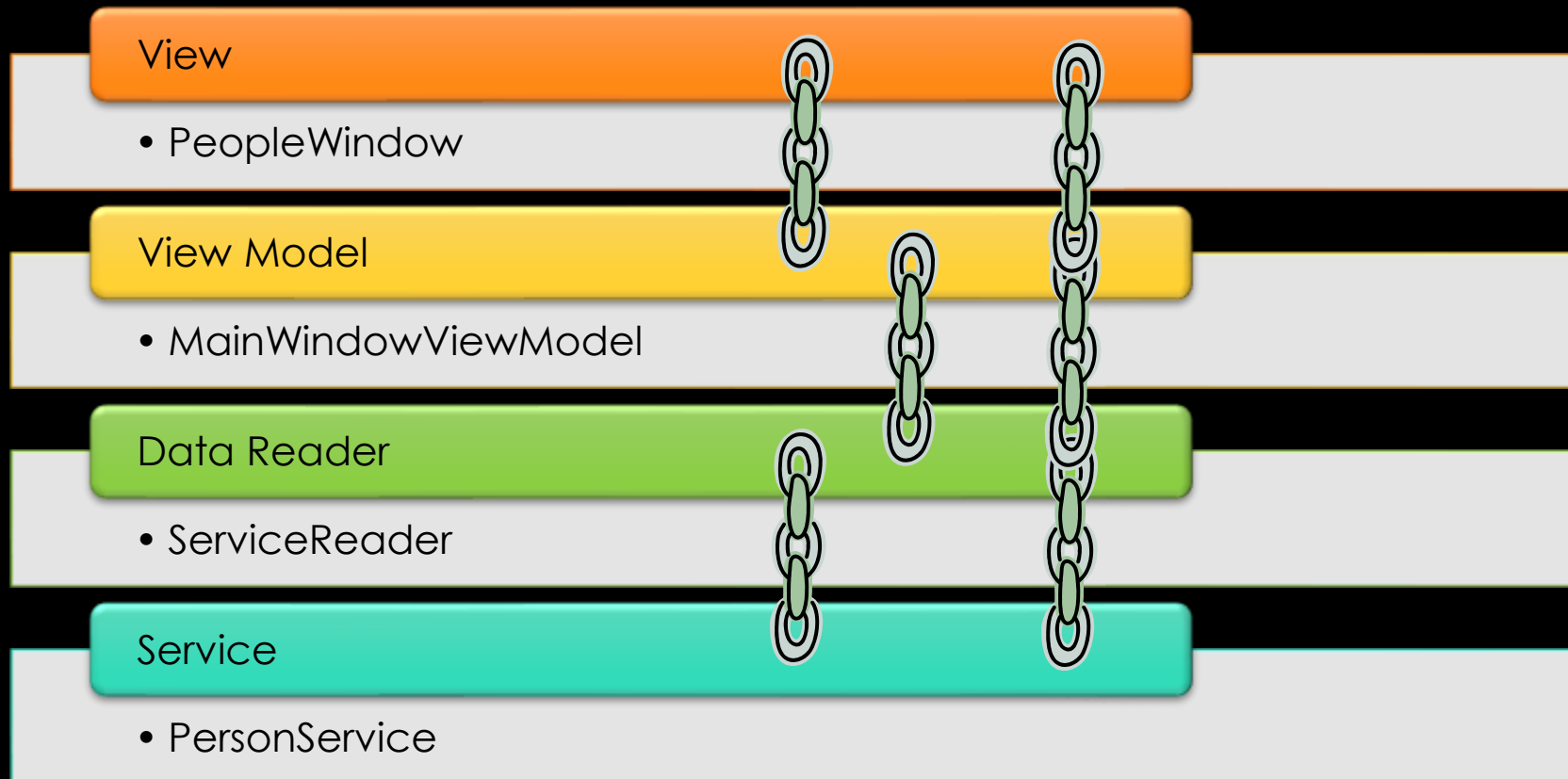
Data Reader

- ServiceReader

Service

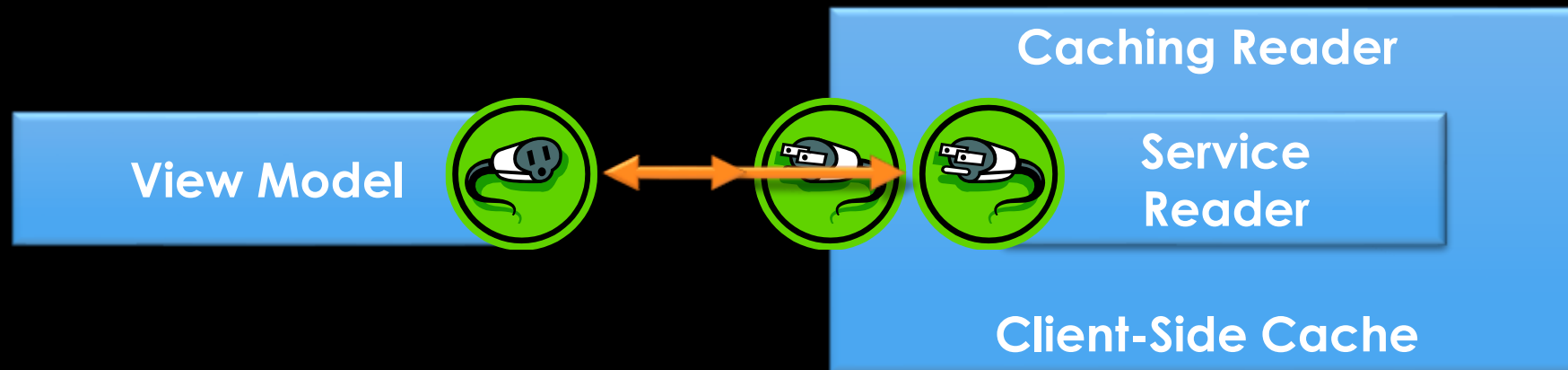
- PersonService

Tight Coupling

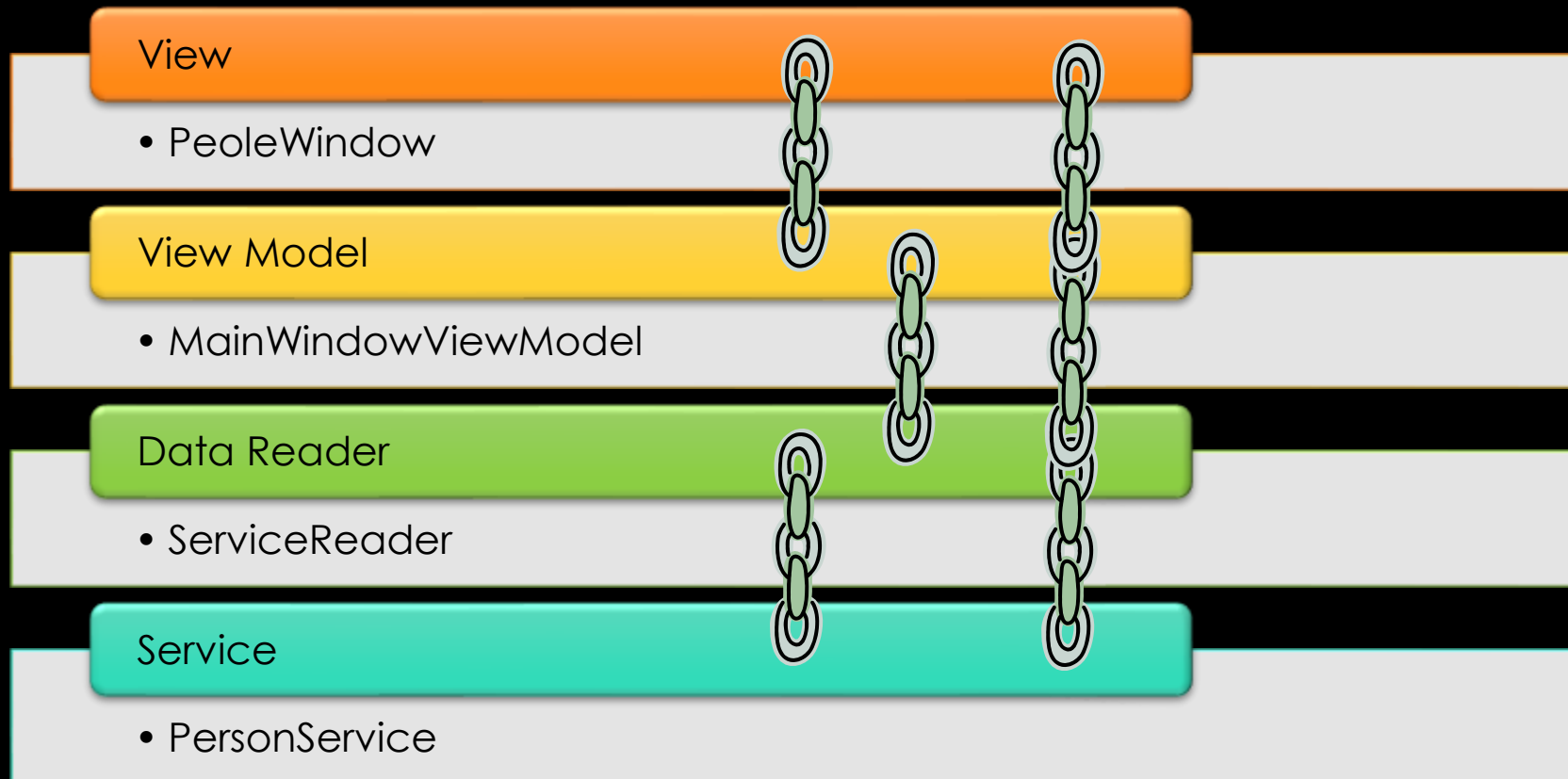


Creating a Caching Reader

The Decorator Pattern



Loose(r) Coupling



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Resources

Code Samples & Resources

[https://github.com/jeremybytes/
di-dotnet-workshop-2022](https://github.com/jeremybytes/di-dotnet-workshop-2022)