Leveling Up Dependency Injection in C#

1: Basics

Jeremy Clark

www.jeremybytes.com

@jeremybytes

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.
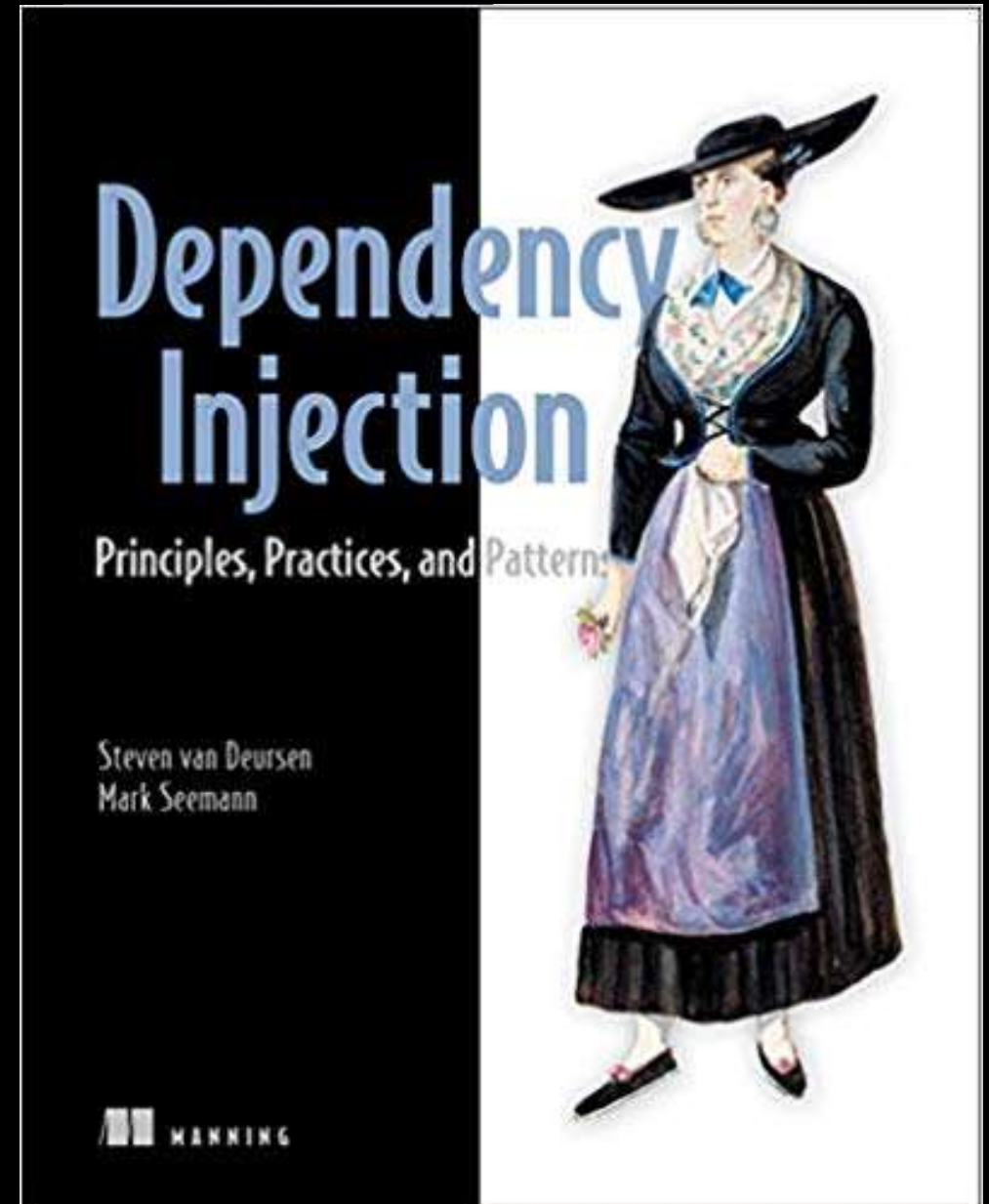
  - Wikipedia 2016

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

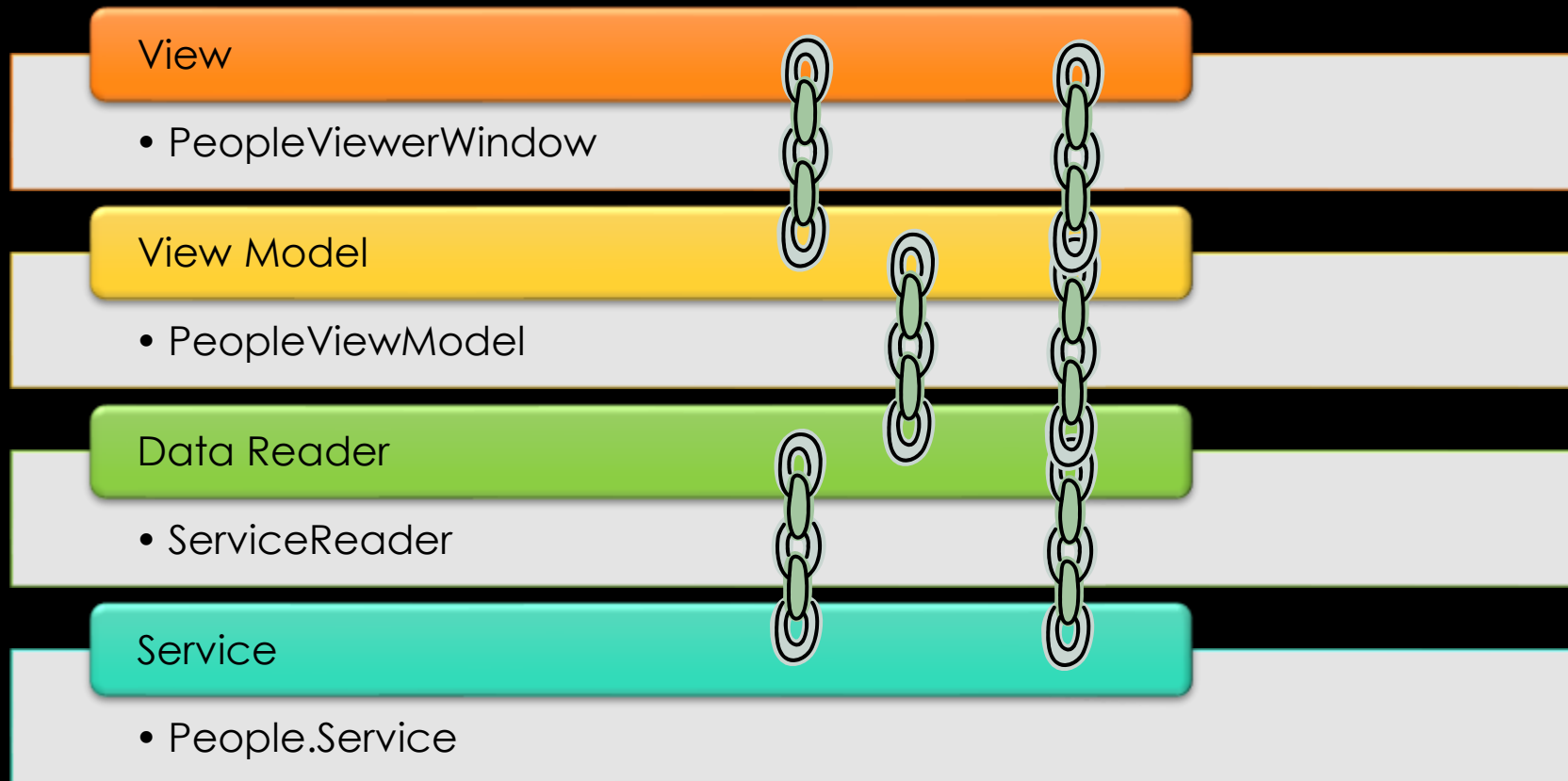**View**
- PeopleViewerWindow

View Model
- PeopleViewModel
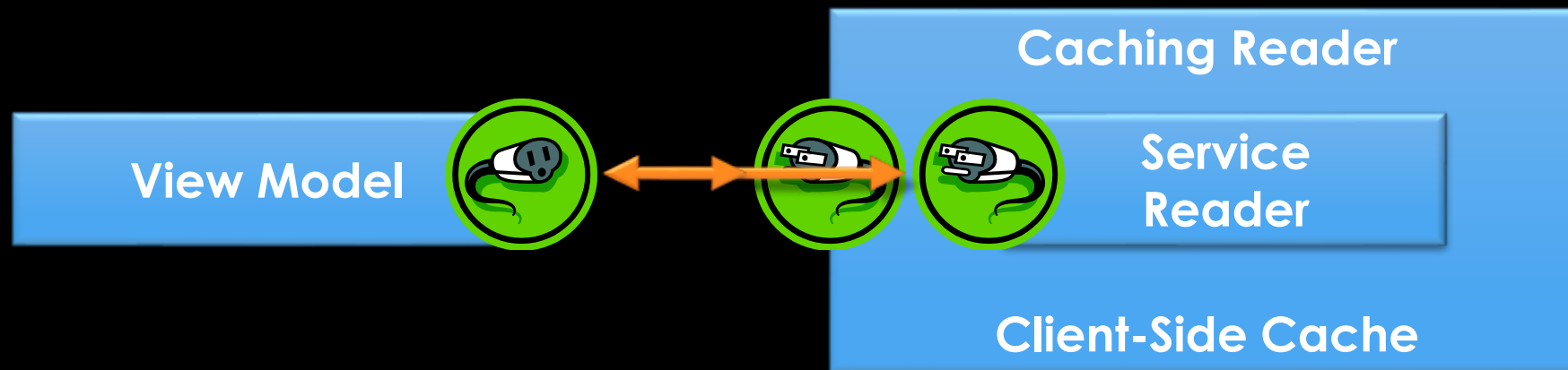
Data Reader
- ServiceReader
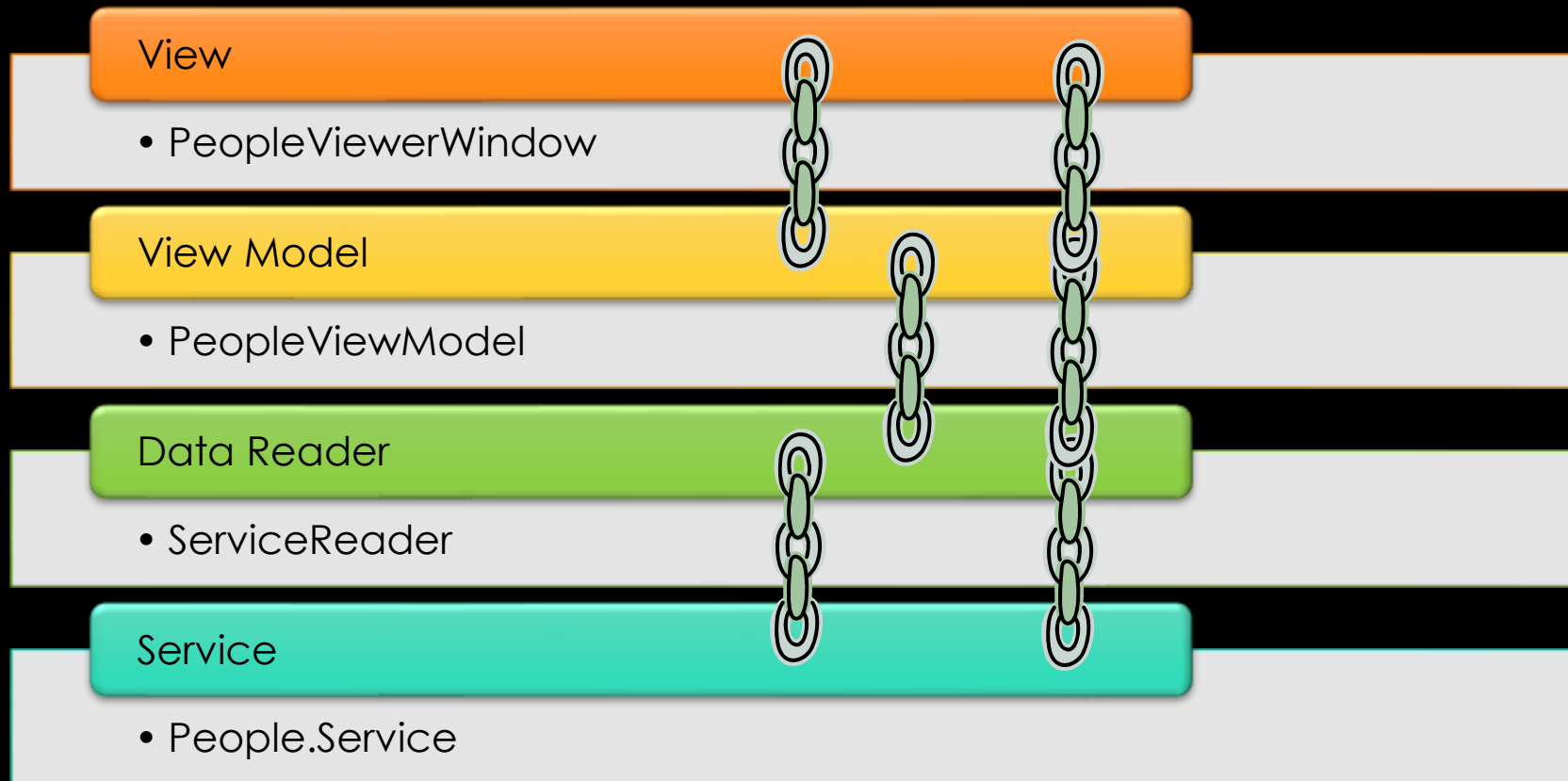
Service
- People.Service

Tight Coupling

View
- PeopleViewerWindow

View Model
- PeopleViewModel

Data Reader
- ServiceReader

Service
- People.Service

Loose(r) Coupling

View
- PeopleViewerWindow

View Model
- PeopleViewModel

Data Reader
- ServiceReader

Service
- People.Service

©Jeremy Clark 2022

Primary Benefits

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

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

Dependency Injection Concepts

- DI Design Patterns
  - Constructor Injection
  - Property Injection
  - Method Injection
  - Ambient Context
  - Service Locator

- Dimensions of DI
  - Object Composition
  - Interception
  - Lifetime Management

Resources

Code Samples & Resources

https://github.com/jeremybytes/
di-dotnet-workshop-2022