

# Design Pattern & Clean Code

## Dependency Injection

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# [DIP]

! The Dependency Inversion Principle (DIP) states that high level modules should not depend on low level modules; both should depend on abstractions. Abstractions should not depend on details. Details should depend upon abstractions. !

# Goals

- DI & SL differences
- Lifetime scopes
- Factory Pattern

# DI vs. SL

- [Dependency injection] (DI)
  - Injects dependencies
  - Constructor/property injection
- [Service Locator] (SL)
  - Single point of contact
  - Static dependency resolver.

# Demo

- Project EUMEL Dj
- Mobile app uses service locator
- Desktop app uses dependency injection.

# DI as SL

- Inject DI container
- Resolve dependency from container.

# Lifetime Scopes

- Unique-Instance context or scope
- Example
  - Per process
  - Per thread
  - Per HTTP request
  - Any customer defined
- DI framework has already implementations.

# [Singleton]

- Instance is created once
- Instance is created on first use
- [Double-Check Locking]
- [MSDN Documentation](#)
- Implementation see Lazy<T>.



# Demo

- Project [src/Zapfenstreich.sln](#)

# AD: DI Frameworks

- Reduces "hard dependencies"
  - Delegates creation
  - Simplifies injecting of code
  - Simplifies changing of implementation
- 👉 A DI container makes you write cleaner software
- 👍 A DI container helps refactoring code.

# Factories

- Creates an *implementation*
- Returns an *interface*.

# [Factory] Implementations

- Class with `Create()` method(s)
- Interface with `Create()` method(s)
- `Func<T>` / Lambda.

# Lazy<T> vs. Func<T>

- Func<T> is a method which creates a T
- Lazy<T> implements a singleton
- Lazy gets a Func as constructor parameter
- Lazy can solve circular (DI) dependencies.

# Demo

- Project