KNOW YOUR DEPENDENCY

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WHAT IS A DEPENDENCY?

DEPENDENCY

DEPENDENCY

- Introduces a level of coupling in your code
- Sometimes your code becomes resistant to change
- You can’t test anything in isolation
- You can’t reuse code
  - Code readability - bad
  - Bigger code source
  - Low code quality

DEPENDENCY SIMPTOMS

- Rigidity
  - Difficult to change – if affect other parts
- Fragility
  - One change breaks the hell loose
- Immobility
  - Difficult to reuse code

TYPES OF DEPENDENCIES

VISIBLE

```
public class CustomerAccount
{
   private BankAccount currentAccount;

   public CustomerAccount(BankAccount currentAccount)
   {
         this.currentAccount = currentAccount;
    }
}
```

HIDDEN

```
public class SurvivalAccount
{
   private IBankAccount shoesAccount;
   private IBankAccount handBagsAccount;

    public SurvivalAccount()
    {
      this.shoesAccount = new ShoesAccount();
      this.handBagsAccount = new HandBagsAccount();
    }
}
```

VOLATILE

- Require setup or a configuration
- Implementation of dependency hasn’t been created yet.
- Can be a third party library that requires a license.
- Have non-deterministic behavior => can’t be tested

- Looked at from the environment perspective

TIGHT COUPLING

```
public class BankAccount
 {
   private SavingsAccount savingsAccount = new SavingsAccount();
   private CurrentAccount currentAccount = new CurrentAccount();

  public decimal GetTotalForAccount(Guid accountNumber)
  {
    decimal currentAccountMoney = this.currentAccount.GetMoneyByAccountNumber(accountNumber);
    decimal savingsAccountMoney = this.savingsAccount.GetMoneyByAccountNumber(accountNumber);
     return currentAccountMoney + savingsAccountMoney;
   }
 }
```

LOOSE COUPLING

```
public class BankAccount
 {
   private IBankAccount currentAccount;
   private IBankAccount savingsAccount;

   public BankAccount (IBankAccount currentAccount, IBankAccount savingsAccount)
   {
     this.currentAccount = currentAccount;
     this.savingsAccount = savingsAccount;
   }
}
```

LOOSE COUPLING – how is it achieved?

- Through interfaces because
  - you can inject any implementation you want

- Is it bad?

  Let’s see

```
public class SurvivalAccount
{
   private ShoesAccount shoesAccount;
   private HandBagsAccount handBagsAccount;

    public SurvivalAccount(ShoesAccount shoesAccount, HandBagsAccount handBagsAccount )
    {
      this.shoesAccount = shoesAccount;
      this.handBagsAccount = handBagsAccount;
    }
}
```

```
public class SurvivalAccount
{
   private IAccessoriesAccount shoesAccount;
   private IAccessoriesAccount handBagsAccount;

    public SurvivalAccount(IAccessoriesAccount shoesAccount, IAccessoriesAccount handBagsAccount )
    {
      this.shoesAccount = shoesAccount;
      this.handBagsAccount = handBagsAccount;
    }
}
```

DI ANTIPATTERN - CONTROL FREAK

DI ANTIPATTERN - CONTROL FREAK

```
public class ProductService
{
  private ProductRepository repository;
  private FoodProcessor foodProcessor;
  public ProductService()
    {
       //OMG I need something, so I'll get it by myself
      this.repository = new ProductRepository(connectionString);
      this.foodProcessor=  new FoodProcessor();
    }
}
```

DI ANTIPATTERN - CONTROL FREAK

- Most common DI – antipattern
- Default way of creating instances
- No effort to introduce abstractions
- We can’t change implementations
- We can’t develop in parallel
- The Most Problematic in terms of coupling
- Every time when directly or **indirectly use the new keyword !**

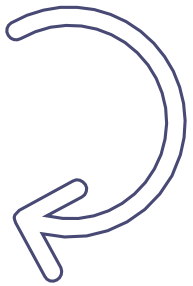
- **WHAAAT? NEW?**
- **How about using a new StringBuilder() ?**

INVERSION OF CONTROL

Inversion of Control

INVERSION OF CONTROL

- Programming style where a framework or runtime controls the program flow
- You let a framework to take care of instance creation
- You move somewhere else the decisions of which concrete class to use

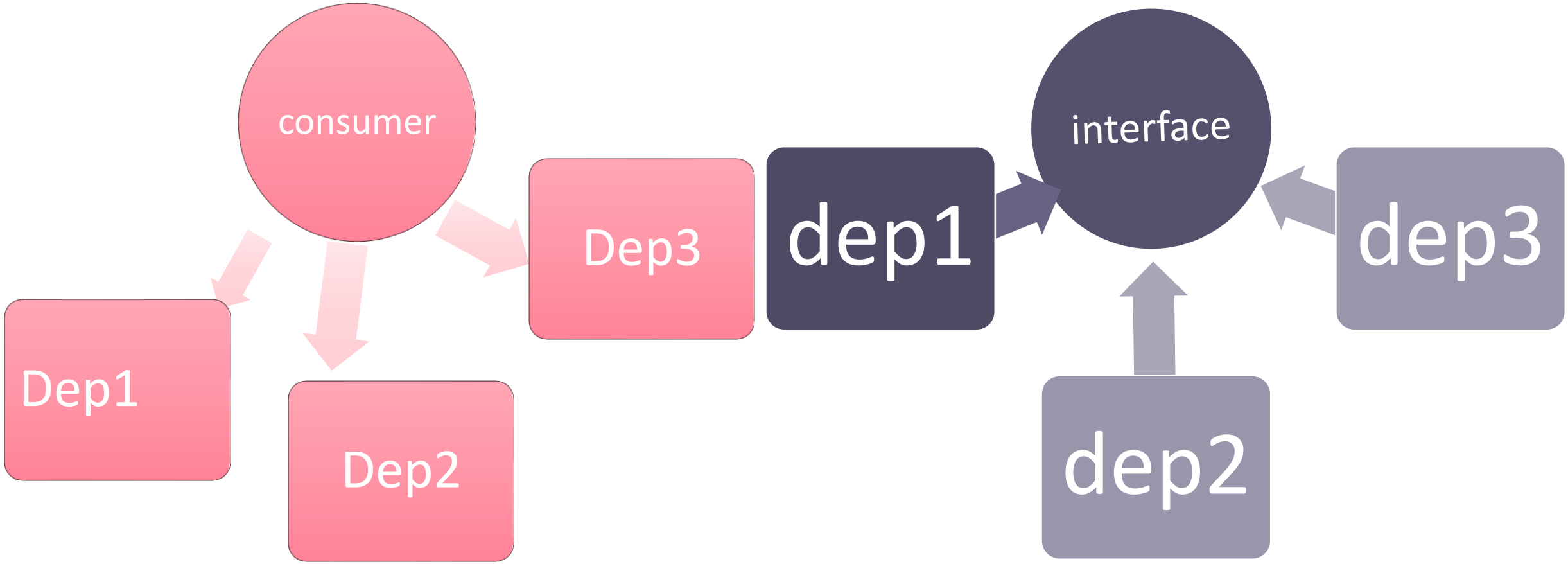


Flexibility

“Don’t call us, we’ll call you”

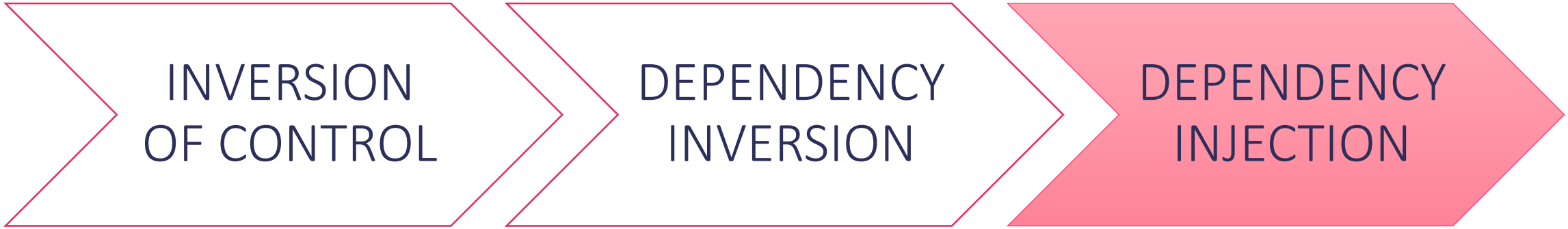
Hollywood Principle

INVERSION OF CONTROL



DEPENDENCY INJECTON

HOW IT STARTED?



DEPENDENCY INJECTION

- Subset of Inversion of Control
- Refers to dependency management
- The idea is to have a mechanism that provides concrete implementation over an abstraction
- Helps with Single Responsibility (SR) and Separation of Concerns (SoC).

Why ?

WHY?

- **S** Single Responsibility Principle
- **O** Open/Closed principle
- **L** Liskov substitution principle
- **I** Interface segregation
- **D** Dependency inversion

WHY?

Single Responsibility Principle

Open/Closed principle

Dependency inversion

WHY - Benefits

- Loose coupling
  - Extensibility
  - Testability
  - Reusability
- DRY – write less boiler plate code
- Mockability (yes, that’s a word)
- You don’t pull your dependencies, they are pushed

DEPENDENCY INJECTION MINDSET

- It’s not a goal
- It’s one of the best ways to enable loose coupling
  - If used right, gives you more maintainable code
- It’s more a way of thinking and designing code than a collection of tools and techniques
- Not the supreme approach, but should be the minimal

THE DEPENDENCY INJECTION

- It’s THE ONE AND ONLY WAY?

  NO

- It’s the better way?

  MAYBE

SERVICE LOCATOR ANTI-PATTERN

SERVICE LOCATOR

```
public static class Locator
{
    private readonly static Dictionary<Type, object> services = new Dictionary<Type,
    object>();

    public static T GetService<T>()
    {
    return (T)Locator.services[typeof(T)];
    }

    public static void Register<T>(T service)
    {
        Locator.services[typeof(T)] = service;
    }
}
```

SERVICE LOCATOR

```
public class ProductService
{
    private readonly ProductRepository repository;

    public ProductService()
    {
        this.repository = Locator.GetService<ProductRepository>();
    }
 }
```

SERVICE LOCATOR

- Round about Control Freak
- Static factory that registers your dependencies
- Classes interact with your Locator to obtain dependencies

WHY?

- “new” is bad – so you don’t use it

DI ? SERVICE LOCATOR?

```
public MyAwesomeClass() {
        this.awesome = new AwesomeFeature();
}

public MyAwesomeClass () {
     this.awesome = Locator.Resolve<AwesomeFeature>();
 }

public MyAwesomeClass (ServiceLocator locator) {
      this.awesome = Locator.Resolve<AwesomeFeature>();
}

public MyAwesomeClass (AwesomeFeature awesome) {
        this.awesome = awesome;
}
```

Still ….why?

“Change is the only constant”

Still ….why?

“Change is the only constant in software development”

SUMMARY

- A Few dependency types
- Control Freak antipattern
- Inversion Of Control
- Dependency Injection
- A little SOLID
- And a little dependency injection mindset
- Service Locator

THANK YOU

Q&A

We all need people who will give us feedback. That's how we improve.

Bill Gates