Services

Dependency Injection, Services

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DEPENDENCY INJECTION

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Dependency Injection

- Dependency injection is a software design pattern in witch one or more dependencies (or services) are injected, or passed by reference, into a dependent object (or client) and are made part of the client's
state.
- The pattern separates the creation of a client's dependencies from its own behavior, witch allows program designs to be loosely coupled and to follow the dependency inversion and single responsibility principles.
- In directly contrasts with the service locator pattern, witch allows clients to know about the system they use to find dependencies.

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Controller

```php
class Author
{
    private $firstName;
    private $lastName;

    public function __construct($firstName,
    {
        $this->firstName = $firstName;
        $this->lastName = $lastName;
    }

    public function getFirstName()
    {
        return $this->firstName;
    }

    public function getLastName()
    {
        return $this->lastName;
    }
}
```

```php
class Question
{
    private $author;
    private $question;

    public function __construct(
        $question,
        $authorFirstName,
        $authorLastName)
    {
        $this->author = new Author($authorFirstName, $authorFirstName);
        $this->question = $question;
    }

    public function getAuthor()
    {
        return $this->author;
    }

    public function getQuestion()
    {
        return $this->question;
    }
}
```

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Problems of the code

- Name of the author is out of scope of the question
- Author is tightly coupled with the Question
- Unit Testing becomes difficult

INJECT ALL DEPENDENCIES!

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Controller

```php
class Author
{
    private $firstName;
    private $lastName;

    public function __construct($firstName, $lastName)
    {
        $this->firstName = $firstName;
        $this->lastName = $lastName;
    }

    public function getFirstName()
    {
        return $this->firstName;
    }

    public function getLastName()
    {
        return $this->lastName;
    }
}
```

```php
class Question
{
    private $question;
    private $author;

    public function __construct($question, Author $author)
    {
        $this->author = $author;
        $this->question = $question;
    }

    public function getAuthor()
    {
        return $this->author;
    }

    public function getQuestion()
    {
        return $this->question;
    }
}
```

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Benefits

- Reduces complexity
- Improves quality
- Eases unit testing

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Using constructor injection

- Strictly defines the requirements
- Dependencies cannot be changed

Except…

- Does not work with optional dependencies
- Inheritance can become difficult

Solution ?

Setter Injection

```php
class Question
{
    private $question;
    private $author;

    public function __construct($question) {
        $this->question = $question;
    }

    public function setAuthor(Author $author) {
        $this->author = $author;
    }

    public function getAuthor() {
        return $this->author;
    }

    public function getQuestion()
    {
        return $this->question;
    }
}
```

- Allows creating an object with the default values
- Allows easy insertion of new optional dependencies

SYMFONY SERVICES

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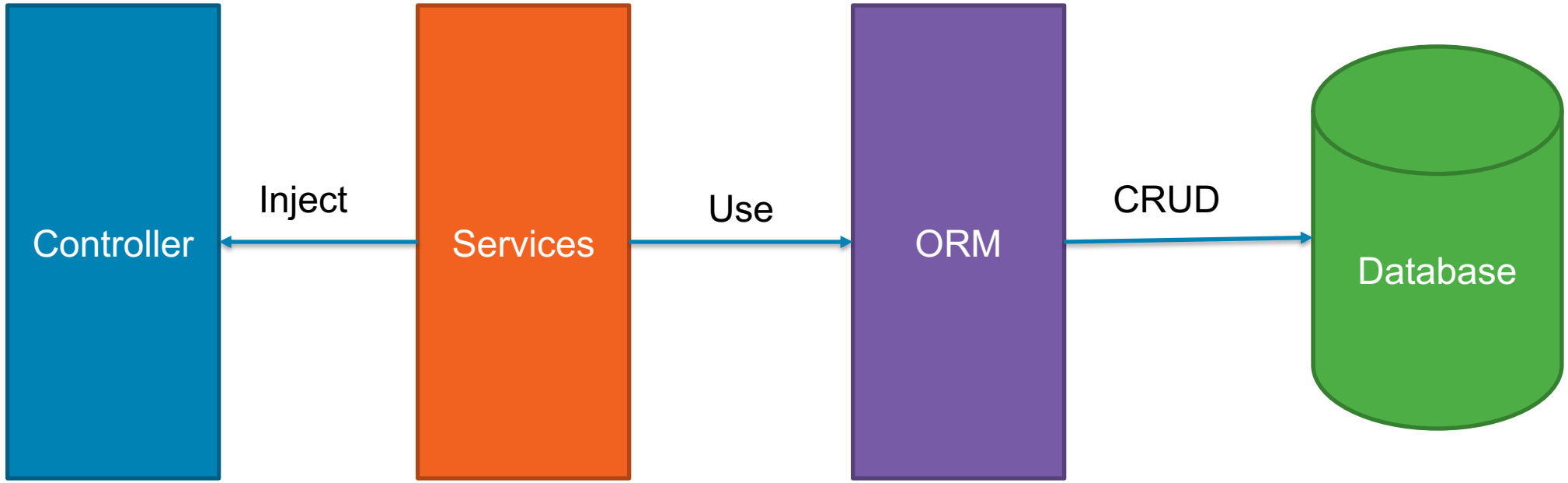
What is Service

- Useful objects not directly related your application logic



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Defining our own services

```php
<?php

namespace App\Service;

use App\Repository\CarRepository;

class CarService
{
    private $carRepository;

    public function __construct(CarRepository $carRepository)
    {
        $this->carRepository = $carRepository;
    }

    public function findAll()
    {
        $data = $this->carRepository->findAll();

        return $data;
    }
}
```

SYMFONY SERVICES EXAMPLE

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countries_mysql.sql

```
CREATE TABLE countries(id BIGINT NOT NULL PRIMARY KEY AUTO_INCREMENT,
    name VARCHAR(100), population INT);

INSERT INTO countries(name, population) VALUES('China', 1382050000);
INSERT INTO countries(name, population) VALUES('India', 1313210000);
INSERT INTO countries(name, population) VALUES('USA', 324666000);
INSERT INTO countries(name, population) VALUES('Indonesia', 260581000);
INSERT INTO countries(name, population) VALUES('Brazil', 207221000);
INSERT INTO countries(name, population) VALUES('Pakistan', 196626000);
INSERT INTO countries(name, population) VALUES('Nigeria', 186988000);
INSERT INTO countries(name, population) VALUES('Bangladesh', 162099000);
INSERT INTO countries(name, population) VALUES('Nigeria', 186988000);
INSERT INTO countries(name, population) VALUES('Russia', 146838000);
INSERT INTO countries(name, population) VALUES('Japan', 126830000);
INSERT INTO countries(name, population) VALUES('Mexico', 122273000);
INSERT INTO countries(name, population) VALUES('Philippines', 103738000);
```

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MyController.php

```
class MyController extends AbstractController
{
    /**
     * @Route("/countries", name="countries")
     */
    public function index(CountryService $countryService)
    {
        $countries = $countryService->findAll();

        return $this->json([
            'countries' => $countries
        ]);
    }
}
```

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CountryService.php

```
class CountryService
{
    private $countryRepository;

    public function __construct(CountryRepository $countryRepository)
    {
        $this->countryRepository = $countryRepository;
    }

    /**
     * Finds all countries
     */
    public function findAll() {

        $data = $this->countryRepository->findAll();

        return $data;
    }
}
```

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CountryRepository.php

```
class CountryRepository
{
    private $conn;

    public function __construct(Connection $conn)
    {
        $this->conn = $conn;
    }

    /**
     * Finds all countries
     */
    public function findAll() {

        $queryBuilder = $this->conn->createQueryBuilder();
        $queryBuilder->select('*')->from('countries');

        $countries = $queryBuilder->execute()->fetchAll();

        return $countries;
    }
}
```

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Result

```
$ curl localhost:8000/countries
{"countries":[{"id":"1","name":"China","population":"1382050000"},
{"id":"2","name":"India","population":"1313210000"},
{"id":"3","name":"USA","population":"324666000"},
{"id":"4","name":"Indonesia","population":"260581000"},
{"id":"5","name":"Brazil","population":"207221000"},
{"id":"6","name":"Pakistan","population":"196626000"},
{"id":"7","name":"Nigeria","population":"186988000"},
{"id":"8","name":"Bangladesh","population":"162099000"},
{"id":"9","name":"Nigeria","population":"186988000"},
{"id":"10","name":"Russia","population":"146838000"},
{"id":"11","name":"Japan","population":"126830000"},
{"id":"12","name":"Mexico","population":"122273000"},
{"id":"13","name":"Philippines","population":"103738000"}]}
```

CONTROLLER AS A SERVICE

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Controller as a Service

- Controller and passed services can be controller by a container
  configuration
- Sandboxing the controller
- Easily spotting "fat" controllers

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Creating the controller as a service

```php
use Symfony\Component\HttpFoundation\Response;

class HelloWorldController
{
    public function indexAction($name)
    {
        return new Response(
            content: '<html><body>Hello '.$name. '!</body></html>');
    }
}
```

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Drawbacks

- More work to create
- Complex constructor
- More work to create methods defined in the base controller

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Summary

- Dependency Injection
- Symfony Services
- Controller as a Service