



Symfony

The Best Practices Book

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The Best Practices Book (2.5)

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Chapter 1

The Symfony Framework Best Practices

The Symfony framework is well-known for being *really* flexible and is used to build micro-sites, enterprise applications that handle billions of connections and even as the basis for *other* frameworks. Since its release in July 2011, the community has learned a lot about what's possible and how to do things *best*.

These community resources - like blog posts or presentations - have created an unofficial set of recommendations for developing Symfony applications. Unfortunately, a lot of these recommendations are unneeded for web applications. Much of the time, they unnecessarily overcomplicate things and don't follow the original pragmatic philosophy of Symfony.

What is this Guide About?

This guide aims to fix that by describing the **best practices for developing web apps with the Symfony full-stack framework**. These are best practices that fit the philosophy of the framework as envisioned by its original creator *Fabien Potencier*¹.



Best practice is a noun that means "*a well defined procedure that is known to produce near-optimum results*". And that's exactly what this guide aims to provide. Even if you don't agree with every recommendation, we believe these will help you build great applications with less complexity.

This guide is **specially suited** for:

- Websites and web applications developed with the full-stack Symfony framework.

For other situations, this guide might be a good **starting point** that you can then **extend and fit to your specific needs**:

- Bundles shared publicly to the Symfony community;
- Advanced developers or teams who have created their own standards;
- Some complex applications that have highly customized requirements;

1. <https://connect.sensiolabs.com/profile/fabpot>

- Bundles that may be shared internally within a company.

We know that old habits die hard and some of you will be shocked by some of these best practices. But by following these, you'll be able to develop apps faster, with less complexity and with the same or even higher quality. It's also a moving target that will continue to improve.

Keep in mind that these are **optional recommendations** that you and your team may or may not follow to develop Symfony applications. If you want to continue using your own best practices and methodologies, you can of course do it. Symfony is flexible enough to adapt to your needs. That will never change.

Who this Book Is for (Hint: It's not a Tutorial)

Any Symfony developer, whether you are an expert or a newcomer, can read this guide. But since this isn't a tutorial, you'll need some basic knowledge of Symfony to follow everything. If you are totally new to Symfony, welcome! Start with *The Quick Tour* tutorial first.

We've deliberately kept this guide short. We won't repeat explanations that you can find in the vast Symfony documentation, like discussions about dependency injection or front controllers. We'll solely focus on explaining how to do what you already know.

The Application

In addition to this guide, you'll find a sample application developed with all these best practices in mind. **The application is a simple blog engine**, because that will allow us to focus on the Symfony concepts and features without getting buried in difficult details.

Instead of developing the application step by step in this guide, you'll find selected snippets of code through the chapters. Please refer to the last chapter of this guide to find more details about this application and the instructions to install it.

Don't Update Your Existing Applications

After reading this handbook, some of you may be considering refactoring your existing Symfony applications. Our recommendation is sound and clear: **you should not refactor your existing applications to comply with these best practices**. The reasons for not doing it are various:

- Your existing applications are not wrong, they just follow another set of guidelines;
- A full codebase refactorization is prone to introduce errors in your applications;
- The amount of work spent on this could be better dedicated to improving your tests or adding features that provide real value to the end users.



Chapter 2

Creating the Project

Installing Symfony

In the past, Symfony projects were created with *Composer*¹, the dependency manager for PHP applications. However, the current recommendation is to use the **Symfony Installer**, which has to be installed before creating your first project.

Linux and Mac OS X Systems

Open your command console and execute the following:

```
Listing 2-1 1 $ curl -Ls http://symfony.com/installer > symfony.phar
           2 $ sudo mv symfony.phar /usr/local/bin/symfony
           3 $ chmod a+x /usr/local/bin/symfony
```

Now you can execute the Symfony Installer as a global system command called `symfony`.

Windows Systems

Open your command console and execute the following:

```
Listing 2-2 1 c:\> php -r "readfile('http://symfony.com/installer');" > symfony.phar
```

Then, move the downloaded `symfony.phar` file to your projects directory and execute it as follows:

```
Listing 2-3 1 c:\> php symfony.phar
```

1. <https://getcomposer.org/>

Creating the Blog Application

Now that everything is correctly set up, you can create a new project based on Symfony. In your command console, browse to a directory where you have permission to create files and execute the following commands:

```
Listing 2-4 1 # Linux, Mac OS X
           2 $ cd projects/
           3 $ symfony new blog
           4
           5 # Windows
           6 c:\> cd projects/
           7 c:\projects\> php symfony.phar new blog
```

This command creates a new directory called **blog** that contains a fresh new project based on the most recent stable Symfony version available. In addition, the installer checks if your system meets the technical requirements to execute Symfony applications. If not, you'll see the list of changes needed to meet those requirements.



Symfony releases are digitally signed for security reasons. If you want to verify the integrity of your Symfony installation, take a look at the *public checksums repository*² and follow *these steps*³ to verify the signatures.

Structuring the Application

After creating the application, enter the **blog/** directory and you'll see a number of files and directories generated automatically:

```
Listing 2-5 1 blog/
           2 | app/
           3 |   | console
           4 |   | cache/
           5 |   | config/
           6 |   | logs/
           7 |   | Resources/
           8 |   | src/
           9 |   |   | AppBundle/
          10 |   | vendor/
          11 |   | web/
```

This file and directory hierarchy is the convention proposed by Symfony to structure your applications. The recommended purpose of each directory is the following:

- **app/cache/**, stores all the cache files generated by the application;
- **app/config/**, stores all the configuration defined for any environment;
- **app/logs/**, stores all the log files generated by the application;
- **app/Resources/**, stores all the templates and the translation files for the application;
- **src/AppBundle/**, stores the Symfony specific code (controllers and routes), your domain code (e.g. Doctrine classes) and all your business logic;

2. <https://github.com/sensiolabs/checksums>

3. <http://fabien.potencier.org/article/73/signing-project-releases>

- **vendor/**, this is the directory where Composer installs the application's dependencies and you should never modify any of its contents;
- **web/**, stores all the front controller files and all the web assets, such as stylesheets, JavaScript files and images.

Application Bundles

When Symfony 2.0 was released, most developers naturally adopted the symfony 1.x way of dividing applications into logical modules. That's why many Symfony apps use bundles to divide their code into logical features: UserBundle, ProductBundle, InvoiceBundle, etc.

But a bundle is *meant* to be something that can be reused as a stand-alone piece of software. If UserBundle cannot be used "as is" in other Symfony apps, then it shouldn't be its own bundle. Moreover InvoiceBundle depends on ProductBundle, then there's no advantage to having two separate bundles.

Create only one bundle called AppBundle for your application logic

Implementing a single AppBundle bundle in your projects will make your code more concise and easier to understand. Starting in Symfony 2.6, the official Symfony documentation uses the AppBundle name.



There is no need to prefix the AppBundle with your own vendor (e.g. AcmeAppBundle), because this application bundle is never going to be shared.

All in all, this is the typical directory structure of a Symfony application that follows these best practices:

Listing 2-6

```

1  blog/
2  |  app/
3  |  |  console
4  |  |  cache/
5  |  |  config/
6  |  |  logs/
7  |  |  Resources/
8  |  src/
9  |  |  AppBundle/
10 |  vendor/
11 |  web/
12 |  app.php
13 |  app_dev.php

```



If your Symfony installation doesn't come with a pre-generated AppBundle, you can generate it by hand executing this command:

```

Listing 2-7  1  $ php app/console generate:bundle --namespace=AppBundle --dir=src --format=annotation
              --no-interaction

```

Extending the Directory Structure

If your project or infrastructure requires some changes to the default directory structure of Symfony, you can *override the location of the main directories*: cache/, logs/ and web/.

In addition, Symfony3 will use a slightly different directory structure when it's released:

Listing 2-8

```
1 blog-symfony3/  
2 |  
3 |├─ config/  
4 |└─ Resources/  
5 |  
6 |├─ bin/  
6 |└─ console  
7 |  
8 |├─ src/  
8 |└─ var/  
9 |   │├─ cache/  
10 |   └─ logs/  
11 |  
12 |├─ vendor/  
12 |└─ web/
```

The changes are pretty superficial, but for now, we recommend that you use the Symfony directory structure.



Chapter 3

Configuration

Configuration usually involves different application parts (such as infrastructure and security credentials) and different environments (development, production). That's why Symfony recommends that you split the application configuration into three parts.

Infrastructure-Related Configuration

Define the infrastructure-related configuration options in the `app/config/parameters.yml` file.

The default `parameters.yml` file follows this recommendation and defines the options related to the database and mail server infrastructure:

Listing 3-1

```
1 # app/config/parameters.yml
2 parameters:
3     database_driver: pdo_mysql
4     database_host: 127.0.0.1
5     database_port: ~
6     database_name: symfony
7     database_user: root
8     database_password: ~
9
10    mailer_transport: smtp
11    mailer_host: 127.0.0.1
12    mailer_user: ~
13    mailer_password: ~
14
15    # ...
```

These options aren't defined inside the `app/config/config.yml` file because they have nothing to do with the application's behavior. In other words, your application doesn't care about the location of your database or the credentials to access to it, as long as the database is correctly configured.

Canonical Parameters

Define all your application's parameters in the `app/config/parameters.yml.dist` file.

Since version 2.3, Symfony includes a configuration file called `parameters.yml.dist`, which stores the canonical list of configuration parameters for the application.

Whenever a new configuration parameter is defined for the application, you should also add it to this file and submit the changes to your version control system. Then, whenever a developer updates the project or deploys it to a server, Symfony will check if there is any difference between the canonical `parameters.yml.dist` file and your local `parameters.yml` file. If there is a difference, Symfony will ask you to provide a value for the new parameter and it will add it to your local `parameters.yml` file.

Application-Related Configuration

Define the application behavior related configuration options in the `app/config/config.yml` file.

The `config.yml` file contains the options used by the application to modify its behavior, such as the sender of email notifications, or the enabled *feature toggles*¹. Defining these values in `parameters.yml` file would add an extra layer of configuration that's not needed because you don't need or want these configuration values to change on each server.

The configuration options defined in the `config.yml` file usually vary from one *environment* to another. That's why Symfony already includes `app/config/config_dev.yml` and `app/config/config_prod.yml` files so that you can override specific values for each environment.

Constants vs Configuration Options

One of the most common errors when defining application configuration is to create new options for values that never change, such as the number of items for paginated results.

Use constants to define configuration options that rarely change.

The traditional approach for defining configuration options has caused many Symfony apps to include an option like the following, which would be used to control the number of posts to display on the blog homepage:

```
Listing 3-2 1 # app/config/config.yml
           2 parameters:
           3     homepage.num_items: 10
```

If you ask yourself when the last time was that you changed the value of *any* option like this, odds are that you *never* have. Creating a configuration option for a value that you are never going to configure just isn't necessary. Our recommendation is to define these values as constants in your application. You could, for example, define a `NUM_ITEMS` constant in the `Post` entity:

```
Listing 3-3 1 // src/AppBundle/Entity/Post.php
           2 namespace AppBundle\Entity;
           3
           4 class Post
           5 {
           6     const NUM_ITEMS = 10;
           7 }
```

1. http://en.wikipedia.org/wiki/Feature_toggle

```
8     // ...
9 }
```

The main advantage of defining constants is that you can use their values everywhere in your application. When using parameters, they are only available from places with access to the Symfony container.

Constants can be used for example in your Twig templates thanks to the `constant()` function:

```
Listing 3-4 1 <p>
2     Displaying the {{ constant('NUM_ITEMS', post) }} most recent results.
3 </p>
```

And Doctrine entities and repositories can now easily access these values, whereas they cannot access the container parameters:

```
Listing 3-5 1 namespace AppBundle\Repository;
2
3 use Doctrine\ORM\EntityRepository;
4 use AppBundle\Entity\Post;
5
6 class PostRepository extends EntityRepository
7 {
8     public function findLatest($limit = Post::NUM_ITEMS)
9     {
10         // ...
11     }
12 }
```

The only notable disadvantage of using constants for this kind of configuration values is that you cannot redefine them easily in your tests.

Semantic Configuration: Don't Do It

Don't define a semantic dependency injection configuration for your bundles.

As explained in *How to Load Service Configuration inside a Bundle* article, Symfony bundles have two choices on how to handle configuration: normal service configuration through the `services.yml` file and semantic configuration through a special `*Extension` class.

Although semantic configuration is much more powerful and provides nice features such as configuration validation, the amount of work needed to define that configuration isn't worth it for bundles that aren't meant to be shared as third-party bundles.

Moving Sensitive Options Outside of Symfony Entirely

When dealing with sensitive options, like database credentials, we also recommend that you store them outside the Symfony project and make them available through environment variables. Learn how to do it in the following article: *How to Set external Parameters in the Service Container*



Chapter 4

Organizing Your Business Logic

In computer software, **business logic** or domain logic is "the part of the program that encodes the real-world business rules that determine how data can be created, displayed, stored, and changed" (read *full definition*¹).

In Symfony applications, business logic is all the custom code you write for your app that's not specific to the framework (e.g. routing and controllers). Domain classes, Doctrine entities and regular PHP classes that are used as services are good examples of business logic.

For most projects, you should store everything inside the AppBundle. Inside here, you can create whatever directories you want to organize things:

Listing 4-1

```
1 symfony2-project/  
2 |— app/  
3 |— src/  
4 |   |— AppBundle/  
5 |     |— Utils/  
6 |       |— MyClass.php  
7 |— vendor/  
8 |— web/
```

Storing Classes Outside of the Bundle?

But there's no technical reason for putting business logic inside of a bundle. If you like, you can create your own namespace inside the `src/` directory and put things there:

Listing 4-2

```
1 symfony2-project/  
2 |— app/  
3 |— src/  
4 |   |— Acme/  
5 |     |— Utils/  
6 |       |— MyClass.php
```

1. http://en.wikipedia.org/wiki/Business_logic

```
7 | ┌ AppBundle/
8 | └ vendor/
9 | └ web/
```



The recommended approach of using the `AppBundle/` directory is for simplicity. If you're advanced enough to know what needs to live in a bundle and what can live outside of one, then feel free to do that.

Services: Naming and Format

The blog application needs a utility that can transform a post title (e.g. "Hello World") into a slug (e.g. "hello-world"). The slug will be used as part of the post URL.

Let's create a new `Slugger` class inside `src/AppBundle/Utils/` and add the following `slugify()` method:

Listing 4-3

```
1 // src/AppBundle/Utils/Slugger.php
2 namespace AppBundle\Utils;
3
4 class Slugger
5 {
6     public function slugify($string)
7     {
8         return preg_replace(
9             '/[^a-z0-9]/', '-', strtolower(trim(strip_tags($string)))
10        );
11    }
12 }
```

Next, define a new service for that class.

Listing 4-4

```
1 # app/config/services.yml
2 services:
3     # keep your service names short
4     app.slugger:
5         class: AppBundle\Utils\Slugger
```

Traditionally, the naming convention for a service involved following the class name and location to avoid name collisions. Thus, the service *would have been* called `app.utils.slugger`. But by using short service names, your code will be easier to read and use.

The name of your application's services should be as short as possible, but unique enough that you can search your project for the service if you ever need to.

Now you can use the custom slugger in any controller class, such as the `AdminController`:

Listing 4-5

```
1 public function createAction(Request $request)
2 {
3     // ...
4
5     if ($form->isSubmitted() && $form->isValid()) {
6         $slug = $this->get('app.slugger')->slugify($post->getTitle());
```

```

7         $post->setSlug($slug);
8
9         // ...
10    }
11 }

```

Service Format: YAML

In the previous section, YAML was used to define the service.

Use the YAML format to define your own services.

This is controversial, and in our experience, YAML and XML usage is evenly distributed among developers, with a slight preference towards YAML. Both formats have the same performance, so this is ultimately a matter of personal taste.

We recommend YAML because it's friendly to newcomers and concise. You can of course use whatever format you like.

Service: No Class Parameter

You may have noticed that the previous service definition doesn't configure the class namespace as a parameter:

Listing 4-6

```

1 # app/config/services.yml
2
3 # service definition with class namespace as parameter
4 parameters:
5     slugger.class: AppBundle\Utils\Slugger
6
7 services:
8     app.slugger:
9         class: "%slugger.class%"

```

This practice is cumbersome and completely unnecessary for your own services:

Don't define parameters for the classes of your services.

This practice was wrongly adopted from third-party bundles. When Symfony introduced its service container, some developers used this technique to easily allow overriding services. However, overriding a service by just changing its class name is a very rare use case because, frequently, the new service has different constructor arguments.

Using a Persistence Layer

Symfony is an HTTP framework that only cares about generating an HTTP response for each HTTP request. That's why Symfony doesn't provide a way to talk to a persistence layer (e.g. database, external API). You can choose whatever library or strategy you want for this.

In practice, many Symfony applications rely on the independent *Doctrine project*² to define their model using entities and repositories. Just like with business logic, we recommend storing Doctrine entities in the AppBundle.

The three entities defined by our sample blog application are a good example:

Listing 4-7

```
1 symfony2-project/  
2 └─ ...  
3   └─ src/  
4     └─ AppBundle/  
5       └─ Entity/  
6         └─ Comment.php  
7         └─ Post.php  
8         └─ User.php
```



If you're more advanced, you can of course store them under your own namespace in `src/`.

Doctrine Mapping Information

Doctrine Entities are plain PHP objects that you store in some "database". Doctrine only knows about your entities through the mapping metadata configured for your model classes. Doctrine supports four metadata formats: YAML, XML, PHP and annotations.

Use annotations to define the mapping information of the Doctrine entities.

Annotations are by far the most convenient and agile way of setting up and looking for mapping information:

Listing 4-8

```
1 namespace AppBundle\Entity;  
2  
3 use Doctrine\ORM\Mapping as ORM;  
4 use Doctrine\Common\Collections\ArrayCollection;  
5  
6 /**  
7  * @ORM\Entity  
8  */  
9 class Post  
10 {  
11     const NUM_ITEMS = 10;  
12  
13     /**  
14      * @ORM\Id  
15      * @ORM\GeneratedValue  
16      * @ORM\Column(type="integer")  
17      */  
18     private $id;  
19  
20     /**  
21      * @ORM\Column(type="string")  
22      */  
23     private $title;  
24
```

2. <http://www.doctrine-project.org/>


```

25     /**
26      * @ORM\Column(type="string")
27      */
28     private $slug;
29
30     /**
31      * @ORM\Column(type="text")
32      */
33     private $content;
34
35     /**
36      * @ORM\Column(type="string")
37      */
38     private $authorEmail;
39
40     /**
41      * @ORM\Column(type="datetime")
42      */
43     private $publishedAt;
44
45     /**
46      * @ORM\OneToMany(
47      *     targetEntity="Comment",
48      *     mappedBy="post",
49      *     orphanRemoval=true
50      * )
51      * @ORM\OrderBy({"publishedAt" = "ASC"})
52      */
53     private $comments;
54
55     public function __construct()
56     {
57         $this->publishedAt = new \DateTime();
58         $this->comments = new ArrayCollection();
59     }
60
61     // getters and setters ...
62 }

```

All formats have the same performance, so this is once again ultimately a matter of taste.

Data Fixtures

As fixtures support is not enabled by default in Symfony, you should execute the following command to install the Doctrine fixtures bundle:

Listing 4-9 `1 $ composer require "doctrine/doctrine-fixtures-bundle"`

Then, enable the bundle in `AppKernel.php`, but only for the `dev` and `test` environments:

Listing 4-10

```

1 use Symfony\Component\HttpKernel\Kernel;
2
3 class AppKernel extends Kernel
4 {
5     public function registerBundles()
6     {
7         $bundles = array(

```

```

8         // ...
9     );
10
11     if (in_array($this->getEnvironment(), array('dev', 'test'))) {
12         // ...
13         $bundles[] = new Doctrine\Bundle\FixturesBundle\DoctrineFixturesBundle();
14     }
15
16     return $bundles;
17 }
18
19 // ...
20 }

```

We recommend creating just *one fixture class*³ for simplicity, though you're welcome to have more if that class gets quite large.

Assuming you have at least one fixtures class and that the database access is configured properly, you can load your fixtures by executing the following command:

Listing 4-11

```

1 $ php app/console doctrine:fixtures:load
2
3 Careful, database will be purged. Do you want to continue Y/N ? Y
4 > purging database
5 > loading AppBundle\DataFixtures\ORM\LoadFixtures

```

Coding Standards

The Symfony source code follows the *PSR-1*⁴ and *PSR-2*⁵ coding standards that were defined by the PHP community. You can learn more about *the Symfony Coding standards* and even use the *PHP-CS-Fixer*⁶, which is a command-line utility that can fix the coding standards of an entire codebase in a matter of seconds.

3. <http://symfony.com/doc/current/bundles/DoctrineFixturesBundle/index.html#writing-simple-fixtures>

4. <http://www.php-fig.org/psr/psr-1/>

5. <http://www.php-fig.org/psr/psr-2/>

6. <https://github.com/FriendsOfPHP/PHP-CS-Fixer>



Chapter 5

Controllers

Symfony follows the philosophy of "*thin controllers and fat models*". This means that controllers should hold just the thin layer of *glue-code* needed to coordinate the different parts of the application.

As a rule of thumb, you should follow the 5-10-20 rule, where controllers should only define 5 variables or less, contain 10 actions or less and include 20 lines of code or less in each action. This isn't an exact science, but it should help you realize when code should be refactored out of the controller and into a service.

Make your controller extend the FrameworkBundle base controller and use annotations to configure routing, caching and security whenever possible.

Coupling the controllers to the underlying framework allows you to leverage all of its features and increases your productivity.

And since your controllers should be thin and contain nothing more than a few lines of *glue-code*, spending hours trying to decouple them from your framework doesn't benefit you in the long run. The amount of time *wasted* isn't worth the benefit.

In addition, using annotations for routing, caching and security simplifies configuration. You don't need to browse tens of files created with different formats (YAML, XML, PHP): all the configuration is just where you need it and it only uses one format.

Overall, this means you should aggressively decouple your business logic from the framework while, at the same time, aggressively coupling your controllers and routing *to* the framework in order to get the most out of it.

Routing Configuration

To load routes defined as annotations in your controllers, add the following configuration to the main routing configuration file:

Listing 5-1

```
1 # app/config/routing.yml
2 app:
3     resource: "@AppBundle/Controller/"
4     type:     annotation
```

This configuration will load annotations from any controller stored inside the `src/AppBundle/Controller/` directory and even from its subdirectories. So if your application defines lots of controllers, it's perfectly ok to reorganize them into subdirectories:

```
Listing 5-2 1 <your-project>/
2   └─ ...
3   └─ src/
4       └─ AppBundle/
5           └─ ...
6               └─ Controller/
7                   └─ DefaultController.php
8                   └─ ...
9                   └─ Api/
10                      └─ ...
11                      └─ ...
12                   └─ Backend/
13                      └─ ...
14
```

Template Configuration

Don't use the `@Template()` annotation to configure the template used by the controller.

The `@Template` annotation is useful, but also involves some magic. For that reason, we don't recommend using it.

Most of the time, `@Template` is used without any parameters, which makes it more difficult to know which template is being rendered. It also makes it less obvious to beginners that a controller should always return a Response object (unless you're using a view layer).

Lastly, the `@Template` annotation uses a `TemplateListener` class that hooks into the `kernel.view` event dispatched by the framework. This listener introduces a measurable performance impact. In the sample blog application, rendering the homepage took 5 milliseconds using the `$this->render()` method and 26 milliseconds using the `@Template` annotation.

How the Controller Looks

Considering all this, here is an example of how the controller should look for the homepage of our app:

```
Listing 5-3 1 namespace AppBundle\Controller;
2
3 use Symfony\Bundle\FrameworkBundle\Controller\Controller;
4 use Sensio\Bundle\FrameworkExtraBundle\Configuration\Route;
5
6 class DefaultController extends Controller
7 {
8     /**
9      * @Route("/", name="homepage")
10     */
11     public function indexAction()
12     {
13         $posts = $this->getDoctrine()
14             ->getRepository('AppBundle:Post');
```

```

15         ->findLatest();
16
17         return $this->render('default/index.html.twig', array(
18             'posts' => $posts
19         ));
20     }
21 }

```

Using the ParamConverter

If you're using Doctrine, then you can *optionally* use the *ParamConverter*¹ to automatically query for an entity and pass it as an argument to your controller.

Use the ParamConverter trick to automatically query for Doctrine entities when it's simple and convenient.

For example:

Listing 5-4

```

1 use AppBundle\Entity\Post;
2 use Sensio\Bundle\FrameworkExtraBundle\Configuration\Route;
3
4 /**
5  * @Route("/{id}", name="admin_post_show")
6  */
7 public function showAction(Post $post)
8 {
9     $deleteForm = $this->createDeleteForm($post);
10
11     return $this->render('admin/post/show.html.twig', array(
12         'post' => $post,
13         'delete_form' => $deleteForm->createView(),
14     ));
15 }

```

Normally, you'd expect a `$id` argument to `showAction`. Instead, by creating a new argument (`$post`) and type-hinting it with the `Post` class (which is a Doctrine entity), the `ParamConverter` automatically queries for an object whose `$id` property matches the `{id}` value. It will also show a 404 page if no `Post` can be found.

When Things Get More Advanced

This works without any configuration because the wildcard name `{id}` matches the name of the property on the entity. If this isn't true, or if you have even more complex logic, the easiest thing to do is just query for the entity manually. In our application, we have this situation in `CommentController`:

Listing 5-5

```

1 /**
2  * @Route("/comment/{postSlug}/new", name = "comment_new")
3  */
4 public function newAction(Request $request, $postSlug)
5 {
6     $post = $this->getDoctrine()
7         ->getRepository('AppBundle:Post')

```

1. <http://symfony.com/doc/current/bundles/SensioFrameworkExtraBundle/annotations/converters.html>

```

8         ->findOneBy(array('slug' => $postSlug));
9
10        if (!$post) {
11            throw $this->createNotFoundException();
12        }
13
14        // ...
15    }

```

You can also use the `@ParamConverter` configuration, which is infinitely flexible:

Listing 5-6

```

1  use AppBundle\Entity\Post;
2  use Sensio\Bundle\FrameworkExtraBundle\Configuration\Route;
3  use Sensio\Bundle\FrameworkExtraBundle\Configuration\ParamConverter;
4  use Symfony\Component\HttpFoundation\Request;
5
6  /**
7   * @Route("/comment/{postSlug}/new", name = "comment_new")
8   * @ParamConverter("post", options={"mapping": {"postSlug": "slug"}})
9   */
10 public function newAction(Request $request, Post $post)
11 {
12     // ...
13 }

```

The point is this: the `ParamConverter` shortcut is great for simple situations. But you shouldn't forget that querying for entities directly is still very easy.

Pre and Post Hooks

If you need to execute some code before or after the execution of your controllers, you can use the `EventDispatcher` component to *set up before and after filters*.



Chapter 6

Templates

When PHP was created 20 years ago, developers loved its simplicity and how well it blended HTML and dynamic code. But as time passed, other template languages - like *Twig*¹ - were created to make templating even better.

Use Twig templating format for your templates.

Generally speaking, PHP templates are much more verbose than Twig templates because they lack native support for lots of modern features needed by templates, like inheritance, automatic escaping and named arguments for filters and functions.

Twig is the default templating format in Symfony and has the largest community support of all non-PHP template engines (it's used in high profile projects such as Drupal 8).

In addition, Twig is the only template format with guaranteed support in Symfony 3.0. As a matter of fact, PHP may be removed from the officially supported template engines.

Template Locations

Store all your application's templates in `app/Resources/views/` directory.

Traditionally, Symfony developers stored the application templates in the `Resources/views/` directory of each bundle. Then they used the logical name to refer to them (e.g. `AcmeDemoBundle:Default:index.html.twig`).

But for the templates used in your application, it's much more convenient to store them in the `app/Resources/views/` directory. For starters, this drastically simplifies their logical names:

Templates Stored inside Bundles	Templates Stored in <code>app/</code>
<code>AcmeDemoBundle:Default:index.html.twig</code>	<code>default/index.html.twig</code>
<code>::layout.html.twig</code>	<code>layout.html.twig</code>

1. <http://twig.sensiolabs.org/>

Templates Stored inside Bundles	Templates Stored in app/
AcmeDemoBundle::index.html.twig	index.html.twig
AcmeDemoBundle:Default:subdir/index.html.twig	default/subdir/index.html.twig
AcmeDemoBundle:Default/subdir:index.html.twig	default/subdir/index.html.twig

Another advantage is that centralizing your templates simplifies the work of your designers. They don't need to look for templates in lots of directories scattered through lots of bundles.

Twig Extensions

Define your Twig extensions in the `AppBundle/Twig/` directory and configure them using the `app/config/services.yml` file.

Our application needs a custom `md2html` Twig filter so that we can transform the Markdown contents of each post into HTML.

To do this, first, install the excellent *Parsedown*² Markdown parser as a new dependency of the project:

Listing 6-1

```
1 $ composer require erusev/parsedown
```

Then, create a new `Markdown` service that will be used later by the Twig extension. The service definition only requires the path to the class:

Listing 6-2

```
1 # app/config/services.yml
2 services:
3     # ...
4     markdown:
5         class: AppBundle\Utils\Markdown
```

And the `Markdown` class just needs to define one single method to transform Markdown content into HTML:

Listing 6-3

```
1 namespace AppBundle\Utils;
2
3 class Markdown
4 {
5     private $parser;
6
7     public function __construct()
8     {
9         $this->parser = new \Parsedown();
10    }
11
12    public function toHtml($text)
13    {
14        $html = $this->parser->text($text);
15
16        return $html;
17    }
18 }
```

2. <http://parsedown.org/>

Next, create a new Twig extension and define a new filter called `md2html` using the `Twig_SimpleFilter` class. Inject the newly defined `markdown` service in the constructor of the Twig extension:

```
Listing 6-4 1 namespace AppBundle\Twig;
2
3 use AppBundle\Utils\Markdown;
4
5 class AppExtension extends \Twig_Extension
6 {
7     private $parser;
8
9     public function __construct(Markdown $parser)
10    {
11        $this->parser = $parser;
12    }
13
14    public function getFilters()
15    {
16        return array(
17            new \Twig_SimpleFilter(
18                'md2html',
19                array($this, 'markdownToHtml'),
20                array('is_safe' => array('html'))
21            ),
22        );
23    }
24
25    public function markdownToHtml($content)
26    {
27        return $this->parser->toHtml($content);
28    }
29
30    public function getName()
31    {
32        return 'app_extension';
33    }
34 }
```

Lastly define a new service to enable this Twig extension in the app (the service name is irrelevant because you never use it in your own code):

```
Listing 6-5 1 # app/config/services.yml
2 services:
3     app.twig.app_extension:
4         class: AppBundle\Twig\AppExtension
5         arguments: ["@markdown"]
6         public: false
7         tags:
8             - { name: twig.extension }
```



Chapter 7

Forms

Forms are one of the most misused Symfony components due to its vast scope and endless list of features. In this chapter we'll show you some of the best practices so you can leverage forms but get work done quickly.

Building Forms

Define your forms as PHP classes.

The Form component allows you to build forms right inside your controller code. This is perfectly fine if you don't need to reuse the form somewhere else. But for organization and reuse, we recommend that you define each form in its own PHP class:

```
Listing 7-1 1 namespace AppBundle\Form;
2
3 use Symfony\Component\Form\AbstractType;
4 use Symfony\Component\Form\FormBuilderInterface;
5 use Symfony\Component\OptionsResolver\OptionsResolverInterface;
6
7 class PostType extends AbstractType
8 {
9     public function buildForm(FormBuilderInterface $builder, array $options)
10    {
11        $builder
12            ->add('title')
13            ->add('summary', 'textarea')
14            ->add('content', 'textarea')
15            ->add('authorEmail', 'email')
16            ->add('publishedAt', 'datetime')
17        ;
18    }
19
20    public function setDefaultOptions(OptionsResolverInterface $resolver)
21    {
```

```

22     $resolver->setDefaults(array(
23         'data_class' => 'AppBundle\Entity\Post'
24     ));
25 }
26
27 public function getName()
28 {
29     return 'post';
30 }
31 }

```

To use the class, use `createForm` and instantiate the new class:

Listing 7-2

```

1 use AppBundle\Form\PostType;
2 // ...
3
4 public function newAction(Request $request)
5 {
6     $post = new Post();
7     $form = $this->createForm(new PostType(), $post);
8
9     // ...
10 }

```

Registering Forms as Services

You can also *register your form type as a service*. But this is *not* recommended unless you plan to reuse the new form type in many places or embed it in other forms directly or via the *collection type*.

For most forms that are used only to edit or create something, registering the form as a service is over-kill, and makes it more difficult to figure out exactly which form class is being used in a controller.

Form Button Configuration

Form classes should try to be agnostic to *where* they will be used. This makes them easier to re-use later.

Add buttons in the templates, not in the form classes or the controllers.

Since Symfony 2.5, you can add buttons as fields on your form. This is a nice way to simplify the template that renders your form. But if you add the buttons directly in your form class, this would effectively limit the scope of that form:

Listing 7-3

```

1 class PostType extends AbstractType
2 {
3     public function buildForm(FormBuilderInterface $builder, array $options)
4     {
5         $builder
6             // ...
7             ->add('save', 'submit', array('label' => 'Create Post'))
8         ;
9     }
10
11     // ...
12 }

```

This form *may* have been designed for creating posts, but if you wanted to reuse it for editing posts, the button label would be wrong. Instead, some developers configure form buttons in the controller:

```
Listing 7-4 1 namespace AppBundle\Controller\Admin;
2
3 use Symfony\Component\HttpFoundation\Request;
4 use Symfony\Bundle\FrameworkBundle\Controller\Controller;
5 use AppBundle\Entity\Post;
6 use AppBundle\Form\PostType;
7
8 class PostController extends Controller
9 {
10     // ...
11
12     public function newAction(Request $request)
13     {
14         $post = new Post();
15         $form = $this->createForm(new PostType(), $post);
16         $form->add('submit', 'submit', array(
17             'label' => 'Create',
18             'attr' => array('class' => 'btn btn-default pull-right')
19         ));
20
21         // ...
22     }
23 }
```

This is also an important error, because you are mixing presentation markup (labels, CSS classes, etc.) with pure PHP code. Separation of concerns is always a good practice to follow, so put all the view-related things in the view layer:

```
Listing 7-5 1 {{ form_start(form) }}
2     {{ form_widget(form) }}
3
4     <input type="submit" value="Create"
5         class="btn btn-default pull-right" />
6 {{ form_end(form) }}
```

Rendering the Form

There are a lot of ways to render your form, ranging from rendering the entire thing in one line to rendering each part of each field independently. The best way depends on how much customization you need.

One of the simplest ways - which is especially useful during development - is to render the form tags and use `form_widget()` to render all of the fields:

```
Listing 7-6 1 {{ form_start(form, {'attr': {'class': 'my-form-class'}}) }}
2     {{ form_widget(form) }}
3 {{ form_end(form) }}
```

If you need more control over how your fields are rendered, then you should remove the `form_widget(form)` function and render your fields individually. See the *How to Customize Form Rendering* article for more information on this and how you can control *how* the form renders at a global level using form theming.

Handling Form Submits

Handling a form submit usually follows a similar template:

```
Listing 7-7 1 public function newAction(Request $request)
2 {
3     // build the form ...
4
5     $form->handleRequest($request);
6
7     if ($form->isSubmitted() && $form->isValid()) {
8         $em = $this->getDoctrine()->getManager();
9         $em->persist($post);
10        $em->flush();
11
12        return $this->redirect($this->generateUrl(
13            'admin_post_show',
14            array('id' => $post->getId())
15        ));
16    }
17
18    // render the template
19 }
```

There are really only two notable things here. First, we recommend that you use a single action for both rendering the form and handling the form submit. For example, you *could* have a `newAction` that *only* renders the form and a `createAction` that *only* processes the form submit. Both those actions will be almost identical. So it's much simpler to let `newAction` handle everything.

Second, we recommend using `$form->isSubmitted()` in the `if` statement for clarity. This isn't technically needed, since `isValid()` first calls `isSubmitted()`. But without this, the flow doesn't read well as it *looks* like the form is *always* processed (even on the GET request).



Chapter 8

Internationalization

Internationalization and localization adapt the applications and their contents to the specific region or language of the users. In Symfony this is an opt-in feature that needs to be enabled before using it. To do this, uncomment the following `translator` configuration option and set your application locale:

Listing 8-1

```
1 # app/config/config.yml
2 framework:
3     # ...
4     translator: { fallback: "%locale%" }
5
6 # app/config/parameters.yml
7 parameters:
8     # ...
9     locale:     en
```

Translation Source File Format

The Symfony Translation component supports lots of different translation formats: PHP, Qt, `.po`, `.mo`, JSON, CSV, INI, etc.

Use the XLIFF format for your translation files.

Of all the available translation formats, only XLIFF and gettext have broad support in the tools used by professional translators. And since it's based on XML, you can validate XLIFF file contents as you write them.

Symfony 2.6 added support for notes inside XLIFF files, making them more user-friendly for translators. At the end, good translations are all about context, and these XLIFF notes allow you to define that context.



The Apache-licensed *JMSTranslationBundle*¹ offers you a web interface for viewing and editing these translation files. It also has advanced extractors that can read your project and automatically update the XLIFF files.

Translation Source File Location

Store the translation files in the `app/Resources/translations/` directory.

Traditionally, Symfony developers have created these files in the `Resources/translations/` directory of each bundle.

But since the `app/Resources/` directory is considered the global location for the application's resources, storing translations in `app/Resources/translations/` centralizes them *and* gives them priority over any other translation file. This lets you override translations defined in third-party bundles.

Translation Keys

Always use keys for translations instead of content strings.

Using keys simplifies the management of the translation files because you can change the original contents without having to update all of the translation files.

Keys should always describe their *purpose* and *not* their location. For example, if a form has a field with the label "Username", then a nice key would be `label.username`, *not* `edit_form.label.username`.

Example Translation File

Applying all the previous best practices, the sample translation file for English in the application would be:

Listing 8-2

```
1 <!-- app/Resources/translations/messages.en.xliff -->
2 <?xml version="1.0"?>
3 <xliff version="1.2" xmlns="urn:oasis:names:tc:xliff:document:1.2">
4     <file source-language="en" target-language="en" datatype="plaintext"
5     original="file.ext">
6         <body>
7             <trans-unit id="1">
8                 <source>title.post_list</source>
9                 <target>Post List</target>
10            </trans-unit>
11        </body>
12    </file>
</xliff>
```

1. <https://github.com/schmittjoh/JMSTranslationBundle>



Chapter 9

Security

Authentication and Firewalls (i.e. Getting the User's Credentials)

You can configure Symfony to authenticate your users using any method you want and to load user information from any source. This is a complex topic, but the *Security Cookbook Section* has a lot of information about this.

Regardless of your needs, authentication is configured in `security.yml`, primarily under the `firewalls` key.

Unless you have two legitimately different authentication systems and users (e.g. form login for the main site and a token system for your API only), we recommend having only one firewall entry with the `anonymous` key enabled.

Most applications only have one authentication system and one set of users. For this reason, you only need *one* firewall entry. There are exceptions of course, especially if you have separated web and API sections on your site. But the point is to keep things simple.

Additionally, you should use the `anonymous` key under your firewall. If you need to require users to be logged in for different sections of your site (or maybe nearly *all* sections), use the `access_control` area.

Use the `bcrypt` encoder for encoding your users' passwords.

If your users have a password, then we recommend encoding it using the `bcrypt` encoder, instead of the traditional SHA-512 hashing encoder. The main advantages of `bcrypt` are the inclusion of a `salt` value to protect against rainbow table attacks, and its adaptive nature, which allows to make it slower to remain resistant to brute-force search attacks.

With this in mind, here is the authentication setup from our application, which uses a login form to load users from the database:

```
Listing 9-1 1 # app/config/security.yml
           2 security:
           3     encoders:
```



```

4     AppBundle\Entity\User: bcrypt
5
6     providers:
7         database_users:
8             entity: { class: AppBundle\User, property: username }
9
10    firewalls:
11        secured_area:
12            pattern: ^/
13            anonymous: true
14            form_login:
15                check_path: security_login_check
16                login_path: security_login_form
17
18            logout:
19                path: security_logout
20                target: homepage
21
22    # ... access_control exists, but is not shown here

```



The source code for our project contains comments that explain each part.

Authorization (i.e. Denying Access)

Symfony gives you several ways to enforce authorization, including the `access_control` configuration in `security.yml`, the `@Security` annotation and using `isGranted` on the `security.context` service directly.

- For protecting broad URL patterns, use `access_control`;
- Whenever possible, use the `@Security` annotation;
- Check security directly on the `security.context` service whenever you have a more complex situation.

There are also different ways to centralize your authorization logic, like with a custom security voter or with ACL.

- For fine-grained restrictions, define a custom security voter;
- For restricting access to any object by any user via an admin interface, use the Symfony ACL.

The @Security Annotation

For controlling access on a controller-by-controller basis, use the `@Security` annotation whenever possible. It's easy to read and is placed consistently above each action.

In our application, you need the `ROLE_ADMIN` in order to create a new post. Using `@Security`, this looks like:

Listing 9-2

```

1 use Sensio\Bundle\FrameworkExtraBundle\Configuration\Route;
2 use Sensio\Bundle\FrameworkExtraBundle\Configuration\Security;
3 // ...
4
5 /**
6  * Displays a form to create a new Post entity.
7  *
8  * @Route("/new", name="admin_post_new")
9  * @Security("has_role('ROLE_ADMIN')")
10 */
11 public function newAction()
12 {
13     // ...
14 }

```

Using Expressions for Complex Security Restrictions

If your security logic is a little bit more complex, you can use an *expression*¹ inside `@Security`. In the following example, a user can only access the controller if their email matches the value returned by the `getAuthorEmail` method on the `Post` object:

Listing 9-3

```

1 use AppBundle\Entity\Post;
2 use Sensio\Bundle\FrameworkExtraBundle\Configuration\Route;
3 use Sensio\Bundle\FrameworkExtraBundle\Configuration\Security;
4
5 /**
6  * @Route("/{id}/edit", name="admin_post_edit")
7  * @Security("user.getEmail() == post.getAuthorEmail()")
8  */
9 public function editAction(Post $post)
10 {
11     // ...
12 }

```

Notice that this requires the use of the *ParamConverter*², which automatically queries for the `Post` object and puts it on the `$post` argument. This is what makes it possible to use the `post` variable in the expression.

This has one major drawback: an expression in an annotation cannot easily be reused in other parts of the application. Imagine that you want to add a link in a template that will only be seen by authors. Right now you'll need to repeat the expression code using Twig syntax:

Listing 9-4

```

1 {% if app.user and app.user.email == post.authorEmail %}
2     <a href=""> ... </a>
3 {% endif %}

```

The easiest solution - if your logic is simple enough - is to add a new method to the `Post` entity that checks if a given user is its author:

Listing 9-5

```

1 // src/AppBundle/Entity/Post.php
2 // ...
3

```

1. http://symfony.com/doc/current/components/expression_language/introduction.html

2. <http://symfony.com/doc/current/bundles/SensioFrameworkExtraBundle/annotations/converters.html>

```

4 class Post
5 {
6     // ...
7
8     /**
9      * Is the given User the author of this Post?
10    *
11    * @return bool
12    */
13    public function isAuthor(User $user = null)
14    {
15        return $user && $user->getEmail() == $this->getAuthorEmail();
16    }
17 }

```

Now you can reuse this method both in the template and in the security expression:

```

Listing 9-6 1 use AppBundle\Entity\Post;
2 use Sensio\Bundle\FrameworkExtraBundle\Configuration\Security;
3
4 /**
5  * @Route("/{id}/edit", name="admin_post_edit")
6  * @Security("post.isAuthor(user)")
7  */
8 public function editAction(Post $post)
9 {
10    // ...
11 }

```

```

Listing 9-7 1 {% if post.isAuthor(app.user) %}
2     <a href="" > ... </a>
3 {% endif %}

```

Checking Permissions without @Security

The above example with `@Security` only works because we're using the `ParamConverter`, which gives the expression access to the `post` variable. If you don't use this, or have some other more advanced use-case, you can always do the same security check in PHP:

```

Listing 9-8 1 /**
2  * @Route("/{id}/edit", name="admin_post_edit")
3  */
4 public function editAction($id)
5 {
6     $post = $this->getDoctrine()->getRepository('AppBundle:Post')
7         ->find($id);
8
9     if (!$post) {
10        throw $this->createNotFoundException();
11    }
12
13    if (!$post->isAuthor($this->getUser())) {
14        throw $this->createAccessDeniedException();

```

```

15     }
16
17     // ...
18 }

```

Security Voters

If your security logic is complex and can't be centralized into a method like `isAuthor()`, you should leverage custom voters. These are an order of magnitude easier than *ACLs* and will give you the flexibility you need in almost all cases.

First, create a voter class. The following example shows a voter that implements the same `getAuthorEmail` logic you used above:

Listing 9-9

```

1 namespace AppBundle\Security;
2
3 use Symfony\Component\Security\Core\Authorization\Voter\AbstractVoter;
4 use Symfony\Component\Security\Core\User\UserInterface;
5
6 // AbstractVoter class requires Symfony 2.6 or higher version
7 class PostVoter extends AbstractVoter
8 {
9     const CREATE = 'create';
10    const EDIT   = 'edit';
11
12    protected function getSupportedAttributes()
13    {
14        return array(self::CREATE, self::EDIT);
15    }
16
17    protected function getSupportedClasses()
18    {
19        return array('AppBundle\Entity\Post');
20    }
21
22    protected function isGranted($attribute, $post, $user = null)
23    {
24        if (!$user instanceof UserInterface) {
25            return false;
26        }
27
28        if ($attribute === self::CREATE && in_array('ROLE_ADMIN', $user->getRoles(),
29 true)) {
30            return true;
31        }
32
33        if ($attribute === self::EDIT && $user->getEmail() === $post->getAuthorEmail()) {
34            return true;
35        }
36
37        return false;
38    }
39 }

```

To enable the security voter in the application, define a new service:

Listing 9-10

```

1 # app/config/services.yml
2 services:
3     # ...
4     post_voter:
5         class:     AppBundle\Security\PostVoter
6         public:    false
7         tags:
8             - { name: security.voter }

```

Now, you can use the voter with the `@Security` annotation:

```

Listing 9-11 1 /**
2     * @Route("/{id}/edit", name="admin_post_edit")
3     * @Security("is_granted('edit', post)")
4     */
5 public function editAction(Post $post)
6 {
7     // ...
8 }

```

You can also use this directly with the `security.context` service or via the even easier shortcut in a controller:

```

Listing 9-12 1 /**
2     * @Route("/{id}/edit", name="admin_post_edit")
3     */
4 public function editAction($id)
5 {
6     $post = // query for the post ...
7
8     if (!$this->get('security.context')->isGranted('edit', $post)) {
9         throw $this->createAccessDeniedException();
10    }
11 }

```

Learn More

The *FOSUserBundle*³, developed by the Symfony community, adds support for a database-backed user system in Symfony. It also handles common tasks like user registration and forgotten password functionality.

Enable the *Remember Me feature* to allow your users to stay logged in for a long period of time.

When providing customer support, sometimes it's necessary to access the application as some *other* user so that you can reproduce the problem. Symfony provides the ability to *impersonate users*.

If your company uses a user login method not supported by Symfony, you can develop *your own user provider* and *your own authentication provider*.

3. <https://github.com/FriendsOfSymfony/FOSUserBundle>



Chapter 10

Web Assets

Web assets are things like CSS, JavaScript and image files that make the frontend of your site look and work great. Symfony developers have traditionally stored these assets in the `Resources/public/` directory of each bundle.

Store your assets in the `web/` directory.

Scattering your web assets across tens of different bundles makes it more difficult to manage them. Your designers' lives will be much easier if all the application assets are in one location.

Templates also benefit from centralizing your assets, because the links are much more concise:

Listing 10-1

```
1 <link rel="stylesheet" href="{{ asset('css/bootstrap.min.css') }}" />
2 <link rel="stylesheet" href="{{ asset('css/main.css') }}" />
3
4 {# ... #}
5
6 <script src="{{ asset('js/jquery.min.js') }}"></script>
7 <script src="{{ asset('js/bootstrap.min.js') }}"></script>
```



Keep in mind that `web/` is a public directory and that anything stored here will be publicly accessible. For that reason, you should put your compiled web assets here, but not their source files (e.g. SASS files).

Using Assetic

These days, you probably can't simply create static CSS and JavaScript files and include them in your template. Instead, you'll probably want to combine and minify these to improve client-side performance. You may also want to use LESS or Sass (for example), which means you'll need some way to process these into CSS files.

A lot of tools exist to solve these problems, including pure-frontend (non-PHP) tools like GruntJS.

Use Assetic to compile, combine and minimize web assets, unless you're comfortable with frontend tools like GruntJS.

Assetic is an asset manager capable of compiling assets developed with a lot of different frontend technologies like LESS, Sass and CoffeeScript. Combining all your assets with Assetic is a matter of wrapping all the assets with a single Twig tag:

```
Listing 10-2 1 {% stylesheets
2     'css/bootstrap.min.css'
3     'css/main.css'
4     filter='cssrewrite' output='css/compiled/all.css' %}
5     <link rel="stylesheet" href="{{ asset_url }}" />
6 {% endstylesheets %}
7
8 {# ... #}
9
10 {% javascripts
11     'js/jquery.min.js'
12     'js/bootstrap.min.js'
13     output='js/compiled/all.js' %}
14     <script src="{{ asset_url }}"></script>
15 {% endjavascripts %}
```

Frontend-Based Applications

Recently, frontend technologies like AngularJS have become pretty popular for developing frontend web applications that talk to an API.

If you are developing an application like this, you should use the tools that are recommended by the technology, such as Bower and GruntJS. You should develop your frontend application separately from your Symfony backend (even separating the repositories if you want).

Learn More about Assetic

Assetic can also minimize CSS and JavaScript assets *using UglifyCSS/UglifyJS* to speed up your websites. You can even *compress images* with Assetic to reduce their size before serving them to the user. Check out the *official Assetic documentation*¹ to learn more about all the available features.

1. <https://github.com/kriswallsmith/assetic>



Chapter 11

Tests

Roughly speaking, there are two types of test. Unit testing allows you to test the input and output of specific functions. Functional testing allows you to command a "browser" where you browse to pages on your site, click links, fill out forms and assert that you see certain things on the page.

Unit Tests

Unit tests are used to test your "business logic", which should live in classes that are independent of Symfony. For that reason, Symfony doesn't really have an opinion on what tools you use for unit testing. However, the most popular tools are *PHPUnit*¹ and *PhpSpec*².

Functional Tests

Creating really good functional tests can be tough so some developers skip these completely. Don't skip the functional tests! By defining some *simple* functional tests, you can quickly spot any big errors before you deploy them:

Define a functional test that at least checks if your application pages are successfully loading.

A functional test can be as easy as this:

```
Listing 11-1 1 // src/AppBundle/Tests/ApplicationAvailabilityFunctionalTest.php
2 namespace AppBundle\Tests;
3
4 use Symfony\Bundle\FrameworkBundle\Test\WebTestCase;
5
6 class ApplicationAvailabilityFunctionalTest extends WebTestCase
7 {
8     /**
9      * @dataProvider urlProvider
```

1. <https://phpunit.de/>
2. <http://www.phpspec.net/>


```

10     */
11     public function testPageIsSuccessful($url)
12     {
13         $client = self::createClient();
14         $client->request('GET', $url);
15
16         $this->assertTrue($client->getResponse()->isSuccessful());
17     }
18
19     public function urlProvider()
20     {
21         return array(
22             array('/'),
23             array('/posts'),
24             array('/post/fixture-post-1'),
25             array('/blog/category/fixture-category'),
26             array('/archives'),
27             // ...
28         );
29     }
30 }

```

This code checks that all the given URLs load successfully, which means that their HTTP response status code is between 200 and 299. This may not look that useful, but given how little effort this took, it's worth having it in your application.

In computer software, this kind of test is called *smoke testing*³ and consists of "preliminary testing to reveal simple failures severe enough to reject a prospective software release".

Hardcode URLs in a Functional Test

Some of you may be asking why the previous functional test doesn't use the URL generator service:

Hardcode the URLs used in the functional tests instead of using the URL generator.

Consider the following functional test that uses the `router` service to generate the URL of the tested page:

```

Listing 11-2 1 public function testBlogArchives()
2 {
3     $client = self::createClient();
4     $url = $client->getContainer()->get('router')->generate('blog_archives');
5     $client->request('GET', $url);
6
7     // ...
8 }

```

This will work, but it has one *huge* drawback. If a developer mistakenly changes the path of the `blog_archives` route, the test will still pass, but the original (old) URL won't work! This means that any bookmarks for that URL will be broken and you'll lose any search engine page ranking.

Testing JavaScript Functionality

The built-in functional testing client is great, but it can't be used to test any JavaScript behavior on your pages. If you need to test this, consider using the *Mink*⁴ library from within PHPUnit.

3. [http://en.wikipedia.org/wiki/Smoke_testing_\(software\)](http://en.wikipedia.org/wiki/Smoke_testing_(software))

Of course, if you have a heavy JavaScript frontend, you should consider using pure JavaScript-based testing tools.

Learn More about Functional Tests

Consider using *Faker*⁵ and *Alice*⁶ libraries to generate real-looking data for your test fixtures.

4. <http://mink.behat.org>

5. <https://github.com/fzaninotto/Faker>

6. <https://github.com/nelmio/alice>

