



Getting Started

symfony 1.4

This PDF is brought to you by
SENSIOLABS 

License: Creative Commons Attribution-Share Alike 3.0 Unported License
Version: getting-started-1.4-en-2010-03-21

Table of Contents

Chapter 1: Introduction	3
Chapter 2: Prerequisites	4
Third-Party Software	4
Command Line Interface	4
PHP Configuration	4
Chapter 3: Symfony Installation	6
Initializing the Project Directory	6
Choosing the Symfony Version	6
Choosing the Symfony Installation Location	6
Installing Symfony	7
Installing from an archive	7
Installing from Subversion (recommended)	7
Chapter 4: Project Setup	9
Project Creation	9
Installation Verification	10
Configuring the Database	10
Application Creation	11
Directory Structure Rights	12
Chapter 5: Web Server Configuration	13
The ugly Way	13
The secure Way	13
Web Server Configuration	13
Test the New Configuration	15
Chapter 6: The Environments	17
Chapter 7: What's next?	20
Appendix A: The Sandbox	22
Appendix B: License	24
Attribution-Share Alike 3.0 Unported License	24

Chapter 1

Introduction

The symfony framework is a full-stack MVC framework that helps you develop websites faster. It also establishes a set of best practices that will help you to develop maintainable and secure websites. And advocating best practices starts as soon as you want to install the framework itself.

Installing symfony is not very much different to installing any other PHP software but, to make your installation secure from the start, you should not just put all the files under your web root directory as many other installation guides may prescribe. Although it will take slightly more time to install symfony our way, a little extra effort at the beginning is really worth it in the long run. Also, as with any other PHP software installation, there are a lot of small traps that you can fall into that can make your experience harder than it needs to be, so we will try to help you avoid them.

This tutorial teaches you everything you need to get started with a new symfony project. From the web server configuration, installation of symfony itself, to the creation of an application; at the end of the tutorial, you will have a fully-working symfony application, ready to be used for your next project.

Chapter 2

Prerequisites

Before installing symfony, you need to check that your computer has everything installed and configured correctly. Take the time to conscientiously read this chapter and follow all the steps required to check your configuration, as it may save your day further down the road.

Third-Party Software

First of all, you need to check that your computer has a friendly working environment for web development. At a minimum, you need a web server (Apache, for instance), a database engine (MySQL, PostgreSQL, SQLite, or any PDO¹-compatible database engine), and PHP 5.2.4 or later.

Command Line Interface

The symfony framework comes bundled with a command line tool that automates a lot of work for you. If you are a Unix-like OS user, you will feel right at home. If you run a Windows system, it will also work fine, but you will just have to type a few commands at the cmd prompt.



Unix shell commands can come in handy in a Windows environment. If you would like to use tools like `tar`, `gzip` or `grep` on Windows, you can install Cygwin². The adventurous may also like to try Microsoft's Windows Services for Unix³.

PHP Configuration

As PHP configurations can vary a lot from one OS to another, or even between different Linux distributions, you need to check that your PHP configuration meets the symfony minimum requirements.

First, ensure that you have PHP 5.2.4 at a minimum installed by using the `phpinfo()` built-in function or by running `php -v` on the command line. Be aware that on some configurations, you might have two different PHP versions installed: one for the command line, and another for the web.

Then, download the symfony configuration checker script at the following URL:

-
1. <http://www.php.net/PDO>
 2. <http://cygwin.com/>
 3. <http://technet.microsoft.com/en-gb/interopmigration/bb380242.aspx>

`http://sf-to.org/1.4/check.php`

*Listing
2-1*

Save the script somewhere under your current web root directory.

Launch the configuration checker script from the command line:

```
$ php check_configuration.php
```

*Listing
2-2*

If there is a problem with your PHP configuration, the output of the command will give you hints on what to fix and how to fix it.

You should also execute the checker from a browser and fix the issues it might discover. That's because PHP can have a distinct `php.ini` configuration file for these two environments, with different settings.



Don't forget to remove the file from your web root directory afterwards.



If your goal is to give symfony a try for a few hours, you can install the symfony sandbox as described in Appendix A⁴. If you want to bootstrap a real world project or want to learn more about symfony, keep reading.

Chapter 3

Symfony Installation

Initializing the Project Directory

Before installing symfony, you first need to create a directory that will host all the files related to your project:

Listing 3-1

```
$ mkdir -p /home/sfproject
$ cd /home/sfproject
```

Or on Windows:

Listing 3-2

```
c:\> mkdir c:\dev\sfproject
c:\> cd c:\dev\sfproject
```



Windows users are advised to run symfony and to setup their new project in a path which contains no spaces. Avoid using the Documents and Settings directory, including anywhere under My Documents.



If you create the symfony project directory under the web root directory, you won't need to configure your web server. Of course, for production environments, we strongly advise you to configure your web server as explained in the web server configuration section.

Choosing the Symfony Version

Now, you need to install symfony. As the symfony framework has several stable versions, you need to choose the one you want to install by reading the installation page⁵ on the symfony website.

This tutorial assumes you want to install symfony 1.4.

Choosing the Symfony Installation Location

You can install symfony globally on your machine, or embed it into each of your project. The latter is the recommended one as projects will then be totally independent from each others. Upgrading your locally installed symfony won't break some of your projects unexpectedly. It

5. <http://www.symfony-project.org/installation>

means you will be able to have projects on different versions of symfony, and upgrade them one at a time as you see fit.

As a best practice, many people install the symfony framework files in the `lib/vendor` project directory. So, first, create this directory:

```
$ mkdir -p lib/vendor
```

*Listing
3-3*

Installing Symfony

Installing from an archive

The easiest way to install symfony is to download the archive for the version you choose from the symfony website. Go to the installation page for the version you have just chosen, symfony 1.4⁶ for instance.

Under the “**Download as an Archive**” section, you will find the archive in `.tgz` or in `.zip` format. Download the archive, put it under the freshly created `lib/vendor/` directory, unarchive it, and rename the directory to `symfony`:

```
$ cd lib/vendor
$ tar xzpf symfony-1.4.0.tgz
$ mv symfony-1.4.0 symfony
$ rm symfony-1.4.0.tgz
```

*Listing
3-4*

Under Windows, unzipping the zip file can be achieved using Windows Explorer. After you rename the directory to `symfony`, there should be a directory structure similar to `c:\dev\sfproject\lib\vendor\symfony`.

Installing from Subversion (recommended)

If you use Subversion, it is even better to use the `svn:externals` property to embed symfony into your project in the `lib/vendor/` directory:

```
$ svn pe svn:externals lib/vendor/
```

*Listing
3-5*

If everything goes well, this command will run your favorite editor to give you the opportunity to configure the external Subversion sources.



On Windows, you can use tools like TortoiseSVN⁷ to do everything without the need to use the console.

If you are conservative, tie your project to a specific release (a subversion tag):

```
svn checkout http://svn.symfony-project.com/tags/RELEASE_1_4_0
```

*Listing
3-6*

Whenever a new release comes out (as announced on the symfony blog⁸), you will need to change the URL to the new version.

If you want to go the bleeding-edge route, use the 1.4 branch:

6. http://www.symfony-project.org/installation/1_4

7. <http://tortoisesvn.net/>

8. <http://www.symfony-project.org/blog/>

Listing 3-7 `svn checkout http://svn.symfony-project.com/branches/1.4/`

Using the branch makes your project benefit from the bug fixes automatically whenever you run a `svn update`.

Chapter 4

Project Setup

In symfony, **applications** sharing the same data model are regrouped into **projects**. For most projects, you will have two different applications: a frontend and a backend.

Project Creation

From the `sfproject/` directory, run the `symfony generate:project` task to actually create the symfony project:

```
$ php lib/vendor/symfony/data/bin/symfony generate:project PROJECT_NAME
```

*Listing
4-1*

On Windows:

```
c:\> php lib\vendor\symfony\data\bin\symfony generate:project PROJECT_NAME
```

*Listing
4-2*

The `generate:project` task generates the default structure of directories and files needed for a symfony project:

Directory	Description
<code>apps/</code>	Hosts all project applications
<code>cache/</code>	The files cached by the framework
<code>config/</code>	The project configuration files
<code>data/</code>	Data files like initial fixtures
<code>lib/</code>	The project libraries and classes
<code>log/</code>	The framework log files
<code>plugins/</code>	The installed plugins
<code>test/</code>	The unit and functional test files
<code>web/</code>	The web root directory (see below)



Why does symfony generate so many files? One of the main benefits of using a full-stack framework is to standardize your developments. Thanks to symfony's default structure of files and directories, any developer with some symfony knowledge can take over the maintenance of any symfony project. In a matter of minutes, he will be able to dive into the code, fix bugs, and add new features.

The `generate:project` task has also created a `symfony` shortcut in the project root directory to shorten the number of characters you have to write when running a task.

So, from now on, instead of using the fully qualified path to the symfony program, you can use the symfony shortcut.

Installation Verification

Now that symfony is installed, check that everything is working by using the symfony command line to display the symfony version (note the capital V):

```
Listing 4-3 $ cd ../../
$ php lib/vendor/symfony/data/bin/symfony -V
```

On Windows:

```
Listing 4-4 c:\> cd ../../
c:\> php lib\vendor\symfony\data\bin\symfony -V
```

The `-V` option also displays the path to the symfony installation directory, which is stored in `config/ProjectConfiguration.class.php`.

If the path to symfony is an absolute one (which should not be by default if you follow the above instructions), change it so it reads like follows for better portability:

```
Listing 4-5 // config/ProjectConfiguration.class.php
require_once dirname(__FILE__).'/../lib/vendor/symfony/lib/autoload/
sfCoreAutoload.class.php';
```

That way, you can move the project directory anywhere on your machine or another one, and it will just work.



If you are curious about what this command line tool can do for you, type `symfony` to list the available options and tasks:

```
Listing 4-6 $ php lib/vendor/symfony/data/bin/symfony
```

On Windows:

```
Listing 4-7 c:\> php lib\vendor\symfony\data\bin\symfony
```

The symfony command line is the developer's best friend. It provides a lot of utilities that improve your productivity for day-to-day activities like cleaning the cache, generating code, and much more.

Configuring the Database

The symfony framework supports all PDO⁹-supported databases (MySQL, PostgreSQL, SQLite, Oracle, MSSQL, ...) out of the box. On top of PDO, symfony comes bundled with two ORM tools: Propel and Doctrine.

When creating a new project, Doctrine is enabled by default. Configuring the database used by Doctrine is as simple as using the `configure:database` task:

```
Listing 4-8 $ php symfony configure:database "mysql:host=localhost;dbname=dbname" root
mYsEcret
```

9. <http://www.php.net/PDO>

The `configure:database` task takes three arguments: the PDO DSN¹⁰, the username, and the password to access the database. If you don't need a password to access your database on the development server, just omit the third argument.



If you want to use Propel instead of Doctrine, add `--orm=Propel` when creating the project with the `generate:project` task. And if you don't want to use an ORM, just pass `--orm=none`.

Application Creation

Now, create the frontend application by running the `generate:app` task:

```
$ php symfony generate:app frontend
```

Listing
4-9



Because the `symfony` shortcut file is executable, Unix users can replace all occurrences of `'php symfony'` by `'./symfony'` from now on.

On Windows you can copy the `'symfony.bat'` file to your project and use `'symfony'` instead of `'php symfony'`:

```
c:\> copy lib\vendor\symfony\data\bin\symfony.bat .
```

Listing
4-10

Based on the application name given as an *argument*, the `generate:app` task creates the default directory structure needed for the application under the `apps/frontend/` directory:

Directory	Description
<code>config/</code>	The application configuration files
<code>lib/</code>	The application libraries and classes
<code>modules/</code>	The application code (MVC)
<code>templates/</code>	The global template files

Security

By default, the `generate:app` task has secured our application from the two most widespread vulnerabilities found on the web. That's right, `symfony` automatically takes security measures on our behalf.

To prevent XSS attacks, output escaping has been enabled; and to prevent CSRF attacks, a random CSRF secret has been generated.

Of course, you can tweak these settings thanks to the following *options*:

- `--escaping-strategy`: Enables or disables output escaping
- `--csrf-secret`: Enables session tokens in forms

If you know nothing about XSS¹¹ or CSRF¹², take the time to learn more these security vulnerabilities.

10. <http://www.php.net/manual/en/pdo.drivers.php>

11. http://en.wikipedia.org/wiki/Cross-site_scripting

12. <http://en.wikipedia.org/wiki/CSRF>

Directory Structure Rights

Before trying to access your newly created project, you need to set the write permissions on the `cache/` and `log/` directories to the appropriate levels, so that your web server can write to them:

Listing 4-11 `$ chmod 777 cache/ log/`

Tips for People using a SCM Tool

symfony only ever writes in two directories of a symfony project, `cache/` and `log/`. The content of these directories should be ignored by your SCM (by editing the `svn:ignore` property if you use Subversion for instance).

Chapter 5

Web Server Configuration

The ugly Way

In the previous chapters, you have created a directory that hosts the project. If you have created it somewhere under the web root directory of your web server, you can already access the project in a web browser.

Of course, as there is no configuration, it is very fast to set up, but try to access the `config/databases.yml` file in your browser to understand the bad consequences of such a lazy attitude. If the user knows that your website is developed with symfony, he will have access to a lot of sensitive files.

Never ever use this setup on a production server, and read the next section to learn how to configure your web server properly.

The secure Way

A good web practice is to put under the web root directory only the files that need to be accessed by a web browser, like stylesheets, JavaScripts and images. By default, we recommend to store these files under the `web/` sub-directory of a symfony project.

If you have a look at this directory, you will find some sub-directories for web assets (`css/` and `images/`) and the two front controller files. The front controllers are the only PHP files that need to be under the web root directory. All other PHP files can be hidden from the browser, which is a good idea as far as security is concerned.

Web Server Configuration

Now it is time to change your Apache configuration, to make the new project accessible to the world.

Locate and open the `httpd.conf` configuration file and add the following configuration at the end:

```
# Be sure to only have this line once in your configuration
NameVirtualHost 127.0.0.1:8080

# This is the configuration for your project
Listen 127.0.0.1:8080

<VirtualHost 127.0.0.1:8080>
```

*Listing
5-1*

```

DocumentRoot "/home/sfproject/web"
DirectoryIndex index.php
<Directory "/home/sfproject/web">
    AllowOverride All
    Allow from All
</Directory>

Alias /sf /home/sfproject/lib/vendor/symfony/data/web/sf
<Directory "/home/sfproject/lib/vendor/symfony/data/web/sf">
    AllowOverride All
    Allow from All
</Directory>
</VirtualHost>

```



The `/sf` alias gives you access to images and javascript files needed to properly display default symfony pages and the web debug toolbar.

On Windows, you need to replace the `Alias` line with something like:

```
Listing 5-2 Alias /sf "c:\dev\sproject\lib\vendor\symfony\data\web\sf"
```

And `/home/sfproject/web` should be replaced with:

```
Listing 5-3 c:\dev\sproject\web
```

This configuration makes Apache listen to port `8080` on your machine, so the website will be accessible at the following URL:

```
Listing 5-4 http://localhost:8080/
```

You can change `8080` to any number, but favour numbers greater than `1024` as they do not require administrator rights.

Configure a dedicated Domain Name

If you are an administrator on your machine, it is better to setup virtual hosts instead of adding a new port each time you start a new project. Instead of choosing a port and add a `Listen` statement, choose a domain name (for instance the real domain name with `.localhost` added at the end) and add a `ServerName` statement:

```
Listing 5-5 # This is the configuration for your project
<VirtualHost 127.0.0.1:80>
    ServerName www.myproject.com.localhost
    <!-- same configuration as before -->
</VirtualHost>
```

The domain name `www.myproject.com.localhost` used in the Apache configuration has to be declared locally. If you run a Linux system, it has to be done in the `/etc/hosts` file. If you run Windows XP, this file is located in the `C:\WINDOWS\system32\drivers\etc\` directory.

Add in the following line:

```
Listing 5-6 127.0.0.1 www.myproject.com.localhost
```

Test the New Configuration

Restart Apache, and check that you now have access to the new application by opening a browser and typing `http://localhost:8080/index.php/`, or `http://www.myproject.com.localhost/index.php/` depending on the Apache configuration you chose in the previous section.



If you have the Apache `mod_rewrite` module installed, you can remove the `index.php/` part of the URL. This is possible thanks to the rewriting rules configured in the `web/.htaccess` file.

You should also try to access the application in the development environment (see the next section for more information about environments). Type in the following URL:

```
http://www.myproject.com.localhost/frontend_dev.php/
```

Listing 5-7

The web debug toolbar should show in the top right corner, including small icons proving that your `sf/` alias configuration is correct.



The setup is a little different if you want to run symfony on an IIS server in a Windows environment. Find how to configure it in the related tutorial¹³.

13. http://www.symfony-project.com/cookbook/10/web_server_iis

Chapter 6


The Environments

If you have a look at the `web/` directory, you will find two PHP files: `index.php` and `frontend_dev.php`. These files are called **front controllers**; all requests to the application are made through them. But why do we have two front controllers for each application?

Both files point to the same application but for different **environments**. When you develop an application, except if you develop directly on the production server, you need several environments:

- The **development environment**: This is the environment used by **web developers** when they work on the application to add new features, fix bugs, ...
- The **test environment**: This environment is used to automatically test the application.
- The **staging environment**: This environment is used by the **customer** to test the application and report bugs or missing features.
- The **production environment**: This is the environment **end users** interact with.

What makes an environment unique? In the development environment for instance, the application needs to log all the details of a request to ease debugging, but the cache system must be disabled as all changes made to the code must be taken into account right away. So, the development environment must be optimized for the developer. The best example is certainly when an exception occurs. To help the developer debug the issue faster, symfony displays the exception with all the information it has about the current request right into the browser:


500 | Internal Server Error | Exception 


Foo exception

stack trace

1. at ()
in SF_ROOT_DIR/apps/frontend/modules/job/actions/actions.class.php line 15 ...
 12. {
 13. public function executeIndex(sfWebRequest \$request)
 14. {
 15. throw new Exception('Foo exception');
 16. \$this->jobeet_job_list = JobeetJobPeer::doSelect(new Criteria());
 17. }
 18. }
2. at jobActions->executeIndex(object('sfWebRequest'))
in SF_SYMFONY_LIB_DIR/action/sfActions.class.php line 53 ...
3. at sfActions->execute(object('sfWebRequest'))
in SF_SYMFONY_LIB_DIR/filter/sfExecutionFilter.class.php line 90 ...
4. at sfExecutionFilter->executeAction(object('jobActions'))
in SF_SYMFONY_LIB_DIR/filter/sfExecutionFilter.class.php line 76 ...
5. at sfExecutionFilter->handleAction(object('sfFilterChain'), object('jobActions'))
in SF_SYMFONY_LIB_DIR/filter/sfExecutionFilter.class.php line 42 ...

But on the production environment, the cache layer must be activated and, of course, the application must display customized error messages instead of raw exceptions. So, the production environment must be optimized for performance and the user experience.





 **Oops! An Error Occurred**
The server returned a "500 Internal Server Error".

Something is broken

Please e-mail us at [email] and let us know what you were doing when this error occurred. We will fix it as soon as possible. Sorry for any inconvenience caused.

What's next

-  [Back to previous page](#)
-  [Go to Homepage](#)



If you open the front controller files, you will see that their content is the same except for the environment setting:

Listing
6-1

```
// web/index.php
<?php

require_once(dirname(__FILE__).'../config/
ProjectConfiguration.class.php');

$configuration =
ProjectConfiguration::getApplicationConfiguration('frontend', 'prod',
false);
sfContext::createInstance($configuration)->dispatch();
```

The web debug toolbar is also a great example of the usage of environment. It is present on all pages in the development environment and gives you access to a lot of information by clicking on the different tabs: the current application configuration, the logs for the current request, the SQL statements executed on the database engine, memory information, and time information.

Chapter 7

What's next?

If you have followed the instructions from the previous chapters, you should now have a fully-functional symfony project, and are ready to experiment with symfony.

You can start reading more documentation on the main documentation page¹⁴ of your version.

On the documentation page, you will find the Jobeet¹⁵ tutorial, which is probably the best way to learn symfony. It explains in great detail the development of a web application from start to finish, and also teaches you the best practices of a web development. You can also buy it as a printed book¹⁶.

You can also browse the symfony reference¹⁷ guide and dive into the symfony framework configuration. This book is an invaluable resource when you need to find something quickly. As any other piece of symfony documentation, it is also available as a printed book¹⁸.

The symfony framework has a lot of great features and a lot of free documentation. That said, one of the most valuable assets an Open-Source project can have is its community, and symfony has one of the most active and friendly communities around. If you start using symfony for your projects, consider joining the symfony community:

- Subscribe to the user mailing-list¹⁹
- Subscribe to the official blog feed²⁰
- Subscribe to the symfony planet feed²¹
- Come and chat on the #symfony IRC²² channel on freenode

14. http://www.symfony-project.org/doc/1_4/

15. http://www.symfony-project.org/jobeeť/1_4/Doctrine/en/

16. <http://www.amazon.com/gp/product/2918390062?ie=UTF8&tag=symfonyprojec-20&linkCode=as2&camp=1789&creative=390957&crea>

17. http://www.symfony-project.org/reference/1_4/en/

18. <http://www.amazon.com/gp/product/2918390054?ie=UTF8&tag=symfonyprojec-20&linkCode=as2&camp=1789&creative=9325&creati>

19. <http://groups.google.com/group/symfony-users>

20. <http://feeds.feedburner.com/symfony/blog>

21. <http://feeds.feedburner.com/symfony/planet>

22. <irc://irc.freenode.net/symfony>

Appendices

Appendix A

The Sandbox

If your goal is to give symfony a try for a few hours, keep reading this chapter as we will show you the fastest way to get you started. If you want to bootstrap a real world project, you should jump to installation²³ chapter.

The fastest way to experiment with symfony is to install the symfony sandbox. The sandbox is a dead-easy-to-install pre-packaged symfony project, already configured with some sensible defaults. It is a great way to practice using symfony without the hassle of a proper installation that respects the web best practices.



As the sandbox is pre-configured to use SQLite as a database engine, you need to check that your PHP supports SQLite (see the Prerequisites²⁴ chapter). You can also read the Configuring the Database²⁵ section to learn how to change the database used by the sandbox.

You can download the symfony sandbox in `.tgz` or `.zip` format from the symfony installation page²⁶ or at the following URLs:

Listing
A-1

```
http://www.symfony-project.org/get/sf_sandbox_1_4.tgz
```

```
http://www.symfony-project.org/get/sf_sandbox_1_4.zip
```

Un-archive the files somewhere under your web root directory, and you are done. Your symfony project is now accessible by requesting the `web/index.php` script from a browser.



Having all the symfony files under the web root directory is fine for testing symfony on your local computer, but is a really bad idea for a production server as it potentially makes all the internals of your application visible to end users.

You can now finish your installation by reading the Web Server Configuration²⁷ and the Environments²⁸ chapters.



As a sandbox is just a normal symfony project where some tasks have been executed for you and some configuration changed, it is quite easy to use it as a starting point for a new project. However, keep in mind that you will probably need to adapt the configuration; for

23. 03-Symfony-Installation#chapter_03

24. 02-Prerequisites#chapter_02

25. 04-Project-Setup#chapter_04_configuring_the_database

26. http://www.symfony-project.org/installation/1_4

27. 05-Web-Server-Configuration#chapter_05

28. 06-Environments#chapter_06

instance changing the security related settings (see the configuration of XSS and CSRF in this tutorial).

Appendix B

License

Attribution-Share Alike 3.0 Unported License

THE WORK (AS DEFINED BELOW) IS PROVIDED UNDER THE TERMS OF THIS CREATIVE COMMONS PUBLIC LICENSE (“CCPL” OR “LICENSE”). THE WORK IS PROTECTED BY COPYRIGHT AND/OR OTHER APPLICABLE LAW. ANY USE OF THE WORK OTHER THAN AS AUTHORIZED UNDER THIS LICENSE OR COPYRIGHT LAW IS PROHIBITED.

BY EXERCISING ANY RIGHTS TO THE WORK PROVIDED HERE, YOU ACCEPT AND AGREE TO BE BOUND BY THE TERMS OF THIS LICENSE. TO THE EXTENT THIS LICENSE MAY BE CONSIDERED TO BE A CONTRACT, THE LICENSOR GRANTS YOU THE RIGHTS CONTAINED HERE IN CONSIDERATION OF YOUR ACCEPTANCE OF SUCH TERMS AND CONDITIONS.

1. Definitions

- a. **“Adaptation”** means a work based upon the Work, or upon the Work and other pre-existing works, such as a translation, adaptation, derivative work, arrangement of music or other alterations of a literary or artistic work, or phonogram or performance and includes cinematographic adaptations or any other form in which the Work may be recast, transformed, or adapted including in any form recognizably derived from the original, except that a work that constitutes a Collection will not be considered an Adaptation for the purpose of this License. For the avoidance of doubt, where the Work is a musical work, performance or phonogram, the synchronization of the Work in timed-relation with a moving image (“synching”) will be considered an Adaptation for the purpose of this License.
- b. **“Collection”** means a collection of literary or artistic works, such as encyclopedias and anthologies, or performances, phonograms or broadcasts, or other works or subject matter other than works listed in Section 1(f) below, which, by reason of the selection and arrangement of their contents, constitute intellectual creations, in which the Work is included in its entirety in unmodified form along with one or more other contributions, each constituting separate and independent works in themselves, which together are assembled into a collective whole. A work that constitutes a Collection will not be considered an Adaptation (as defined below) for the purposes of this License.
- c. **“Creative Commons Compatible License”** means a license that is listed at <http://creativecommons.org/compatiblelicenses> that has been approved by Creative Commons as being essentially equivalent to this License, including, at a minimum, because that license: (i) contains terms that have the same purpose, meaning and effect as the License Elements of this License; and, (ii) explicitly permits the relicensing of adaptations of works made available under that license under this

License or a Creative Commons jurisdiction license with the same License Elements as this License.

d. **“Distribute”** means to make available to the public the original and copies of the Work or Adaptation, as appropriate, through sale or other transfer of ownership.

e. **“License Elements”** means the following high-level license attributes as selected by Licensor and indicated in the title of this License: Attribution, ShareAlike.

f. **“Licensor”** means the individual, individuals, entity or entities that offer(s) the Work under the terms of this License.

g. **“Original Author”** means, in the case of a literary or artistic work, the individual, individuals, entity or entities who created the Work or if no individual or entity can be identified, the publisher; and in addition (i) in the case of a performance the actors, singers, musicians, dancers, and other persons who act, sing, deliver, declaim, play in, interpret or otherwise perform literary or artistic works or expressions of folklore; (ii) in the case of a phonogram the producer being the person or legal entity who first fixes the sounds of a performance or other sounds; and, (iii) in the case of broadcasts, the organization that transmits the broadcast.

h. **“Work”** means the literary and/or artistic work offered under the terms of this License including without limitation any production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression including digital form, such as a book, pamphlet and other writing; a lecture, address, sermon or other work of the same nature; a dramatic or dramatico-musical work; a choreographic work or entertainment in dumb show; a musical composition with or without words; a cinematographic work to which are assimilated works expressed by a process analogous to cinematography; a work of drawing, painting, architecture, sculpture, engraving or lithography; a photographic work to which are assimilated works expressed by a process analogous to photography; a work of applied art; an illustration, map, plan, sketch or three-dimensional work relative to geography, topography, architecture or science; a performance; a broadcast; a phonogram; a compilation of data to the extent it is protected as a copyrightable work; or a work performed by a variety or circus performer to the extent it is not otherwise considered a literary or artistic work.

i. **“You”** means an individual or entity exercising rights under this License who has not previously violated the terms of this License with respect to the Work, or who has received express permission from the Licensor to exercise rights under this License despite a previous violation.

j. **“Publicly Perform”** means to perform public recitations of the Work and to communicate to the public those public recitations, by any means or process, including by wire or wireless means or public digital performances; to make available to the public Works in such a way that members of the public may access these Works from a place and at a place individually chosen by them; to perform the Work to the public by any means or process and the communication to the public of the performances of the Work, including by public digital performance; to broadcast and rebroadcast the Work by any means including signs, sounds or images.

k. **“Reproduce”** means to make copies of the Work by any means including without limitation by sound or visual recordings and the right of fixation and reproducing fixations of the Work, including storage of a protected performance or phonogram in digital form or other electronic medium.

2. Fair Dealing Rights

Nothing in this License is intended to reduce, limit, or restrict any uses free from copyright or rights arising from limitations or exceptions that are provided for in connection with the copyright protection under copyright law or other applicable laws.

3. License Grant

Subject to the terms and conditions of this License, Licensor hereby grants You a worldwide, royalty-free, non-exclusive, perpetual (for the duration of the applicable copyright) license to exercise the rights in the Work as stated below:

a. to Reproduce the Work, to incorporate the Work into one or more Collections, and to Reproduce the Work as incorporated in the Collections;

b. to create and Reproduce Adaptations provided that any such Adaptation, including any translation in any medium, takes reasonable steps to clearly label, demarcate or otherwise identify that changes were made to the original Work. For example, a translation could be marked “The original work was translated from English to Spanish,” or a modification could indicate “The original work has been modified.”;

c. to Distribute and Publicly Perform the Work including as incorporated in Collections; and,

d. to Distribute and Publicly Perform Adaptations.

e. For the avoidance of doubt:

i. **Non-waivable Compulsory License Schemes.** In those jurisdictions in which the right to collect royalties through any statutory or compulsory licensing scheme cannot be waived, the Licensor reserves the exclusive right to collect such royalties for any exercise by You of the rights granted under this License;

ii. **Waivable Compulsory License Schemes.** In those jurisdictions in which the right to collect royalties through any statutory or compulsory licensing scheme can be waived, the Licensor waives the exclusive right to collect such royalties for any exercise by You of the rights granted under this License; and,

iii. **Voluntary License Schemes.** The Licensor waives the right to collect royalties, whether individually or, in the event that the Licensor is a member of a collecting society that administers voluntary licensing schemes, via that society, from any exercise by You of the rights granted under this License.

The above rights may be exercised in all media and formats whether now known or hereafter devised. The above rights include the right to make such modifications as are technically necessary to exercise the rights in other media and formats. Subject to Section 8(f), all rights not expressly granted by Licensor are hereby reserved.

4. Restrictions

The license granted in Section 3 above is expressly made subject to and limited by the following restrictions:

a. You may Distribute or Publicly Perform the Work only under the terms of this License. You must include a copy of, or the Uniform Resource Identifier (URI) for, this License with every copy of the Work You Distribute or Publicly Perform. You may not offer or impose any terms on the Work that restrict the terms of this License or the ability of the recipient of the Work to exercise the rights granted to that recipient under the terms of the License. You may not sublicense the Work. You must keep intact all notices that refer to this License and to the disclaimer of warranties with every copy of the Work You Distribute or Publicly Perform. When You Distribute or Publicly Perform the Work, You may not impose any effective technological measures on the Work that restrict the ability of a recipient of the Work from You to exercise the rights granted to that recipient under the terms of the License. This Section 4(a) applies to the Work as incorporated in a Collection, but this does not require the Collection apart from the Work itself to be made subject to the terms of this License. If You create a Collection, upon notice from any Licensor You must, to the extent practicable, remove from the Collection any credit as required by Section 4(c), as requested. If You create an Adaptation, upon notice from any Licensor You must, to

the extent practicable, remove from the Adaptation any credit as required by Section 4(c), as requested.

b. You may Distribute or Publicly Perform an Adaptation only under the terms of: (i) this License; (ii) a later version of this License with the same License Elements as this License; (iii) a Creative Commons jurisdiction license (either this or a later license version) that contains the same License Elements as this License (e.g., Attribution-ShareAlike 3.0 US)); (iv) a Creative Commons Compatible License. If you license the Adaptation under one of the licenses mentioned in (iv), you must comply with the terms of that license. If you license the Adaptation under the terms of any of the licenses mentioned in (i), (ii) or (iii) (the “Applicable License”), you must comply with the terms of the Applicable License generally and the following provisions: (I) You must include a copy of, or the URI for, the Applicable License with every copy of each Adaptation You Distribute or Publicly Perform; (II) You may not offer or impose any terms on the Adaptation that restrict the terms of the Applicable License or the ability of the recipient of the Adaptation to exercise the rights granted to that recipient under the terms of the Applicable License; (III) You must keep intact all notices that refer to the Applicable License and to the disclaimer of warranties with every copy of the Work as included in the Adaptation You Distribute or Publicly Perform; (IV) when You Distribute or Publicly Perform the Adaptation, You may not impose any effective technological measures on the Adaptation that restrict the ability of a recipient of the Adaptation from You to exercise the rights granted to that recipient under the terms of the Applicable License. This Section 4(b) applies to the Adaptation as incorporated in a Collection, but this does not require the Collection apart from the Adaptation itself to be made subject to the terms of the Applicable License.

c. If You Distribute, or Publicly Perform the Work or any Adaptations or Collections, You must, unless a request has been made pursuant to Section 4(a), keep intact all copyright notices for the Work and provide, reasonable to the medium or means You are utilizing: (i) the name of the Original Author (or pseudonym, if applicable) if supplied, and/or if the Original Author and/or Licensor designate another party or parties (e.g., a sponsor institute, publishing entity, journal) for attribution (“Attribution Parties”) in Licensor’s copyright notice, terms of service or by other reasonable means, the name of such party or parties; (ii) the title of the Work if supplied; (iii) to the extent reasonably practicable, the URI, if any, that Licensor specifies to be associated with the Work, unless such URI does not refer to the copyright notice or licensing information for the Work; and (iv) , consistent with Section 3(b), in the case of an Adaptation, a credit identifying the use of the Work in the Adaptation (e.g., “French translation of the Work by Original Author,” or “Screenplay based on original Work by Original Author”). The credit required by this Section 4(c) may be implemented in any reasonable manner; provided, however, that in the case of a Adaptation or Collection, at a minimum such credit will appear, if a credit for all contributing authors of the Adaptation or Collection appears, then as part of these credits and in a manner at least as prominent as the credits for the other contributing authors. For the avoidance of doubt, You may only use the credit required by this Section for the purpose of attribution in the manner set out above and, by exercising Your rights under this License, You may not implicitly or explicitly assert or imply any connection with, sponsorship or endorsement by the Original Author, Licensor and/or Attribution Parties, as appropriate, of You or Your use of the Work, without the separate, express prior written permission of the Original Author, Licensor and/or Attribution Parties.

d. Except as otherwise agreed in writing by the Licensor or as may be otherwise permitted by applicable law, if You Reproduce, Distribute or Publicly Perform the Work either by itself or as part of any Adaptations or Collections, You must not distort, mutilate, modify or take other derogatory action in relation to the Work

which would be prejudicial to the Original Author's honor or reputation. Licensor agrees that in those jurisdictions (e.g. Japan), in which any exercise of the right granted in Section 3(b) of this License (the right to make Adaptations) would be deemed to be a distortion, mutilation, modification or other derogatory action prejudicial to the Original Author's honor and reputation, the Licensor will waive or not assert, as appropriate, this Section, to the fullest extent permitted by the applicable national law, to enable You to reasonably exercise Your right under Section 3(b) of this License (right to make Adaptations) but not otherwise.

5. Representations, Warranties and Disclaimer

UNLESS OTHERWISE MUTUALLY AGREED TO BY THE PARTIES IN WRITING, LICENSOR OFFERS THE WORK AS-IS AND MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND CONCERNING THE WORK, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR THE ABSENCE OF LATENT OR OTHER DEFECTS, ACCURACY, OR THE PRESENCE OF ABSENCE OF ERRORS, WHETHER OR NOT DISCOVERABLE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO SUCH EXCLUSION MAY NOT APPLY TO YOU.

6. Limitation on Liability

EXCEPT TO THE EXTENT REQUIRED BY APPLICABLE LAW, IN NO EVENT WILL LICENSOR BE LIABLE TO YOU ON ANY LEGAL THEORY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES ARISING OUT OF THIS LICENSE OR THE USE OF THE WORK, EVEN IF LICENSOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. Termination

a. This License and the rights granted hereunder will terminate automatically upon any breach by You of the terms of this License. Individuals or entities who have received Adaptations or Collections from You under this License, however, will not have their licenses terminated provided such individuals or entities remain in full compliance with those licenses. Sections 1, 2, 5, 6, 7, and 8 will survive any termination of this License.

b. Subject to the above terms and conditions, the license granted here is perpetual (for the duration of the applicable copyright in the Work). Notwithstanding the above, Licensor reserves the right to release the Work under different license terms or to stop distributing the Work at any time; provided, however that any such election will not serve to withdraw this License (or any other license that has been, or is required to be, granted under the terms of this License), and this License will continue in full force and effect unless terminated as stated above.

8. Miscellaneous

a. Each time You Distribute or Publicly Perform the Work or a Collection, the Licensor offers to the recipient a license to the Work on the same terms and conditions as the license granted to You under this License.

b. Each time You Distribute or Publicly Perform an Adaptation, Licensor offers to the recipient a license to the original Work on the same terms and conditions as the license granted to You under this License.

c. If any provision of this License is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this License, and without further action by the parties to this agreement, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable.

d. No term or provision of this License shall be deemed waived and no breach consented to unless such waiver or consent shall be in writing and signed by the party to be charged with such waiver or consent.

e. This License constitutes the entire agreement between the parties with respect to the Work licensed here. There are no understandings, agreements or representations with respect to the Work not specified here. Licensor shall not be bound by any additional provisions that may appear in any communication from You. This License may not be modified without the mutual written agreement of the Licensor and You.

f. The rights granted under, and the subject matter referenced, in this License were drafted utilizing the terminology of the Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979), the Rome Convention of 1961, the WIPO Copyright Treaty of 1996, the WIPO Performances and Phonograms Treaty of 1996 and the Universal Copyright Convention (as revised on July 24, 1971). These rights and subject matter take effect in the relevant jurisdiction in which the License terms are sought to be enforced according to the corresponding provisions of the implementation of those treaty provisions in the applicable national law. If the standard suite of rights granted under applicable copyright law includes additional rights not granted under this License, such additional rights are deemed to be included in the License; this License is not intended to restrict the license of any rights under applicable law.

Creative Commons Notice

Creative Commons is not a party to this License, and makes no warranty whatsoever in connection with the Work. Creative Commons will not be liable to You or any party on any legal theory for any damages whatsoever, including without limitation any general, special, incidental or consequential damages arising in connection to this license. Notwithstanding the foregoing two (2) sentences, if Creative Commons has expressly identified itself as the Licensor hereunder, it shall have all rights and obligations of Licensor.

Except for the limited purpose of indicating to the public that the Work is licensed under the CCPL, Creative Commons does not authorize the use by either party of the trademark "Creative Commons" or any related trademark or logo of Creative Commons without the prior written consent of Creative Commons. Any permitted use will be in compliance with Creative Commons' then-current trademark usage guidelines, as may be published on its website or otherwise made available upon request from time to time. For the avoidance of doubt, this trademark restriction does not form part of the License.

Creative Commons may be contacted at <http://creativecommons.org/>.

