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How To Install and Use Composer on Ubuntu 20.04

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Introduction

Composer is a popular dependency management tool for PHP, created mainly to facilitate installation and updates for project dependencies. It will check which other packages a specific project depends on and install them for you, using the appropriate versions according to the project requirements. Composer is also commonly used to bootstrap new projects based on popular PHP frameworks, such as Symfony and Laravel.

In this tutorial, you'll install and get started with Composer on an Ubuntu 20.04 system.

Prerequisites

In order to follow this guide, you will need access to an Ubuntu 20.04 server as a non-root `sudo` user, and a firewall enabled on your server. To set this up, you can follow our

In addition to dependencies that should be already included within your Ubuntu 20.04 system, such as `git` and `curl`, Composer requires `php-cli` in order to execute PHP scripts in the command line, and `unzip` to extract zipped archives. We'll install these dependencies now.

First, update the package manager cache by running:

```
$ sudo apt update
```
Copy

Next, run the following command to install the required packages:

```
$ sudo apt install php-cli unzip
```
Copy

You will be prompted to confirm installation by typing `Y` and then `ENTER`.

Once the prerequisites are installed, you can proceed to installing Composer.

Step 2 – Downloading and Installing Composer

Composer provides an installer script written in PHP. We'll download it, verify that it's not corrupted, and then use it to install Composer.

Make sure you're in your home directory, then retrieve the installer using `curl`:

```
$ cd ~
$ curl -sS https://getcomposer.org/installer -o /tmp/composer-setup.php
```
Copy

Next, we'll verify that the downloaded installer matches the SHA-384 hash for the latest installer found on the Composer Public Keys / Signatures page. To facilitate the verification step, you can use the following command to programmatically obtain the latest hash from the Composer page and store it in a shell variable:

```
$ HASH=`curl -sS https://composer.github.io/installer.sig`
```
Copy

If you want to verify the obtained value, you can run:

```
$ echo $HASH
```
Copy

Now execute the following PHP code, as provided in the Composer download page, to verify that the installation script is safe to run:

```
$ php -r "if (hash_file('SHA384', '/tmp/composer-setup.php') === '$HAS
```

Copy e

You'll see the following output:

Output

```
Installer verified
```

If the output says `Installer corrupt`, you'll need to download the installation script again and double check that you're using the correct hash. Then, repeat the verification process. When you have a verified installer, you can continue.

To install `composer` globally, use the following command which will download and install Composer as a system-wide command named `composer`, under `/usr/local/bin`:

```
$ sudo php /tmp/composer-setup.php --install-dir=/usr/local/bin --fil
```

Copy c

You'll see output similar to this:

Output

```
All settings correct for using Composer
Downloading...

Composer (version 2.2.9) successfully installed to: /usr/local/bin/composer
Use it: php /usr/local/bin/composer
```

To test your installation, run:

```
$ composer
```

Copy

Output

```
  _____
 / ____/___  ____ ___  ____ ____  ________  _____
```

```
Options:
  -h, --help                     Display this help message
  -q, --quiet                    Do not output any message
  -V, --version                  Display this application version
      --ansi                     Force ANSI output
      --no-ansi                  Disable ANSI output
  -n, --no-interaction           Do not ask any interactive question
      --profile                  Display timing and memory usage information
      --no-plugins               Whether to disable plugins.
  -d, --working-dir=WORKING-DIR  If specified, use the given directory as work
      --no-cache                 Prevent use of the cache
  -v|vv|vvv, --verbose           Increase the verbosity of messages: 1 for nor
...
```

This verifies that Composer was successfully installed on your system and is available system-wide.

> **Note:** If you prefer to have separate Composer executables for each project you host on this server, you can install it locally, on a per-project basis. This method is also useful when your system user doesn't have permission to install software system-wide.
>
> To do this, use the command `php /tmp/composer-setup.php`. This will generate a `composer.phar` file in your current directory, which can be executed with `php composer.phar`.

Now let's look at using Composer to manage dependencies.

Step 3 – Using Composer in a PHP Project

PHP projects often depend on external libraries, and managing those dependencies and their versions can be tricky. Composer solves that problem by keeping track of project versions and dependencies, while also facilitating the process of finding, installing, and updating packages that are required by a project.

In order to use Composer in your project, you'll need a `composer.json` file. The `composer.json` file tells Composer which dependencies it needs to download for your project, and which versions of each package are allowed to be installed. This is extremely important to keep your project consistent and avoid installing unstable

later as a public package on Packagist. Composer also auto-generates

`composer.json` file when you run a `composer require` command to include a dependency in a newly created project.

The process of using Composer to install a package as dependency in a project involves the following steps:

- Identify what kind of library the application needs.
- Research a suitable open source library on Packagist.org, the official package repository for Composer.
- Choose the package you want to depend on.
- Run `composer require` to include the dependency in the `composer.json` file and install the package.

Let's try this out with a demo application.

The goal of this application is to transform a given sentence into a URL-friendly string - a *slug*. This is commonly used to convert page titles to URL paths (like the final portion of the URL for this tutorial).

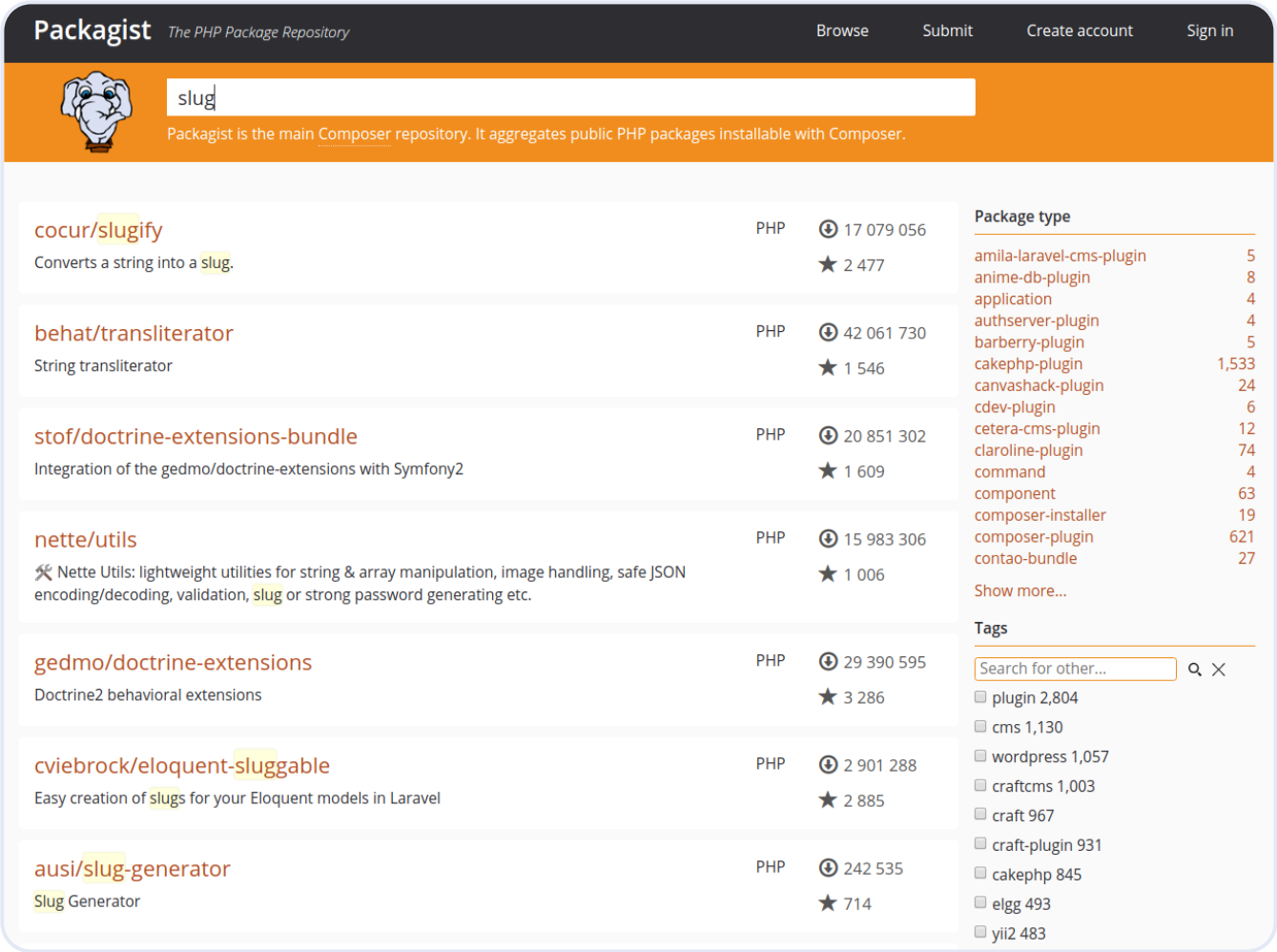
Let's start by creating a directory for our project. We'll call it **slugify**:

```
$ cd ~
$ mkdir slugify
$ cd slugify
```

Copy

Although not required, you could now run a `composer init` command to create a detailed `composer.json` file for your project. Because our project's only objective is to demonstrate how to install dependencies with Composer, we'll use a simpler `composer.json` file that will be auto-generated when we require our first package.

Now it's time to search Packagist.org for a package that can help us generate *slugs*. If you search for the term "slug" on Packagist, you'll get a result similar to this:



You'll see two numbers on the right side of each package in the list. The number on the top represents how many times the package was installed via Composer, and the number on the bottom shows how many times a package was starred on GitHub. Generally speaking, packages with more installations and more stars tend to be more stable, since so many people are using them. It's also important to check the package description for relevance to make sure it's what you need.

We need a *string-to-slug* converter. From the search results, the package `cocur/slugify`, which appears as the first result in that page, seems to be a good match, with a reasonable amount of installations and stars.

Packages on Packagist have a **vendor** name and a **package** name. Each package has a unique identifier (a namespace) in the same format GitHub uses for its repositories: `vendor/package`. The library we want to install uses the namespace `cocur/slugify`. You need a package's namespace in order to require it in your project.

modules a package relies on. In the case of the `cocur/slugify` package, it requires a PHP module that we haven't installed yet.

When a required package relies on a system library that is currently not installed on your server, you will get an error telling which requirement is missing:

```
$ composer require cocur/slugify
```

Copy

```
Output
Using version ^4.0 for cocur/slugify
./composer.json has been updated
Loading composer repositories with package information
Updating dependencies (including require-dev)
Your requirements could not be resolved to an installable set of packages.

  Problem 1
    - Installation request for cocur/slugify ^4.0 -> satisfiable by cocur/slug
    - cocur/slugify v4.0.0 requires ext-mbstring * -> the requested PHP exten
...
```

To solve the system dependency problem, we can search for the missing package using `apt search`:

```
$ apt search mbstring
```

Copy

```
Output
Sorting... Done
Full Text Search... Done
php-mbstring/focal 2:7.4+75 all
  MBSTRING module for PHP [default]

php-patchwork-utf8/focal 1.3.1-1 all
  UTF-8 strings handling for PHP

php7.4-mbstring/focal 7.4.3-4ubuntu1 amd64
  MBSTRING module for PHP
```

After locating the correct package name, you can use `apt` once again to install the

```
$ composer require cocur/slugify
```

Copy


```
Writing lock file
Generating autoload files
```

As you can see from the output, Composer automatically decided which version of the package to use. If you check your project's directory now, it will contain two new files: `composer.json` and `composer.lock`, and a `vendor` directory:

```
$ ls -l
```

Copy

```
Output
total 12
-rw-rw-r-- 1 sammy sammy   59 May  4 13:56 composer.json
-rw-rw-r-- 1 sammy sammy 3229 May  4 13:56 composer.lock
drwxrwxr-x 4 sammy sammy 4096 May  4 13:56 vendor
```

The `composer.lock` file is used to store information about which versions of each package are installed, and ensure the same versions are used if someone else clones your project and installs its dependencies. The `vendor` directory is where the project dependencies are located. The `vendor` folder shouldn't be committed into version control - you only need to include the **composer.json** and **composer.lock** files.

> When installing a project that already contains a `composer.json` file, run `composer install` in order to download the project's dependencies.

Let's take a quick look at version constraints. If you check the contents of your `composer.json` file, you'll see something like this:


```
"cocur/slugify": "^4.0"
```

```
        }
    }
```

You might notice the special character `^` before the version number in `composer.json`. Composer supports several different constraints and formats for defining the required package version, in order to provide flexibility while also keeping your project stable. The caret (`^`) operator used by the auto-generated `composer.json` file is the recommended operator for maximum interoperability, following semantic versioning. In this case, it defines **4.0** as the minimum compatible version, and allows updates to any future version below **5.0**.

Generally speaking, you won't need to tamper with version constraints in your `composer.json` file. However, some situations might require that you manually edit the constraints–for instance, when a major new version of your required library is released and you want to upgrade, or when the library you want to use doesn't follow semantic versioning.

Here are some examples to give you a better understanding of how Composer version constraints work:

Constraint	Meaning	Example Versions Allowed
^1.0	>= 1.0 < 2.0	1.0, 1.2.3, 1.9.9
^1.1.0	>= 1.1.0 < 2.0	1.1.0, 1.5.6, 1.9.9
~1.0	>= 1.0 < 2.0.0	1.0, 1.4.1, 1.9.9
~1.0.0	>= 1.0.0 < 1.1	1.0.0, 1.0.4, 1.0.9
1.2.1	1.2.1	1.2.1

For a more in-depth view of Composer version constraints, see the official documentation.

Next, let's look at how to load dependencies automatically with Composer.

Step 4 – Including the Autoload Script

Since PHP itself doesn't automatically load classes, Composer provides an autoload script that you can include in your project to get autoloading working for your project. This file is automatically generated by Composer when you add your first dependency.

The only thing you need to do is include the `vendor/autoload.php` file in your PHP scripts before any class instantiation.

Let's try it out in our demo application. Open a new file called `test.php` in your text editor:

```
$ nano test.php
```

Copy

Add the following code which brings in the `vendor/autoload.php` file, loads the `cocur/slugify` dependency, and uses it to create a slug:

test.php

```
<?php
require __DIR__ . '/vendor/autoload.php';

use Cocur\Slugify\Slugify;

$slugify = new Slugify();

echo $slugify->slugify('Hello World, this is a long sentence and I need to mak
```

Copy

Save the file and exit your editor.

Now run the script:

```
$ php test.php
```

Copy

Step 5 – Updating Project Dependencies

Whenever you want to update your project dependencies to more recent versions, run the `update` command:

```
$ composer update
```

Copy

This will check for newer versions of the libraries you required in your project. If a newer version is found and it's compatible with the version constraint defined in the `composer.json` file, Composer will replace the previous version installed. The `composer.lock` file will be updated to reflect these changes.

You can also update one or more specific libraries by specifying them like this:

```
$ composer update vendor/package vendor2/package2
```

Copy

Be sure to check in your `composer.json` and `composer.lock` files within your version control system after you update your dependencies so that others can install these newer versions too.

Conclusion

Composer is a powerful tool that can greatly facilitate the work of managing dependencies in PHP projects. It provides a reliable way of discovering, installing, and updating PHP packages that a project depends on. In this guide, we saw how to install Composer, how to include new dependencies in a project, and how to update these dependencies once new versions are available.

About the authors

Erika Heidi Author
Developer Advocate

Dev/Ops passionate about open source, PHP, and Linux.

6 Comments

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Chris Rawley • February 25, 2022

I'm having trouble getting Composer installed with a USER_DATA script through the API. I have run many scripts with no issues. As far as I can tell, a permissions issue is preventing this line from running the Composer Installer script:

php /var/www/myapp/app/composer-setup.php --install-dir=/usr/local/bin --filename=composer

USER_DATA Script below.

USER_DATA="#!/bin/sh

#UPDATE UBUNTU apt -y install php-cli unzip

curl -sS https://getcomposer.org/installer -o /var/www/myapp/app/composer-setup.php chmod 755 /var/www/myapp/app/composer-setup.php php /var/www/myapp/app/composer-setup.php --install-dir=/usr/local/bin --filename=composer

/root/composer.ph /root/composer.phar install --working-dir=/var/www/myapp/app -n "

Reply

David Rodríguez • November 18, 2021

Used to use containers and tools like Lando or DDEV, I had to upgrade my main system and did not remember some steps. This tutorial has been very useful for me to reinstall Composer! Thank you so much.

Reply

SimonBrown • September 2, 2021

Ubuntu comes with apt so why don't we use it to install composer?

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cloudnine • May 18, 2021

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Reply

Rakesh kumar • October 16, 2020

thanks for this informative blog...ma'am ,.I was so confused before...

Really helpful and clear coverage on composer!

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