

**DOCUMENTATION** 

# **Laravel Documentation - 5.7**

# https://laravel.com/docs/

eBook compiled from the source

https://github.com/laravel/docs/

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#### **Prologue**

# **Release Notes**

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## **Versioning Scheme**

Laravel's versioning scheme maintains the following convention: paradigm.major.minor. Major framework releases are released every six months (February and August), while minor releases may be released as often as every week. Minor releases should never contain breaking changes.

When referencing the Laravel framework or its components from your application or package, you should always use a version constraint such as 5.7.\*, since major releases of Laravel do include breaking changes. However, we strive to always ensure you may update to a new major release in one day or less.

Paradigm shifting releases are separated by many years and represent fundamental shifts in the framework's architecture and conventions. Currently, there is no paradigm shifting release under development.

## **Support Policy**

For LTS releases, such as Laravel 5.5, bug fixes are provided for 2 years and security fixes are provided for 3 years. These releases provide the longest window of support and maintenance. For general releases, bug fixes are provided for 6 months and security fixes are provided for 1 year. For all additional libraries, including Lumen, only the latest release receives bug fixes.

Version	Release	<b>Bug Fixes Until</b>	<b>Security Fixes Until</b>
5.0	February 4th, 2015	August 4th, 2015	February 4th, 2016
5.1 (LTS)	June 9th, 2015	June 9th, 2017	June 9th, 2018
5.2	December 21st, 2015	June 21st, 2016	December 21st, 2016
5.3	August 23rd, 2016	February 23rd, 2017	August 23rd, 2017
5.4	January 24th, 2017	July 24th, 2017	January 24th, 2018
5.5 (LTS)	August 30th, 2017	August 30th, 2019	August 30th, 2020
5.6	February 7th, 2018	August 7th, 2018	February 7th, 2019
5.7	September 4th, 2018	March 4th, 2019	September 4th, 2019

## Laravel 5.7

Laravel 5.7 continues the improvements made in Laravel 5.6 by introducing <u>Laravel Nova</u>, optional email verification to the authentication scaffolding, support for guest users in authorization gates and policies, console testing improvements, Symfony dump-server integration, localizable notifications, and a variety of other bug fixes and usability improvements.

## **Laravel Nova**

<u>Laravel Nova</u> is a beautiful, best-in-class administration dashboard for Laravel applications. Of course, the primary feature of Nova is the ability to administer your underlying database records using Eloquent. Additionally, Nova offers support for filters, lenses, actions, queued actions, metrics, authorization, custom tools, custom cards, custom fields, and more.

To learn more about Laravel Nova, check out the Nova website.

## **Email Verification**

Laravel 5.7 introduces optional email verification to the authentication scaffolding included with the framework. To accommodate this feature, an email\_verified\_at timestamp column has been added to the default users table migration that is included with the framework.

To prompt newly registered users to verify their email, the User model should be marked with the MustVerifyEmail interface:

```
<?php
namespace App;
use Illuminate\Notifications\Notifiable;
use Illuminate\Contracts\Auth\MustVerifyEmail;
use Illuminate\Foundation\Auth\User as Authenticatable;</pre>
```

```
class User extends Authenticatable implements MustVerifyEmail {  // \ \dots  }
```

Once the user model is marked with the MustVerifyEmail interface, newly registered users will receive an email containing a signed verification link. Once this link has been clicked, Laravel will automatically record the verification time in the database and redirect users to a location of your choosing.

A verified middleware has been added to the default application's HTTP kernel. This middleware may be attached to routes that should only allow verified users:

```
'verified' => \Illuminate\Auth\Middleware\EnsureEmailIsVerified::class,
```

TIP To learn more about email verification, check out the complete documentation.

#### **Guest User Gates / Policies**

In previous versions of Laravel, authorization gates and policies automatically returned false for unauthenticated visitors to your application. However, you may now allow guests to pass through authorization checks by declaring an "optional" type-hint or supplying a null default value for the user argument definition:

```
Gate::define('update-post', function (?User $user, Post $post) {
    // ...
});
```

## **Symfony Dump Server**

Laravel 5.7 offers integration with Symfony's dump-server command via a package by Marcel Pociot. To get started, run the dump-server Artisan command:

```
php artisan dump-server
```

Once the server has started, all calls to dump will be displayed in the dump-server console window instead of in your browser, allowing you to inspect the values without mangling your HTTP response output.

#### **Notification Localization**

Laravel now allows you to send notifications in a locale other than the current language, and will even remember this locale if the notification is queued.

To accomplish this, the Illuminate\Notifications\Notification class now offers a locale method to set the desired language. The application will change into this locale when the notification is being formatted and then revert back to the previous locale when formatting is complete:

```
$user->notify((new InvoicePaid($invoice))->locale('es'));
```

Localization of multiple notifiable entries may also be achieved via the Notification facade:

```
Notification::locale('es')->send($users, new InvoicePaid($invoice));
```

## **Console Testing**

Laravel 5.7 allows you to easily "mock" user input for your console commands using the expectsQuestion method. In addition, you may specify the exit code and text that you expect to be output by the console command using the assertExitCode and expectsOutput methods. For example, consider the following console command:

You may test this command with the following test which utilizes the expectsQuestion, expectsOutput, and assertExitCode methods:

```
* Test a console command.
```

```
* @return void
*/
public function test_console_command()
{
    $this->artisan('question')
        ->expectsQuestion('What is your name?', 'Taylor Otwell')
        ->expectsQuestion('Which language do you program in?', 'PHP')
        ->expectsOutput('Your name is Taylor Otwell and you program in PHP.')
        ->assertExitCode(0);
}
```

## **URL Generator & Callable Syntax**

Instead of only accepting strings, Laravel's URL generator now accepts "callable" syntax when generating URLs to controller actions:

```
action([UserController::class, 'index']);
```

## **Paginator Links**

Laravel 5.7 allows you to control how many additional links are displayed on each side of the paginator's URL "window". By default, three links are displayed on each side of the primary paginator links. However, you may control this number using the onEachSide method:

```
{{ $paginator->onEachSide(5)->links() }}
```

## Filesystem Read / Write Streams

Laravel's Flysystem integration now offers readStream and writeStream methods:

```
Storage::disk('s3')->writeStream(
   'remote-file.zip',
   Storage::disk('local')->readStream('local-file.zip')):
```

#### **Prologue**

# **Upgrade Guide**

• Upgrading To 5.7.0 From 5.6

## **Upgrading To 5.7.0 From 5.6**

## Estimated Upgrade Time: 10 - 15 Minutes

NOTE We attempt to document every possible breaking change. Since some of these breaking changes are in obscure parts of the framework only a portion of these changes may actually affect your application.

## **Updating Dependencies**

Update your laravel/framework dependency to 5.7.\* in your composer.json file.

If you are using Laravel Passport, you should update your laravel/passport dependency to ^7.0 in your composer.json file.

Of course, don't forget to examine any 3rd party packages consumed by your application and verify you are using the proper version for Laravel 5.7 support.

## **Application**

## The register Method

#### Likelihood Of Impact: Very Low

The unused options argument of the Illuminate\Foundation\Application class' register method has been removed. If you are overriding this method, you should update your method's signature:

```
/**
  * Register a service provider with the application.
  *
  * @param \Illuminate\Support\ServiceProvider|string $provider
  * @param bool $force
  * @return \Illuminate\Support\ServiceProvider
  */
public function register($provider, $force = false);
```

## Artisan

## **Scheduled Job Connection & Queues**

## Likelihood Of Impact: Low

The \$schedule->job method now respects the queue and connection properties on the job class if a connection / job is not explicitly passed into the job method.

Generally, this should be considered a bug fix; however, it is listed as a breaking change out of caution. <u>Please let us know if you encounter any issues surrounding this change</u>.

## Assets

#### **Asset Directory Flattened**

## Likelihood Of Impact: None

For new Laravel 5.7 applications, the assets directory that contains the scripts and styles has been flattened into the resources directory. This **will not** affect existing applications and does not require changes to your existing applications.

However, if you wish to make this change, you should move all files from the resources/assets/\* directory up one level:

- From resources/assets/js/\* to resources/js/\*
- From resources/assets/sass/\* to resources/sass/\*

Then, update any reference to the old directories in your webpack.mix.js file:

```
mix.js('resources/js/app.js', 'public/js')
```

```
.sass('resources/sass/app.scss', 'public/css');
```

#### svg Directory Added

#### Likelihood Of Impact: Very High

A new directory, svg, was added to the public directory. It contains four svg files: 403.svg, 404.svg, 500.svg, and 503.svg, which are displayed on their respective error pages.

You may get the files from GitHub.

#### Authentication

#### The Authenticate Middleware

#### Likelihood Of Impact: Low

The authenticate method of the Illuminate\Auth\Middleware\Authenticate middleware has been updated to accept the incoming \$request as its first argument. If you are overriding this method in your own Authenticate middleware, you should update your middleware's signature:

```
/**
  * Determine if the user is logged in to any of the given guards.
  * @param \Illuminate\Http\Request \$request
  * @param array \$guards
  * @return void
  *
  * @throws \Illuminate\Auth\AuthenticationException
  */
protected function authenticate(\$request, array \$guards)
```

#### The ResetsPasswords Trait

## Likelihood Of Impact: Low

The protected sendResetResponse method of the ResetsPasswords trait now accepts the incoming illuminate\http\Request as its first argument. If you are overriding this method, you should update your method's signature:

```
/**
  * Get the response for a successful password reset.
  *
  * @param \Illuminate\Http\Request $request
  * @param string $response
  * @return \Illuminate\Http\RedirectResponse|\Illuminate\Http\JsonResponse
  */
protected function sendResetResponse(Request $request, $response)
```

## The SendsPasswordResetEmails Trait

## Likelihood Of Impact: Low

The protected sendResetLinkResponse method of the SendsPasswordResetEmails trait now accepts the incoming Illuminate\Http\Request as its first argument. If you are overriding this method, you should update your method's signature:

```
/**
  * Get the response for a successful password reset link.
  *
  * @param \Illuminate\Http\Request $request
  * @param string $response
  * @return \Illuminate\Http\RedirectResponse|\Illuminate\Http\JsonResponse
  */
protected function sendResetLinkResponse(Request $request, $response)
```

#### **Authorization**

## The Gate Contract

# Likelihood Of Impact: Very Low

The raw method was changed from protected to public visibility. In addition, it <u>was added to the Illuminate\Contracts\Auth\Access\Gate Contract</u>:

```
/**

* Get the raw result from the authorization callback.
```

```
* @param string $ability
* @param array|mixed $arguments
* @return mixed
*/
public function raw($ability, $arguments = []);
```

If you are implementing this interface, you should add this method to your implementation.

#### The Login Event

#### Likelihood Of Impact: Very Low

The  $\_$ construct method of Illuminate\Auth\Events\Login event has a new guard argument:

```
/**
  * Create a new event instance.
  * @param string $guard
  * @param \llluminate\Contracts\Auth\Authenticatable $user
  * @param bool $remember
  * @return void
  */
public function __construct($guard, $user, $remember)
```

If you are dispatching this event manually within your application, you'll need to pass this new argument into the event's constructor. The following example passes the default framework guard to the Login event:

```
use Illuminate\Auth\Events\Login;
event(new Login(config('auth.defaults.guard'), $user, $remember))
```

## **Blade**

## The or Operator

## Likelihood Of Impact: High

The Blade "or" operator has been removed in favor of PHP's built-in ?? "null coalesce" operator, which has the same purpose and functionality:

```
// Laravel 5.6...
{{ $foo or 'default' }}
// Laravel 5.7...
{{ $foo ?? 'default' }}
```

## Cache

## Likelihood Of Impact: Very High

 $A new \ {\tt data} \ directory \ has \ been \ {\tt added} \ to \ {\tt storage/framework/cache}. \ You \ should \ create \ this \ directory \ in \ your \ own \ application:$ 

```
mkdir -p storage/framework/cache/data
```

Then, add a <u>.gitignore</u> file to the newly created data directory:

```
cp storage/framework/cache/.gitignore storage/framework/cache/data/.gitignore
```

Finally, ensure that the <a href="mailto:storage/framework/cache/.gitignore">storage/framework/cache/.gitignore</a> file is updated as follows:

```
!data/
!.gitignore
```

## Carbon

## Likelihood Of Impact: Very Low

Carbon "macros" are now handled by the Carbon library directly instead of Laravel's extension of the library. We do not expect this to break your code; however, please make us aware of any problems you encounter related to this change.

## Collections

## The split Method

#### Likelihood Of Impact: Low

The split method has been updated to always return the requested number of "groups", unless the total number of items in the original collection is less than the requested collection count. Generally, this should be considered a bug fix; however, it is listed as a breaking change out of caution.

#### Cookie

## **Factory Contract Method Signature**

## Likelihood Of Impact: Very Low

The signatures of the make and forever methods of the Illuminate\Contracts\Cookie\Factory interface <a href="have been changed">have been changed</a>. If you are implementing this interface, you should update these methods in your implementation.

#### **Database**

#### The softDeletesTz Migration Method

#### Likelihood Of Impact: Low

The schema table builder's softDeletesTz method now accepts the column name as its first argument, while the \*precision has been moved to the second argument position:

```
/**
  * Add a "deleted at" timestampTz for the table.
  *
  * @param string $column
  * @param int $precision
  * @return \Illuminate\Support\Fluent
  */
public function softDeletesTz($column = 'deleted_at', $precision = 0)
```

#### The ConnectionInterface Contract

## Likelihood Of Impact: Very Low

The Illuminate\Contracts\Database\ConnectionInterface contract's select and selectone method signatures have been updated to accommodate the new \$useReadPdo argument:

```
/**

* Run a select statement and return a single result.

* @param string $query

* @param array $bindings

* @param bool $useReadPdo

* @return mixed

*/

public function selectOne($query, $bindings = [], $useReadPdo = true);

/**

* Run a select statement against the database.

* @param string $query

* @param array $bindings

* @param bool $useReadPdo

* @return array

*/

public function select($query, $bindings = [], $useReadPdo = true);

In addition, the cursor method was added to the contract:

/**
```

```
* Run a select statement against the database and returns a generator.

* @param string $query
* @param array $bindings
* @param bool $useReadPdo
* @return \Generator
```

public function cursor(\$query, \$bindings = [], \$useReadPdo = true);

If you are implementing this interface, you should add this method to your implementation.

#### **Migration Command Output**

## Likelihood Of Impact: Very Low

The core migration commands have been <u>updated to set the output instance on the migrator class</u>. If you were overriding or extending the migration commands, you should remove references to <code>\$this->migrator->getNotes()</code> and use <code>\$this->migrator->setOutput(\$this->output)</code> instead.

#### **SQL Server Driver Priority**

#### Likelihood Of Impact: Low

Prior to Laravel 5.7, the PDO\_DBLIB driver was used as the default SQL Server PDO driver. This driver is considered deprecated by Microsoft. As of Laravel 5.7, PDO\_SQLSRV will be used as the default driver if it is available. Alternatively, you may choose to use the PDO\_ODBC driver:

```
'sqlsrv' => [
    // ...
    'odbc' => true,
    'odbc_datasource_name' => 'your-odbc-dsn',
].
```

If neither of these drivers are available, Laravel will use the PDO\_DBLIB driver.

## **SQLite Foreign Keys**

## Likelihood Of Impact: Medium

SQLite does not support dropping foreign keys. For that reason, using the dropForeign method on a table now throws an exception. Generally, this should be considered a bug fix; however, it is listed as a breaking change out of caution.

If you run your migrations on multiple types of databases, consider using DB::getDriverName() in your migrations to skip unsupported foreign key methods for SQLite.

## **Debug**

## **Dumper Classes**

## Likelihood Of Impact: Very Low

The illuminate\Support\Debug\Dumper and illuminate\Support\Debug\HtmlDumper classes have been removed in favor of using Symfony's native variable dumpers: Symfony\Component\VarDumper\VarDumper and Symfony\Component\VarDumper\Dumper\Dumper\HtmlDumper.

## **Eloquent**

## The latest / oldest Methods

### Likelihood Of Impact: Low

The Eloquent query builder's latest and oldest methods have been updated to respect custom "created at" timestamp columns that may be specified on your Eloquent models. Generally, this should be considered a bug fix; however, it is listed as a breaking change out of caution.

## The wasChanged Method

## Likelihood Of Impact: Very Low

An Eloquent model's changes are now available to the waschanged method **before** firing the updated model event. Generally, this should be considered a bug fix; however, it is listed as a breaking change out of caution. <u>Please let us know if you encounter any issues surrounding this change</u>.

## PostgreSQL Special Float Values

#### Likelihood Of Impact: Low

PostgreSQL supports the float values Infinity, -Infinity and NaN. Prior to Laravel 5.7, these were cast to 0 when the Eloquent casting type for the column was float, double, or real.

As of Laravel 5.7, these values will be cast to the corresponding PHP constants INF, -INF, and NAN.

## **Email Verification**

#### Likelihood Of Impact: Optional

If you choose to use Laravel's new <a href="mailto:ema

You will also need to modify your App\User model to implement the MustVerifyEmail contract:

```
<?php
namespace App;
use Illuminate\Notifications\Notifiable;
use Illuminate\Contracts\Auth\MustVerifyEmail;
use Illuminate\Foundation\Auth\User as Authenticatable;
class User extends Authenticatable implements MustVerifyEmail
{
    use Notifiable;
    // ...
}</pre>
```

In order to use the verified middleware so that only verified users may access a given route, you will need to update the \$routeMiddleware property of your app/Http/Kernel.php file to include the new middleware:

```
// Within App\Http\Kernel Class...
protected $routeMiddleware = [
    'auth' => \Illuminate\Auth\Middleware\Authenticate::class,
    'auth.basic' => \Illuminate\Auth\Middleware\AuthenticateWithBasicAuth::class,
    'bindings' => \Illuminate\Routing\Middleware\SubstituteBindings::class,
    'can' => \Illuminate\Auth\Middleware\Authorize::class,
    'guest' => \App\Http\Middleware\RedirectIfAuthenticated::class,
    'throttle' => \Illuminate\Routing\Middleware\ThrottleRequests::class,
    'verified' => \Illuminate\Auth\Middleware\EnsureEmailIsVerified::class,
];
```

You will also need the verification view stub. This view should be placed at resources/views/auth/verify.blade.php. You may obtain the view's contents on GitHub.

Next, your user table must contain an email\_verified\_at column to store the date and time that the email address was verified:

```
$table->timestamp('email_verified_at')->nullable();
```

In order to send the email when a user is registered, you should register following events and listeners in your App\Providers\EventServiceProvider class:

```
use Illuminate\Auth\Events\Registered;
use Illuminate\Auth\Listeners\SendEmailVerificationNotification;
/**
  * The event listener mappings for the application.
  *
  * @var array
  */
protected $listen = [
    Registered::class => [
         SendEmailVerificationNotification::class,
    ],
];
```

Finally, when calling the Auth::routes method, you should pass the verify option to the method:

```
Auth::routes(['verify' => true]);
```

## **Filesystem**

## Filesystem Contract Methods

## Likelihood Of Impact: Low

The readStream and writeStream methods have been added to the Illuminate\Contracts\Filesystem\Filesystem contract. If you are implementing this interface, you should add these methods to your implementation.

## Hashing

#### Hash::check Method

## Likelihood Of Impact: None

The check method now optionally checks if the algorithm of the hash matches the configured algorithm.

#### Mail

## **Mailable Dynamic Variable Casing**

## Likelihood Of Impact: Medium

Variables that are dynamically passed to mailable views <u>are now automatically "camel cased"</u>, which makes mailable dynamic variable behavior consistent with dynamic view variables. Dynamic mailable variables are not a documented Laravel feature, so likelihood of impact to your application is low.

#### **Template Theme**

## Likelihood Of Impact: Medium

If you have customized the default theme styles used for Markdown mailable templates, you will need to re-publish and make your customizations again. The button color classes have been renamed from 'blue', 'green', and 'red' to 'primary', 'success', and 'error'.

#### Queue

#### QUEUE\_DRIVER Environment Variable

#### Likelihood Of Impact: Very Low

The QUEUE\_DRIVER environment variable has been renamed to QUEUE\_CONNECTION. This should not affect existing applications that you are upgrading unless you intentionally modify your config/queue.php configuration file to match Laravel 5.7's.

## WorkCommand Options

## Likelihood Of Impact: Very Low

The stop-when-empty option was added to the WorkCommand. If you extend this command, you need to add stop-when-empty to \$signature property of your class.

### Routing

## The Route::redirect Method

#### Likelihood Of Impact: High

The Route::redirect method now returns a 302 HTTP status code redirect. The permanentRedirect method has been added to allow 301 redirects.

```
// Return a 302 redirect...
Route::redirect('/foo', '/bar');

// Return a 301 redirect...
Route::redirect('/foo', '/bar', 301);

// Return a 301 redirect...
Route::permanentRedirect('/foo', '/bar');
```

## The addRoute Method

## Likelihood Of Impact: Low

The addRoute method of the Illuminate\Routing\Router class has been changed from protected to public.

## **Validation**

## Nested Validation Data

### Likelihood Of Impact: Medium

In previous versions of Laravel, the validate method did not return the correct data for nested validation rules. This has been corrected in Laravel 5.7:

```
$data = Validator::make([
```

```
'person' => [
          'name' => 'Taylor',
          'job' => 'Developer'
]
], ['person.name' => 'required'])->validate();
dump($data);
// Prior Behavior...
['person' => ['name' => 'Taylor', 'job' => 'Developer']]
// New Behavior...
['person' => ['name' => 'Taylor']]
```

#### The Validator Contract

## Likelihood Of Impact: Very Low

The validate method  $\underline{was}$  added to the  $\underline{\mbox{illuminate}\mbox{Contracts}\mbox{Validation}\mbox{Validator}}$  contract:

```
/**
  * Run the validator's rules against its data.
  * @return array
  */
public function validate();
```

If you are implementing this interface, you should add this method to your implementation.

#### **Testing**

## Likelihood of Impact: Medium

Laravel 5.7 introduces improved testing tools for Artisan commands. By default, Artisan command output is now mocked. If you are relying on the artisan method to run commands as part of your test, you should use Artisan::call or define public \$mockConsoleOutput = false as a property in your test class.

## Miscellaneous

We also encourage you to view the changes in the laravel/laravel <u>GitHub repository</u>. While many of these changes are not required, you may wish to keep these files in sync with your application. Some of these changes will be covered in this upgrade guide, but others, such as changes to configuration files or comments, will not be. You can easily view the changes with the <u>GitHub comparison tool</u> and choose which updates are important to you.

#### **Prologue**

# **Contribution Guide**

- Bug Reports
- Core Development Discussion
- Which Branch?
- Compiled Assets
- Security Vulnerabilities
- Coding Style
  - o PHPDoc
  - StyleCI

## **Bug Reports**

To encourage active collaboration, Laravel strongly encourages pull requests, not just bug reports. "Bug reports" may also be sent in the form of a pull request containing a failing test.

However, if you file a bug report, your issue should contain a title and a clear description of the issue. You should also include as much relevant information as possible and a code sample that demonstrates the issue. The goal of a bug report is to make it easy for yourself - and others - to replicate the bug and develop a fix.

Remember, bug reports are created in the hope that others with the same problem will be able to collaborate with you on solving it. Do not expect that the bug report will automatically see any activity or that others will jump to fix it. Creating a bug report serves to help yourself and others start on the path of fixing the problem.

The Laravel source code is managed on GitHub, and there are repositories for each of the Laravel projects:

- Laravel Application
- Laravel Art
- Laravel Documentation
- Laravel Cashier
- Laravel Cashier for Braintree
- Laravel Envoy
- Laravel Framework
- Laravel Homestead
- Laravel Homestead Build Scripts
- Laravel Horizon
- Laravel Passport
- Laravel Scout
- <u>Laravel Socialite</u>
- <u>Laravel Telescope</u>
- <u>Laravel Website</u>

## **Core Development Discussion**

You may propose new features or improvements of existing Laravel behavior in the Laravel Ideas <u>issue board</u>. If you propose a new feature, please be willing to implement at least some of the code that would be needed to complete the feature.

Informal discussion regarding bugs, new features, and implementation of existing features takes place in the #internals channel of the <u>Laravel Discord server</u>. Taylor Otwell, the maintainer of Laravel, is typically present in the channel on weekdays from 8am-5pm (UTC-06:00 or America/Chicago), and sporadically present in the channel at other times.

## **Which Branch?**

**All** bug fixes should be sent to the latest stable branch or to the <u>current LTS branch</u>. Bug fixes should **never** be sent to the master branch unless they fix features that exist only in the upcoming release.

Minor features that are fully backwards compatible with the current Laravel release may be sent to the latest stable branch.

Major new features should always be sent to the master branch, which contains the upcoming Laravel release.

If you are unsure if your feature qualifies as a major or minor, please ask Taylor Otwell in the #internals channel of the <u>Laravel Discord server</u>.

## **Compiled Assets**

If you are submitting a change that will affect a compiled file, such as most of the files in resources/sass or resources/js of the laravel/laravel repository, do not commit the compiled files. Due to their large size, they cannot realistically be reviewed by a maintainer. This could be exploited as a way to inject malicious code into Laravel. In order to defensively prevent this, all compiled files will be generated and committed by Laravel maintainers.

# **Security Vulnerabilities**

If you discover a security vulnerability within Laravel, please send an email to Taylor Otwell at <a href="mailto:taylor@laravel.com">taylor@laravel.com</a>. All security vulnerabilities will be promptly addressed.

# **Coding Style**

Laravel follows the PSR-2 coding standard and the PSR-4 autoloading standard.

#### **PHPDoc**

Below is an example of a valid Laravel documentation block. Note that the <code>@param</code> attribute is followed by two spaces, the argument type, two more spaces, and finally the variable name:

```
/**

* Register a binding with the container.

* @param string|array $abstract

* @param \Closure|string|null $concrete

* @param bool $shared

* @return void

* @throws \Exception

*/
public function bind($abstract, $concrete = null, $shared = false)
{

///
}
```

## **StyleCI**

Don't worry if your code styling isn't perfect! <u>StyleCI</u> will automatically merge any style fixes into the Laravel repository after pull requests are merged. This allows us to focus on the content of the contribution and not the code style.

#### **Getting Started**

# **Installation**

- Installation
  - Server Requirements
  - Installing Laravel
  - Configuration
- Web Server Configuration
  - Pretty URLs

## **Installation**

VIDEO Laracasts provides a <u>free, thorough introduction to Laravel</u> for newcomers to the framework. It's a great place to start your journey.

## **Server Requirements**

The Laravel framework has a few system requirements. Of course, all of these requirements are satisfied by the <u>Laravel</u> <u>Homestead</u> virtual machine, so it's highly recommended that you use Homestead as your local Laravel development environment.

However, if you are not using Homestead, you will need to make sure your server meets the following requirements:

- PHP >= 7.1.3
- OpenSSL PHP Extension
- PDO PHP Extension
- Mbstring PHP Extension
- Tokenizer PHP Extension
- XML PHP Extension
- Ctype PHP Extension
- JSON PHP Extension
- BCMath PHP Extension

## **Installing Laravel**

Laravel utilizes <u>Composer</u> to manage its dependencies. So, before using Laravel, make sure you have Composer installed on your machine.

## Via Laravel Installer

First, download the Laravel installer using Composer:

composer global require laravel/installer

Make sure to place composer's system-wide vendor bin directory in your \$PATH so the laravel executable can be located by your system. This directory exists in different locations based on your operating system; however, some common locations include:

- macOS: \$HOME/.composer/vendor/bin
- GNU / Linux Distributions: \$HOME/.config/composer/vendor/bin

Once installed, the laravel new command will create a fresh Laravel installation in the directory you specify. For instance, laravel new blog will create a directory named blog containing a fresh Laravel installation with all of Laravel's dependencies already installed:

laravel new blog

## Via Composer Create-Project

Alternatively, you may also install Laravel by issuing the Composer create-project command in your terminal:

composer create-project --prefer-dist laravel/laravel blog

## **Local Development Server**

If you have PHP installed locally and you would like to use PHP's built-in development server to serve your application, you may use the serve Artisan command. This command will start a development server at http://localhost:8000:

php artisan serve

Of course, more robust local development options are available via **Homestead** and **Valet**.

### Configuration

#### **Public Directory**

After installing Laravel, you should configure your web server's document / web root to be the public directory. The index.php in this directory serves as the front controller for all HTTP requests entering your application.

#### **Configuration Files**

All of the configuration files for the Laravel framework are stored in the config directory. Each option is documented, so feel free to look through the files and get familiar with the options available to you.

#### **Directory Permissions**

After installing Laravel, you may need to configure some permissions. Directories within the storage and the bootstrap/cache directories should be writable by your web server or Laravel will not run. If you are using the <a href="Homestead">Homestead</a> virtual machine, these permissions should already be set.

## **Application Key**

The next thing you should do after installing Laravel is set your application key to a random string. If you installed Laravel via Composer or the Laravel installer, this key has already been set for you by the php artisan key:generate command.

Typically, this string should be 32 characters long. The key can be set in the .env environment file. If you have not renamed the .env.example file to .env, you should do that now. If the application key is not set, your user sessions and other encrypted data will not be secure!

#### **Additional Configuration**

Laravel needs almost no other configuration out of the box. You are free to get started developing! However, you may wish to review the config/app.php file and its documentation. It contains several options such as timezone and locale that you may wish to change according to your application.

You may also want to configure a few additional components of Laravel, such as:

- Cache
- Database
- <u>Session</u>

## Web Server Configuration

## **Pretty URLs**

## Apache

Laravel includes a public/.htaccess file that is used to provide URLs without the index.php front controller in the path. Before serving Laravel with Apache, be sure to enable the mod\_rewrite module so the .htaccess file will be honored by the server.

If the .htaccess file that ships with Laravel does not work with your Apache installation, try this alternative:

```
Options +FollowSymLinks -Indexes
RewriteEngine On

RewriteCond %{HTTP:Authorization} .
RewriteRule .* - [E=HTTP_AUTHORIZATION:%{HTTP:Authorization}]

RewriteCond %{REQUEST_FILENAME} !-d
RewriteCond %{REQUEST_FILENAME} !-f
RewriteRule ^ index.php [L]
```

#### **Nginx**

If you are using Nginx, the following directive in your site configuration will direct all requests to the index.php front controller:

```
location / {
    try_files $uri $uri/ /index.php?$query_string;
}
```

Of course, when using  $\underline{\text{Homestead}}$  or  $\underline{\text{Valet}},$  pretty URLs will be automatically configured.

#### **Getting Started**

# Configuration

- Introduction
- Environment Configuration
  - Environment Variable Types
  - o Retrieving Environment Configuration
  - o Determining The Current Environment
  - Hiding Environment Variables From Debug Pages
- Accessing Configuration Values
- Configuration Caching
- Maintenance Mode

# Introduction

All of the configuration files for the Laravel framework are stored in the config directory. Each option is documented, so feel free to look through the files and get familiar with the options available to you.

## **Environment Configuration**

It is often helpful to have different configuration values based on the environment where the application is running. For example, you may wish to use a different cache driver locally than you do on your production server.

To make this a cinch, Laravel utilizes the <u>DotEnv</u> PHP library by Vance Lucas. In a fresh Laravel installation, the root directory of your application will contain a .env.example file. If you install Laravel via Composer, this file will automatically be renamed to .env. Otherwise, you should rename the file manually.

Your .env file should not be committed to your application's source control, since each developer / server using your application could require a different environment configuration. Furthermore, this would be a security risk in the event an intruder gains access to your source control repository, since any sensitive credentials would get exposed.

If you are developing with a team, you may wish to continue including a <code>.env.example</code> file with your application. By putting placeholder values in the example configuration file, other developers on your team can clearly see which environment variables are needed to run your application. You may also create a <code>.env.testing</code> file. This file will override the <code>.env</code> file when running PHPUnit tests or executing Artisan commands with the <code>--env=testing</code> option.

TIP Any variable in your .env file can be overridden by external environment variables such as server-level or system-level environment variables.

## **Environment Variable Types**

All variables in your .env files are parsed as strings, so some reserved values have been created to allow you to return a wider range of types from the env() function:

## .env Value env() Value

(bool) true true (true) (bool) true false (bool) false (bool) false (false) empty (string)" (string)" (empty) null (null) null (null) (null) null

If you need to define an environment variable with a value that contains spaces, you may do so by enclosing the value in double quotes.

APP\_NAME="My Application"

#### **Retrieving Environment Configuration**

All of the variables listed in this file will be loaded into the \$\_ENV PHP super-global when your application receives a request. However, you may use the env helper to retrieve values from these variables in your configuration files. In fact, if you review the Laravel configuration files, you will notice several of the options already using this helper:

```
'debug' => env('APP_DEBUG', false),
```

The second value passed to the env function is the "default value". This value will be used if no environment variable exists for the given key.

## **Determining The Current Environment**

The current application environment is determined via the APP\_ENV variable from your .env file. You may access this value via the environment method on the App  $\underline{\text{facade}}$ :

```
$environment = App::environment();
```

You may also pass arguments to the environment method to check if the environment matches a given value. The method will return true if the environment matches any of the given values:

```
if (App::environment('local')) {
    // The environment is local
}

if (App::environment(['local', 'staging'])) {
    // The environment is either local OR staging...
}
```

TIP The current application environment detection can be overridden by a server-level APP\_ENV environment variable. This can be useful when you need to share the same application for different environment configurations, so you can set up a given host to match a given environment in your server's configurations.

## **Hiding Environment Variables From Debug Pages**

When an exception is uncaught and the APP\_DEBUG environment variable is true, the debug page will show all environment variables and their contents. In some cases you may want to obscure certain variables. You may do this by updating the debug\_blacklist option in your config/app.php configuration file.

Some variables are available in both the environment variables and the server / request data. Therefore, you may need to blacklist them for both \$\_ENV and \$\_SERVER:

## **Accessing Configuration Values**

You may easily access your configuration values using the global config helper function from anywhere in your application. The configuration values may be accessed using "dot" syntax, which includes the name of the file and option you wish to access. A default value may also be specified and will be returned if the configuration option does not exist:

```
$value = config('app.timezone');
```

To set configuration values at runtime, pass an array to the config helper:

```
config(['app.timezone' => 'America/Chicago']);
```

## **Configuration Caching**

To give your application a speed boost, you should cache all of your configuration files into a single file using the config:cache Artisan command. This will combine all of the configuration options for your application into a single file which will be loaded quickly by the framework.

You should typically run the php artisan config:cache command as part of your production deployment routine. The command

should not be run during local development as configuration options will frequently need to be changed during the course of your application's development.

NOTE If you execute the <code>config:cache</code> command during your deployment process, you should be sure that you are only calling the <code>env</code> function from within your configuration files. Once the configuration has been cached, the <code>.env</code> file will not be loaded and all calls to the <code>env</code> function will return <code>null</code>.

## **Maintenance Mode**

When your application is in maintenance mode, a custom view will be displayed for all requests into your application. This makes it easy to "disable" your application while it is updating or when you are performing maintenance. A maintenance mode check is included in the default middleware stack for your application. If the application is in maintenance mode, a MaintenanceModeException will be thrown with a status code of 503.

To enable maintenance mode, execute the down Artisan command:

php artisan down

You may also provide message and retry options to the down command. The message value may be used to display or log a custom message, while the retry value will be set as the Retry-After HTTP header's value:

```
php artisan down --message="Upgrading Database" --retry=60
```

Even while in maintenance mode, specific IP addresses or networks may be allowed to access the application using the command's allow option:

```
php artisan down --allow=127.0.0.1 --allow=192.168.0.0/16
```

To disable maintenance mode, use the up command:

php artisan up

TIP You may customize the default maintenance mode template by defining your own template at resources/views/errors/503.blade.php.

## Maintenance Mode & Queues

While your application is in maintenance mode, no <u>queued jobs</u> will be handled. The jobs will continue to be handled as normal once the application is out of maintenance mode.

## **Alternatives To Maintenance Mode**

Since maintenance mode requires your application to have several seconds of downtime, consider alternatives like <u>Envoyer</u> to accomplish zero-downtime deployment with Laravel.

#### **Getting Started**

# **Directory Structure**

- Introduction
- The Root Directory
  - The app Directory
  - The bootstrap Directory
  - The config Directory
  - o The database Directory
  - The public Directory
  - The resources Directory
  - The routes Directory
  - The storage Directory
  - The tests Directory
  - o The vendor Directory
- The App Directory
  - The Broadcasting Directory
  - The Console Directory
  - The Events Directory
  - The Exceptions Directory
  - The Http Directory
  - The Jobs Directory
  - The Listeners Directory
  - o The Mail Directory
  - The Notifications Directory
  - The Policies Directory
  - The Providers Directory
  - The Rules Directory

## Introduction

The default Laravel application structure is intended to provide a great starting point for both large and small applications. Of course, you are free to organize your application however you like. Laravel imposes almost no restrictions on where any given class is located - as long as Composer can autoload the class.

#### Where Is The Models Directory?

When getting started with Laravel, many developers are confused by the lack of a models directory. However, the lack of such a directory is intentional. We find the word "models" ambiguous since it means many different things to many different people. Some developers refer to an application's "model" as the totality of all of its business logic, while others refer to "models" as classes that interact with a relational database.

For this reason, we choose to place Eloquent models in the app directory by default, and allow the developer to place them somewhere else if they choose.

## The Root Directory

## The App Directory

The app directory, as you might expect, contains the core code of your application. We'll explore this directory in more detail soon; however, almost all of the classes in your application will be in this directory.

## The Bootstrap Directory

The bootstrap directory contains the app.php file which bootstraps the framework. This directory also houses a cache directory which contains framework generated files for performance optimization such as the route and services cache files.

## The Config Directory

The config directory, as the name implies, contains all of your application's configuration files. It's a great idea to read through all of these files and familiarize yourself with all of the options available to you.

## The Database Directory

The database directory contains your database migrations, model factories, and seeds. If you wish, you may also use this directory to hold an SQLite database.

#### The Public Directory

The public directory contains the index.php file, which is the entry point for all requests entering your application and configures autoloading. This directory also houses your assets such as images, JavaScript, and CSS.

#### The Resources Directory

The resources directory contains your views as well as your raw, un-compiled assets such as LESS, SASS, or JavaScript. This directory also houses all of your language files.

#### The Routes Directory

The routes directory contains all of the route definitions for your application. By default, several route files are included with Laravel: web.php, api.php, console.php and channels.php.

The web.php file contains routes that the RouteServiceProvider places in the web middleware group, which provides session state, CSRF protection, and cookie encryption. If your application does not offer a stateless, RESTful API, all of your routes will most likely be defined in the web.php file.

The api.php file contains routes that the RouteServiceProvider places in the api middleware group, which provides rate limiting. These routes are intended to be stateless, so requests entering the application through these routes are intended to be authenticated via tokens and will not have access to session state.

The console.php file is where you may define all of your Closure based console commands. Each Closure is bound to a command instance allowing a simple approach to interacting with each command's IO methods. Even though this file does not define HTTP routes, it defines console based entry points (routes) into your application.

The channels .php file is where you may register all of the event broadcasting channels that your application supports.

#### The Storage Directory

The storage directory contains your compiled Blade templates, file based sessions, file caches, and other files generated by the framework. This directory is segregated into app, framework, and logs directories. The app directory may be used to store any files generated by your application. The framework directory is used to store framework generated files and caches. Finally, the logs directory contains your application's log files.

The storage/app/public directory may be used to store user-generated files, such as profile avatars, that should be publicly accessible. You should create a symbolic link at public/storage which points to this directory. You may create the link using the php artisan storage:link command.

## The Tests Directory

The tests directory contains your automated tests. An example <u>PHPUnit</u> test is provided out of the box. Each test class should be suffixed with the word Test. You may run your tests using the phpunit or php vendor/bin/phpunit commands.

## The Vendor Directory

The vendor directory contains your **Composer** dependencies.

# The App Directory

The majority of your application is housed in the app directory. By default, this directory is namespaced under App and is autoloaded by Composer using the <u>PSR-4 autoloading standard</u>.

The app directory contains a variety of additional directories such as <code>console</code>, <code>Http</code>, and <code>Providers</code>. Think of the <code>console</code> and <code>Http</code> directories as providing an API into the core of your application. The HTTP protocol and CLI are both mechanisms to interact with your application, but do not actually contain application logic. In other words, they are two ways of issuing commands to your application. The <code>console</code> directory contains all of your Artisan commands, while the <code>Http</code> directory contains your controllers, middleware, and requests.

A variety of other directories will be generated inside the app directory as you use the make Artisan commands to generate classes. So, for example, the app/Jobs directory will not exist until you execute the make: job Artisan command to generate a job class.

TIP Many of the classes in the app directory can be generated by Artisan via commands. To review the available commands, run the php artisan list make command in your terminal.

#### The Broadcasting Directory

The Broadcasting directory contains all of the broadcast channel classes for your application. These classes are generated using the make:channel command. This directory does not exist by default, but will be created for you when you create your first channel. To learn more about channels, check out the documentation on event broadcasting.

#### The Console Directory

The console directory contains all of the custom Artisan commands for your application. These commands may be generated using the make: command command. This directory also houses your console kernel, which is where your custom Artisan commands are registered and your scheduled tasks are defined.

## The Events Directory

This directory does not exist by default, but will be created for you by the event: generate and make: event Artisan commands. The Events directory, as you might expect, houses event classes. Events may be used to alert other parts of your application that a given action has occurred, providing a great deal of flexibility and decoupling.

#### The Exceptions Directory

The Exceptions directory contains your application's exception handler and is also a good place to place any exceptions thrown by your application. If you would like to customize how your exceptions are logged or rendered, you should modify the Handler class in this directory.

#### The Http Directory

The Http directory contains your controllers, middleware, and form requests. Almost all of the logic to handle requests entering your application will be placed in this directory.

#### The Jobs Directory

This directory does not exist by default, but will be created for you if you execute the <code>make:job</code> Artisan command. The <code>Jobs</code> directory houses the <code>queueable jobs</code> for your application. Jobs may be queued by your application or run synchronously within the current request lifecycle. Jobs that run synchronously during the current request are sometimes referred to as "commands" since they are an implementation of the <code>command pattern</code>.

## The Listeners Directory

This directory does not exist by default, but will be created for you if you execute the event:generate or make:listener Artisan commands. The Listeners directory contains the classes that handle your events. Event listeners receive an event instance and perform logic in response to the event being fired. For example, a UserRegistered event might be handled by a SendWelcomeEmail listener.

## The Mail Directory

This directory does not exist by default, but will be created for you if you execute the make:mail Artisan command. The Mail directory contains all of your classes that represent emails sent by your application. Mail objects allow you to encapsulate all of the logic of building an email in a single, simple class that may be sent using the Mail::send method.

#### The Notifications Directory

This directory does not exist by default, but will be created for you if you execute the <code>make:notification</code> Artisan command. The <code>Notifications</code> directory contains all of the "transactional" notifications that are sent by your application, such as simple notifications about events that happen within your application. Laravel's notification features abstracts sending notifications over a variety of drivers such as email, Slack, SMS, or stored in a database.

## The Policies Directory

This directory does not exist by default, but will be created for you if you execute the make:policy Artisan command. The Policies directory contains the authorization policy classes for your application. Policies are used to determine if a user can perform a given action against a resource. For more information, check out the <u>authorization documentation</u>.

## The Providers Directory

The Providers directory contains all of the <u>service providers</u> for your application. Service providers bootstrap your application by binding services in the service container, registering events, or performing any other tasks to prepare your application for

incoming requests.

In a fresh Laravel application, this directory will already contain several providers. You are free to add your own providers to this directory as needed.

## The Rules Directory

This directory does not exist by default, but will be created for you if you execute the make:rule Artisan command. The Rules directory contains the custom validation rule objects for your application. Rules are used to encapsulate complicated validation logic in a simple object. For more information, check out the <u>validation documentation</u>.

#### **Getting Started**

# **Laravel Homestead**

- Introduction
- Installation & Setup
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  - Configuring Homestead
  - Launching The Vagrant Box
  - o Per Project Installation
  - Installing MariaDB
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  - Aliases
- Daily Usage
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  - Web Servers
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- Extending Homestead
- Updating Homestead
- Provider Specific Settings
  - o <u>VirtualBox</u>

# Introduction

Laravel strives to make the entire PHP development experience delightful, including your local development environment. <u>Vagrant</u> provides a simple, elegant way to manage and provision Virtual Machines.

Laravel Homestead is an official, pre-packaged Vagrant box that provides you a wonderful development environment without requiring you to install PHP, a web server, and any other server software on your local machine. No more worrying about messing up your operating system! Vagrant boxes are completely disposable. If something goes wrong, you can destroy and re-create the box in minutes!

Homestead runs on any Windows, Mac, or Linux system, and includes the Nginx web server, PHP 7.3, PHP 7.1, MySQL, PostgreSQL, Redis, Memcached, Node, and all of the other goodies you need to develop amazing Laravel applications.

NOTE If you are using Windows, you may need to enable hardware virtualization (VT-x). It can usually be enabled via your BIOS. If you are using Hyper-V on a UEFI system you may additionally need to disable Hyper-V in order to access VT-x.

## **Included Software**

- Ubuntu 18.04
- Git
- PHP 7.3
- PHP 7.2
- PHP 7.1
- Nginx
- Apache (Optional)
- MySQL
- MariaDB (Optional)
- Sqlite3
- PostgreSQL
- Composer
- Node (With Yarn, Bower, Grunt, and Gulp)

- Redis
- Memcached
- Beanstalkd
- Mailhog
- Neo4j (Optional)
- MongoDB (Optional)
- Elasticsearch (Optional)
- ngrok
- wp-cli
- Zend Z-Ray
- Go
- Minio

# **Installation & Setup**

## First Steps

Before launching your Homestead environment, you must install <u>VirtualBox</u>, <u>VMWare</u>, <u>Parallels</u> or <u>Hyper-V</u> as well as <u>Vagrant</u>. All of these software packages provide easy-to-use visual installers for all popular operating systems.

To use the VMware provider, you will need to purchase both VMware Fusion / Workstation and the <u>VMware Vagrant plug-in</u>. Though it is not free, VMware can provide faster shared folder performance out of the box.

To use the Parallels provider, you will need to install Parallels Vagrant plug-in. It is free of charge.

Because of Vagrant limitations, The Hyper-V provider ignores all networking settings.

#### **Installing The Homestead Vagrant Box**

Once VirtualBox / VMware and Vagrant have been installed, you should add the laravel/homestead box to your Vagrant installation using the following command in your terminal. It will take a few minutes to download the box, depending on your Internet connection speed:

vagrant box add laravel/homestead

If this command fails, make sure your Vagrant installation is up to date.

## **Installing Homestead**

You may install Homestead by cloning the repository. Consider cloning the repository into a Homestead folder within your "home" directory, as the Homestead box will serve as the host to all of your Laravel projects:

```
{\tt git\ clone\ https://github.com/laravel/homestead.git\ {\tt \sim/Homestead}}
```

You should check out a tagged version of Homestead since the master branch may not always be stable. You can find the latest stable version on the <u>GitHub Release Page</u>:

```
cd ~/Homestead

// Clone the desired release...
git checkout v7.20.0
```

Once you have cloned the Homestead repository, run the bash init.sh command from the Homestead directory to create the Homestead.yaml configuration file. The Homestead.yaml file will be placed in the Homestead directory:

```
// Mac / Linux...
bash init.sh

// Windows...
init bat
```

#### **Configuring Homestead**

## **Setting Your Provider**

The provider key in your Homestead.yaml file indicates which Vagrant provider should be used: virtualbox, vmware\_fusion, vmware\_workstation, parallels or hyperv. You may set this to the provider you prefer:

```
provider: virtualbox
```

## **Configuring Shared Folders**

The folders property of the Homestead yaml file lists all of the folders you wish to share with your Homestead environment. As files within these folders are changed, they will be kept in sync between your local machine and the Homestead environment. You may configure as many shared folders as necessary:

```
folders:
    - map: ~/code
    to: /home/vagrant/code
```

If you are only creating a few sites, this generic mapping will work just fine. However, as the number of sites continue to grow, you may begin to experience performance problems. This problem can be painfully apparent on low-end machines or projects that contain a very large number of files. If you are experiencing this issue, try mapping every project to its own Vagrant folder:

To enable NFS, you only need to add a simple flag to your synced folder configuration:

```
folders:
    - map: ~/code
    to: /home/vagrant/code
    type: "nfs"
```

NOTE When using NFS, you should consider installing the <u>vagrant-winnfsd</u> plug-in. This plug-in will maintain the correct user / group permissions for files and directories within the Homestead box.

You may also pass any options supported by Vagrant's Synced Folders by listing them under the options key:

```
folders:
    - map: ~/code
    to: /home/vagrant/code
    type: "rsync"
    options:
        rsync__args: ["--verbose", "--archive", "--delete", "-zz"]
        rsync__exclude: ["node_modules"]
```

#### **Configuring Nginx Sites**

Not familiar with Nginx? No problem. The sites property allows you to easily map a "domain" to a folder on your Homestead environment. A sample site configuration is included in the Homestead.yaml file. Again, you may add as many sites to your Homestead environment as necessary. Homestead can serve as a convenient, virtualized environment for every Laravel project you are working on:

```
sites:
    - map: homestead.test
    to: /home/vagrant/code/my-project/public
```

If you change the sites property after provisioning the Homestead box, you should re-run vagrant reload --provision to update the Nginx configuration on the virtual machine.

## The Hosts File

You must add the "domains" for your Nginx sites to the hosts file on your machine. The hosts file will redirect requests for your Homestead sites into your Homestead machine. On Mac and Linux, this file is located at /etc/hosts. On Windows, it is located at C:\windows\System32\drivers\etc\hosts. The lines you add to this file will look like the following:

```
192.168.10.10 homestead.test
```

Make sure the IP address listed is the one set in your Homestead.yaml file. Once you have added the domain to your hosts file and launched the Vagrant box you will be able to access the site via your web browser:

```
http://homestead.test
```

## **Launching The Vagrant Box**

Once you have edited the Homestead.yaml to your liking, run the vagrant up command from your Homestead directory. Vagrant will boot the virtual machine and automatically configure your shared folders and Nginx sites.

To destroy the machine, you may use the vagrant destroy --force command.

### **Per Project Installation**

Instead of installing Homestead globally and sharing the same Homestead box across all of your projects, you may instead

configure a Homestead instance for each project you manage. Installing Homestead per project may be beneficial if you wish to ship a Vagrantfile with your project, allowing others working on the project to vagrant up.

To install Homestead directly into your project, require it using Composer:

```
composer require laravel/homestead --dev
```

Once Homestead has been installed, use the make command to generate the Vagrantfile and Homestead.yaml file in your project root. The make command will automatically configure the sites and folders directives in the Homestead.yaml file.

Mac / Linux:

php vendor/bin/homestead make

Windows:

vendor\\bin\\homestead make

Next, run the vagrant up command in your terminal and access your project at http://homestead.test in your browser. Remember, you will still need to add an /etc/hosts file entry for homestead.test or the domain of your choice.

## **Installing MariaDB**

If you prefer to use MariaDB instead of MySQL, you may add the mariadb option to your Homestead.yaml file. This option will remove MySQL and install MariaDB. MariaDB serves as a drop-in replacement for MySQL so you should still use the mysql database driver in your application's database configuration:

box: laravel/homestead ip: "192.168.10.10" memory: 2048 cpus: 4 provider: virtualbox

mariadb: true

## **Installing MongoDB**

To install MongoDB Community Edition, update your Homestead.yaml file with the following configuration option:

mongodb: true

The default MongoDB installation will set the database username to homestead and the corresponding password to secret.

## **Installing Elasticsearch**

To install Elasticsearch, add the elasticsearch option to your Homestead.yaml file and specify a supported version, which may be a major version or an exact version number (major.minor.patch). The default installation will create a cluster named 'homestead'. You should never give Elasticsearch more than half of the operating system's memory, so make sure your Homestead machine has at least twice the Elasticsearch allocation:

box: laravel/homestead ip: "192.168.10.10" memory: 4096 cpus: 4 provider: virtualbox elasticsearch: 6

TIP Check out the **Elasticsearch documentation** to learn how to customize your configuration.

## **Installing Neo4j**

Neo4j is a graph database management system. To install Neo4j Community Edition, update your Homestead.yam1 file with the following configuration option:

```
neo4j: true
```

The default Neo4j installation will set the database username to homestead and corresponding password to secret. To access the Neo4j browser, visit http://homestead.test:7474 via your web browser. The ports 7687 (Bolt), 7474 (HTTP), and 7473 (HTTPS) are ready to serve requests from the Neo4j client.

## **Aliases**

You may add Bash aliases to your Homestead machine by modifying the aliases file within your Homestead directory:

```
alias c='clear'
alias ..='cd ..'
```

After you have updated the aliases file, you should re-provision the Homestead machine using the vagrant reload --provision command. This will ensure that your new aliases are available on the machine.

## **Daily Usage**

## **Accessing Homestead Globally**

Sometimes you may want to vagrant up your Homestead machine from anywhere on your filesystem. You can do this on Mac / Linux systems by adding a Bash function to your Bash profile. On Windows, you may accomplish this by adding a "batch" file to your PATH. These scripts will allow you to run any Vagrant command from anywhere on your system and will automatically point that command to your Homestead installation:

#### Mac / Linux

```
function homestead() {
    ( cd ~/Homestead && vagrant $* )
}
```

Make sure to tweak the ~/Homestead path in the function to the location of your actual Homestead installation. Once the function is installed, you may run commands like homestead up or homestead ssh from anywhere on your system.

#### Windows

Create a homestead.bat batch file anywhere on your machine with the following contents:

```
@echo off
set cwd=%cd%
set homesteadVagrant=C:\Homestead
cd /d %homesteadVagrant% && vagrant %'
cd /d %cwd%
set cwd=
set homesteadVagrant=
```

Make sure to tweak the example c:\homestead path in the script to the actual location of your Homestead installation. After creating the file, add the file location to your PATH. You may then run commands like homestead up or homestead ssh from anywhere on your system.

## **Connecting Via SSH**

You can SSH into your virtual machine by issuing the vagrant ssh terminal command from your Homestead directory.

But, since you will probably need to SSH into your Homestead machine frequently, consider adding the "function" described above to your host machine to quickly SSH into the Homestead box.

## **Connecting To Databases**

A homestead database is configured for both MySQL and PostgreSQL out of the box. For even more convenience, Laravel's .env file configures the framework to use this database out of the box.

To connect to your MySQL or PostgreSQL database from your host machine's database client, you should connect to 127.0.0.1 and port 33060 (MySQL) or 54320 (PostgreSQL). The username and password for both databases is homestead / secret.

NOTE You should only use these non-standard ports when connecting to the databases from your host machine. You will use the default 3306 and 5432 ports in your Laravel database configuration file since Laravel is running *within* the virtual machine.

## **Database Backups**

Homestead can automatically backup your database when your Vagrant box is destroyed. To utilize this feature, you must be using Vagrant 2.1.0 or greater. Or, if you are using an older version of Vagrant, you must install the vagrant-triggers plug-in. To enable automatic database backups, add the following line to your Homestead.yaml file:

```
backup: true
```

Once configured, Homestead will export your databases to mysql\_backup and postgres\_backup directories when the vagrant destroy command is executed. These directories can be found in the folder where you cloned Homestead or in the root of your project if you are using the per project installation method.

#### **Adding Additional Sites**

Once your Homestead environment is provisioned and running, you may want to add additional Nginx sites for your Laravel applications. You can run as many Laravel installations as you wish on a single Homestead environment. To add an additional site, add the site to your Homestead.yaml file:

sites:

```
map: homestead.test
to: /home/vagrant/code/my-project/public
map: another.test
to: /home/vagrant/code/another/public
```

If Vagrant is not automatically managing your "hosts" file, you may need to add the new site to that file as well:

```
192.168.10.10 homestead.test
192.168.10.10 another.test
```

Once the site has been added, run the vagrant reload --provision command from your Homestead directory.

#### Site Types

Homestead supports several types of sites which allow you to easily run projects that are not based on Laravel. For example, we may easily add a Symfony application to Homestead using the symfony2 site type:

sites:

```
- map: symfony2.test
to: /home/vagrant/code/my-symfony-project/web
type: "symfony2"
```

The available site types are: apache, apigility, expressive, laravel (the default), proxy, silverstripe, statamic, symfony2, symfony4, and zf.

## **Site Parameters**

You may add additional Nginx fastcgi\_param values to your site via the params site directive. For example, we'll add a foo parameter with a value of BAR:

sites:

```
    map: homestead.test
    to: /home/vagrant/code/my-project/public
    params:
    key: F00
    value: BAR
```

## **Environment Variables**

You can set global environment variables by adding them to your Homestead.yaml file:

variables:

```
key: APP_ENV
value: localkey: F00
value: bar
```

After updating the Homestead.yaml, be sure to re-provision the machine by running vagrant reload --provision. This will update the PHP-FPM configuration for all of the installed PHP versions and also update the environment for the vagrant user.

## **Configuring Cron Schedules**

Laravel provides a convenient way to <a href="schedule:run">schedule:run</a> Artisan command to be run every minute. The <a href="schedule:run">schedule:run</a> command will examine the job schedule defined in your <a href="mailto:App\Console\Kernel">App\Console\Kernel</a> class to determine which jobs should be run.

If you would like the schedule:run command to be run for a Homestead site, you may set the schedule option to true when defining the site:

sites:

```
--map: homestead.test
  to: /home/vagrant/code/my-project/public
  schedule: true
```

The Cron job for the site will be defined in the /etc/cron.d folder of the virtual machine.

## **Configuring Mailhog**

Mailhog allows you to easily catch your outgoing email and examine it without actually sending the mail to its recipients. To get started, update your .env file to use the following mail settings:

```
MAIL_DRIVER=smtp
MAIL_HOST=localhost
MAIL_PORT=1025
MAIL_USERNAME=null
MAIL_PASSWORD=null
MAIL_ENCRYPTION=null
```

Once Mailhog has been configured, you may access the Mailhog dashboard at http://localhost:8025.

## **Configuring Minio**

Minio is an open source object storage server with an Amazon S3 compatible API. To install Minio, update your Homestead.yaml file with the following configuration option:

```
minio: true
```

By default, Minio is available on port 9600. You may access the Minio control panel by visiting http://homestead:9600/. The default access key is homestead, while the default secret key is secretkey. When accessing Minio, you should always use region use each 1

In order to use Minio you will need to adjust the S3 disk configuration in your <code>config/filesystems.php</code> configuration file. You will need to add the <code>use\_path\_style\_endpoint</code> option to the disk configuration, as well as change the <code>url</code> key to <code>endpoint</code>:

```
's3' => [
  'driver' => 's3',
  'key' => env('AWS_ACCESS_KEY_ID'),
  'secret' => env('AWS_SECRET_ACCESS_KEY'),
  'region' => env('AWS_DEFAULT_REGION'),
  'bucket' => env('AWS_BUCKET'),
  'endpoint' => env('AWS_URL'),
  'use_path_style_endpoint' => true
```

Finally, ensure your .env file has the following options:

```
AWS_ACCESS_KEY_ID=homestead
AWS_SECRET_ACCESS_KEY=secretkey
AWS_DEFAULT_REGION=us-east-1
AWS_URL=http://homestead:9600
```

To provision buckets, add a buckets directive to your Homestead configuration file:

```
ouckets:
```

```
name: your-bucket
policy: publicname: your-private-bucket
policy: none
```

Supported policy values include: none, download, upload, and public.

#### **Ports**

By default, the following ports are forwarded to your Homestead environment:

```
    SSH: 2222 → Forwards To 22
    ngrok UI: 4040 → Forwards To 4040
    HTTP: 8000 → Forwards To 80
    HTTPS: 44300 → Forwards To 443
    MySQL: 33060 → Forwards To 3306
    PostgreSQL: 54320 → Forwards To 5432
    MongoDB: 27017 → Forwards To 27017
    Mailhog: 8025 → Forwards To 8025
    Minio: 9600 → Forwards To 9600
```

## **Forwarding Additional Ports**

If you wish, you may forward additional ports to the Vagrant box, as well as specify their protocol:

```
ports:
- send: 50000
to: 5000
- send: 7777
to: 777
protocol: udp
```

## **Sharing Your Environment**

Sometimes you may wish to share what you're currently working on with coworkers or a client. Vagrant has a built-in way to support this via vagrant share; however, this will not work if you have multiple sites configured in your Homestead.yaml file.

To solve this problem, Homestead includes its own share command. To get started, SSH into your Homestead machine via vagrant ssh and run share homestead.test. This will share the homestead.test site from your Homestead.yaml configuration file. Of course, you may substitute any of your other configured sites for homestead.test:

```
share homestead.test
```

After running the command, you will see an Ngrok screen appear which contains the activity log and the publicly accessible URLs for the shared site. If you would like to specify a custom region, subdomain, or other Ngrok runtime option, you may add them to your share command:

```
share homestead.test -region=eu -subdomain=laravel
```

NOTE Remember, Vagrant is inherently insecure and you are exposing your virtual machine to the Internet when running the share command.

## **Multiple PHP Versions**

Homestead 6 introduced support for multiple versions of PHP on the same virtual machine. You may specify which version of PHP to use for a given site within your Homestead.yaml file. The available PHP versions are: "7.1", "7.2" and "7.3" (the default):

```
sites:
    - map: homestead.test
    to: /home/vagrant/code/my-project/public
    php: "7.1"
```

In addition, you may use any of the supported PHP versions via the CLI:

```
php7.1 artisan list
php7.2 artisan list
php7.3 artisan list
```

#### **Web Servers**

Homestead uses the Nginx web server by default. However, it can install Apache if apache is specified as a site type. While both web servers can be installed at the same time, they cannot both be *running* at the same time. The flip shell command is available to ease the process of switching between web servers. The flip command automatically determines which web server is running, shuts it off, and then starts the other server. To use this command, SSH into your Homestead machine and run the command in your terminal:

flip

#### Mail

Homestead includes the Postfix mail transfer agent, which is listening on port 1025 by default. So, you may instruct your application to use the smtp mail driver on localhost port 1025. Then, all sent mail will be handled by Postfix and caught by Mailhog. To view your sent emails, open <a href="http://localhost:8025">http://localhost:8025</a> in your web browser.

#### **Network Interfaces**

The networks property of the Homestead.yaml configures network interfaces for your Homestead environment. You may configure as many interfaces as necessary:

```
networks:
    type: "private_network"
    ip: "192.168.10.20"
```

To enable a <a href="mailto:bridge">bridge</a> interface, configure a bridge setting and change the network type to public\_network:

To enable <u>DHCP</u>, just remove the ip option from your configuration:

```
networks:
- type: "public_network"
bridge: "en1: Wi-Fi (AirPort)"
```

## **Extending Homestead**

You may extend Homestead using the after.sh script in the root of your Homestead directory. Within this file, you may add any shell commands that are necessary to properly configure and customize your virtual machine.

When customizing Homestead, Ubuntu may ask you if you would like to keep a package's original configuration or overwrite it with a new configuration file. To avoid this, you should use the following command when installing packages to avoid overwriting any configuration previously written by Homestead:

```
sudo apt-get -y \
   -o Dpkg::Options::="--force-confdef" \
   -o Dpkg::Options::="--force-confold" \
   install your-package
```

## **Updating Homestead**

You can update Homestead in two simple steps. First, you should update the Vagrant box using the vagrant box update command:

```
vagrant box update
```

Next, you need to update the Homestead source code. If you cloned the repository you can git pull origin master at the location you originally cloned the repository.

If you have installed Homestead via your project's composer.json file, you should ensure your composer.json file contains "laravel/homestead": "^7" and update your dependencies:

composer update

# **Provider Specific Settings**

## **VirtualBox**

#### natdnshostresolver

By default, Homestead configures the natdnshostresolver setting to on. This allows Homestead to use your host operating system's DNS settings. If you would like to override this behavior, add the following lines to your Homestead.yaml file:

```
provider: virtualbox natdnshostresolver: off
```

## **Symbolic Links On Windows**

If symbolic links are not working properly on your Windows machine, you may need to add the following block to your Vagrantfile:

```
config.vm.provider "virtualbox" do |v|
    v.customize ["setextradata", :id, "VBoxInternal2/SharedFoldersEnableSymlinksCreate/v-root", "1"]
end
```

#### **Getting Started**

## **Laravel Valet**

- Introduction
  - Valet Or Homestead
- <u>Installation</u>
  - Upgrading
- Serving Sites
  - The "Park" Command
  - The "Link" Command
  - Securing Sites With TLS
- Sharing Sites
- Custom Valet Drivers
  - Local Drivers
- Other Valet Commands

#### Introduction

Valet is a Laravel development environment for Mac minimalists. No Vagrant, no /etc/hosts file. You can even share your sites publicly using local tunnels. Yeah, we like it too.

Laravel Valet configures your Mac to always run Nginx in the background when your machine starts. Then, using <a href="DnsMasq">DnsMasq</a>, Valet proxies all requests on the \*.test domain to point to sites installed on your local machine.

In other words, a blazing fast Laravel development environment that uses roughly 7 MB of RAM. Valet isn't a complete replacement for Vagrant or Homestead, but provides a great alternative if you want flexible basics, prefer extreme speed, or are working on a machine with a limited amount of RAM.

Out of the box, Valet support includes, but is not limited to:

- Laravel
- <u>Lumen</u>
- Bedrock
- CakePHP 3
- Concrete5
- Contao
- Craft
- <u>Drupal</u>
- Jigsaw
- <u>Joomla</u>
- Katana
- <u>Kirby</u><u>Magento</u>
- OctoberCMS
- Sculpin
- Slim
- Statamic
- Static HTML
- Symfony
- WordPress
- Zend

However, you may extend Valet with your own custom drivers.

#### **Valet Or Homestead**

As you may know, Laravel offers <u>Homestead</u>, another local Laravel development environment. Homestead and Valet differ in regards to their intended audience and their approach to local development. Homestead offers an entire Ubuntu virtual machine with automated Nginx configuration. Homestead is a wonderful choice if you want a fully virtualized Linux development environment or are on Windows / Linux.

Valet only supports Mac, and requires you to install PHP and a database server directly onto your local machine. This is easily achieved by using <a href="Homebrew">Homebrew</a> with commands like brew install php and brew install mysql. Valet provides a blazing fast local development environment with minimal resource consumption, so it's great for developers who only require PHP / MySQL and do not need a fully virtualized development environment.

Both Valet and Homestead are great choices for configuring your Laravel development environment. Which one you choose will

depend on your personal taste and your team's needs.

#### Installation

Valet requires macOS and <u>Homebrew</u>. Before installation, you should make sure that no other programs such as Apache or Nginx are binding to your local machine's port 80.

- Install or update **Homebrew** to the latest version using brew update.
- Install PHP 7.3 using Homebrew via brew install php.
- Install Composer.
- Install Valet with Composer via composer global require laravel/valet. Make sure the ~/.composer/vendor/bin directory is in your system's "PATH".
- Run the valet install command. This will configure and install Valet and DnsMasq, and register Valet's daemon to launch when your system starts.

Once Valet is installed, try pinging any \*.test domain on your terminal using a command such as ping foobar.test. If Valet is installed correctly you should see this domain responding on 127.0.0.1.

Valet will automatically start its daemon each time your machine boots. There is no need to run valet start or valet install ever again once the initial Valet installation is complete.

#### **Using Another Domain**

By default, Valet serves your projects using the .test TLD. If you'd like to use another domain, you can do so using the valet domain tld-name command.

For example, if you'd like to use .app instead of .test, run valet domain app and Valet will start serving your projects at \* .app automatically.

#### Database

If you need a database, try MySQL by running brew install mysql@5.7 on your command line. Once MySQL has been installed, you may start it using the brew services start mysql@5.7 command. You can then connect to the database at 127.0.0.1 using the root username and an empty string for the password.

#### **Upgrading**

You may update your Valet installation using the composer global update command in your terminal. After upgrading, it is good practice to run the valet install command so Valet can make additional upgrades to your configuration files if necessary.

#### **Upgrading To Valet 2.0**

Valet 2.0 transitions Valet's underlying web server from Caddy to Nginx. Before upgrading to this version you should run the following commands to stop and uninstall the existing Caddy daemon:

```
valet stop
valet uninstall
```

Next, you should upgrade to the latest version of Valet. Depending on how you installed Valet, this is typically done through Git or Composer. If you installed Valet via Composer, you should use the following command to update to the latest major version:

```
composer global require laravel/valet
```

Once the fresh Valet source code has been downloaded, you should run the install command:

```
valet install
valet restart
```

After upgrading, it may be necessary to re-park or re-link your sites.

### **Serving Sites**

Once Valet is installed, you're ready to start serving sites. Valet provides two commands to help you serve your Laravel sites: park and link.

#### The park Command

- Create a new directory on your Mac by running something like mkdir -/Sites. Next, cd -/Sites and run valet park. This command will register your current working directory as a path that Valet should search for sites.
- Next, create a new Laravel site within this directory: laravel new blog.

• Open http://blog.test in your browser.

**That's all there is to it.** Now, any Laravel project you create within your "parked" directory will automatically be served using the http://folder-name.test convention.

#### The link Command

The link command may also be used to serve your Laravel sites. This command is useful if you want to serve a single site in a directory and not the entire directory.

- To use the command, navigate to one of your projects and run valet link app-name in your terminal. Valet will create a symbolic link in ~/.config/valet/Sites which points to your current working directory.
- After running the link command, you can access the site in your browser at http://app-name.test.

To see a listing of all of your linked directories, run the valet links command. You may use valet unlink app-name to destroy the symbolic link.

TIP You can use valet link to serve the same project from multiple (sub)domains. To add a subdomain or another domain to your project run valet link subdomain.app-name from the project folder.

#### **Securing Sites With TLS**

By default, Valet serves sites over plain HTTP. However, if you would like to serve a site over encrypted TLS using HTTP/2, use the secure command. For example, if your site is being served by Valet on the laravel.test domain, you should run the following command to secure it:

valet secure laravel

To "unsecure" a site and revert back to serving its traffic over plain HTTP, use the unsecure command. Like the secure command, this command accepts the host name that you wish to unsecure:

valet unsecure laravel

## **Sharing Sites**

Valet even includes a command to share your local sites with the world. No additional software installation is required once Valet is installed.

To share a site, navigate to the site's directory in your terminal and run the valet share command. A publicly accessible URL will be inserted into your clipboard and is ready to paste directly into your browser. That's it.

To stop sharing your site, hit control + c to cancel the process.

NOTE valet share does not currently support sharing sites that have been secured using the valet secure command.

### **Custom Valet Drivers**

You can write your own Valet "driver" to serve PHP applications running on another framework or CMS that is not natively supported by Valet. When you install Valet, a ~/.config/valet/Drivers directory is created which contains a SampleValetDriver.php file. This file contains a sample driver implementation to demonstrate how to write a custom driver. Writing a driver only requires you to implement three methods: serves, isStaticFile, and frontControllerPath.

All three methods receive the \$sitePath, \$siteName, and \$uri values as their arguments. The \$sitePath is the fully qualified path to the site being served on your machine, such as /Users/Lisa/Sites/my-project. The \$siteName is the "host" / "site name" portion of the domain (my-project). The \$uri is the incoming request URI (/foo/bar).

Once you have completed your custom Valet driver, place it in the ~/.config/valet/Drivers directory using the FrameworkValetDriver.php naming convention. For example, if you are writing a custom valet driver for WordPress, your file name should be WordPressValetDriver.php.

Let's take a look at a sample implementation of each method your custom Valet driver should implement.

### The serves Method

The serves method should return true if your driver should handle the incoming request. Otherwise, the method should return false. So, within this method you should attempt to determine if the given \$sitePath contains a project of the type you are trying to serve.

For example, let's pretend we are writing a WordPressValetDriver. Our serves method might look something like this:

```
* Determine if the driver serves the request.

* @param string $sitePath
* @param string $siteName
* @param string $uri
* @return bool
*/
public function serves($sitePath, $siteName, $uri)
{
    return is_dir($sitePath.'/wp-admin');
}
```

#### The isStaticFile Method

The isstaticFile should determine if the incoming request is for a file that is "static", such as an image or a stylesheet. If the file is static, the method should return the fully qualified path to the static file on disk. If the incoming request is not for a static file, the method should return false:

```
/**
  * Determine if the incoming request is for a static file.
  *
  * @param string $sitePath
  * @param string $siteName
  * @param string $uri
  * @return string|false
  */
public function isStaticFile($sitePath, $siteName, $uri)
{
    if (file_exists($staticFilePath = $sitePath.'/public/'.$uri)) {
        return $staticFilePath;
    }
    return false;
}
```

NOTE The isStaticFile method will only be called if the serves method returns true for the incoming request and the request URI is not /.

#### The frontControllerPath Method

The frontcontrollerPath method should return the fully qualified path to your application's "front controller", which is typically your "index.php" file or equivalent:

```
/**
 * Get the fully resolved path to the application's front controller.
 * @param string $sitePath
 * @param string $siteName
 * @param string $uri
 * @return string
 */
public function frontControllerPath($sitePath, $siteName, $uri)
{
    return $sitePath.'/public/index.php';
}
```

#### **Local Drivers**

If you would like to define a custom Valet driver for a single application, create a LocalValetDriver.php in the application's root directory. Your custom driver may extend the base ValetDriver class or extend an existing application specific driver such as the LaravelValetDriver:

```
class LocalValetDriver extends LaravelValetDriver
{
    /**
    * Determine if the driver serves the request.
    *
    * Oparam string $sitePath
    * Oparam string $siteName
    * Oparam string $uri
    * Oreturn bool
    */
    public function serves($sitePath, $siteName, $uri)
    {
        return true;
    }
    /**
    * Get the fully resolved path to the application's front controller.
    *
    * Oparam string $sitePath
```

```
* @param string $siteName
* @param string $uri
* @return string
*/
public function frontControllerPath($sitePath, $siteName, $uri)
{
    return $sitePath.'/public_html/index.php';
}
```

# **Other Valet Commands**

Comman	d Description
valet forge	Run this command from a "parked" directory to remove it from the parked directory list.
valet paths	View all of your "parked" paths.
valet resta	Restart the Valet daemon.
valet start	Start the Valet daemon.
valet stop	Stop the Valet daemon.
valet unins	tall Uninstall the Valet daemon entirely.

#### **Getting Started**

# **Deployment**

- Introduction
- Server Configuration
  - o Nginx
- **Optimization** 
  - Autoloader Optimization
  - o Optimizing Configuration Loading
  - o Optimizing Route Loading
- Deploying With Forge

#### Introduction

When you're ready to deploy your Laravel application to production, there are some important things you can do to make sure your application is running as efficiently as possible. In this document, we'll cover some great starting points for making sure your Laravel application is deployed properly.

## **Server Configuration**

#### **Nginx**

If you are deploying your application to a server that is running Nginx, you may use the following configuration file as a starting point for configuring your web server. Most likely, this file will need to be customized depending on your server's configuration. If you would like assistance in managing your server, consider using a service such as <u>Laravel Forge</u>:

```
server {
     listen 80;
     server_name example.com;
     root /example.com/public;
     add_header X-Frame-Options "SAMEORIGIN";
     add_header X-XSS-Protection "1; mode=block";
     add_header X-Content-Type-Options "nosniff";
     index index.html index.htm index.php;
     charset utf-8:
     location / {
         try_files $uri $uri/ /index.php?$query_string;
     location = /favicon.ico { access_log off; log_not_found off; }
location = /robots.txt { access_log off; log_not_found off; }
     error_page 404 /index.php;
     location ~ \.php$ {
         fastcgi_pass unix:/var/run/php/php7.2-fpm.sock;
fastcgi_index index.php;
         include fastcgi_params;
     location \sim /\.(?!well-known).* {
         deny all;
}
```

## **Optimization**

## **Autoloader Optimization**

When deploying to production, make sure that you are optimizing Composer's class autoloader map so Composer can quickly find the proper file to load for a given class:

```
composer install --optimize-autoloader --no-dev
```

TIP In addition to optimizing the autoloader, you should always be sure to include a composer.lock file in your project's source control repository. Your project's dependencies can be installed much faster when a composer.lock file is present.

### **Optimizing Configuration Loading**

When deploying your application to production, you should make sure that you run the config:cache Artisan command during your deployment process:

php artisan config:cache

This command will combine all of Laravel's configuration files into a single, cached file, which greatly reduces the number of trips the framework must make to the filesystem when loading your configuration values.

NOTE If you execute the <code>config:cache</code> command during your deployment process, you should be sure that you are only calling the <code>env</code> function from within your configuration files. Once the configuration has been cached, the <code>.env</code> file will not be loaded and all calls to the <code>env</code> function will return <code>null</code>.

#### **Optimizing Route Loading**

If you are building a large application with many routes, you should make sure that you are running the route:cache Artisan command during your deployment process:

php artisan route:cache

This command reduces all of your route registrations into a single method call within a cached file, improving the performance of route registration when registering hundreds of routes.

NOTE Since this feature uses PHP serialization, you may only cache the routes for applications that exclusively use controller based routes. PHP is not able to serialize Closures.

## **Deploying With Forge**

If you aren't quite ready to manage your own server configuration or aren't comfortable configuring all of the various services needed to run a robust Laravel application, <u>Laravel Forge</u> is a wonderful alternative.

Laravel Forge can create servers on various infrastructure providers such as DigitalOcean, Linode, AWS, and more. In addition, Forge installs and manages all of the tools needed to build robust Laravel applications, such as Nginx, MySQL, Redis, Memcached, Beanstalk, and more.

#### **Architecture Concepts**

# **Request Lifecycle**

- Introduction
- Lifecycle Overview
- Focus On Service Providers

#### Introduction

When using any tool in the "real world", you feel more confident if you understand how that tool works. Application development is no different. When you understand how your development tools function, you feel more comfortable and confident using them.

The goal of this document is to give you a good, high-level overview of how the Laravel framework works. By getting to know the overall framework better, everything feels less "magical" and you will be more confident building your applications. If you don't understand all of the terms right away, don't lose heart! Just try to get a basic grasp of what is going on, and your knowledge will grow as you explore other sections of the documentation.

## Lifecycle Overview

### First Things

The entry point for all requests to a Laravel application is the public/index.php file. All requests are directed to this file by your web server (Apache / Nginx) configuration. The index.php file doesn't contain much code. Rather, it is a starting point for loading the rest of the framework.

The index.php file loads the Composer generated autoloader definition, and then retrieves an instance of the Laravel application from bootstrap/app.php script. The first action taken by Laravel itself is to create an instance of the application / service container.

#### **HTTP/Console Kernels**

Next, the incoming request is sent to either the HTTP kernel or the console kernel, depending on the type of request that is entering the application. These two kernels serve as the central location that all requests flow through. For now, let's just focus on the HTTP kernel, which is located in app/Http/Kernel.php.

The HTTP kernel extends the <code>illuminate\Foundation\Http\Kernel</code> class, which defines an array of bootstrappers that will be run before the request is executed. These bootstrappers configure error handling, configure logging, <a href="detect the application">detect the application</a> environment, and perform other tasks that need to be done before the request is actually handled.

The HTTP kernel also defines a list of HTTP middleware that all requests must pass through before being handled by the application. These middleware handle reading and writing the HTTP session, determining if the application is in maintenance mode, verifying the CSRF token, and more.

The method signature for the HTTP kernel's handle method is quite simple: receive a Request and return a Response. Think of the Kernel as being a big black box that represents your entire application. Feed it HTTP requests and it will return HTTP responses.

### **Service Providers**

One of the most important Kernel bootstrapping actions is loading the <u>service providers</u> for your application. All of the service providers for the application are configured in the config/app.php configuration file's providers array. First, the register method will be called on all providers, then, once all providers have been registered, the boot method will be called.

Service providers are responsible for bootstrapping all of the framework's various components, such as the database, queue, validation, and routing components. Since they bootstrap and configure every feature offered by the framework, service providers are the most important aspect of the entire Laravel bootstrap process.

#### **Dispatch Request**

Once the application has been bootstrapped and all service providers have been registered, the Request will be handed off to the router for dispatching. The router will dispatch the request to a route or controller, as well as run any route specific middleware.

#### **Focus On Service Providers**

Service providers are truly the key to bootstrapping a Laravel application. The application instance is created, the service providers are registered, and the request is handed to the bootstrapped application. It's really that simple!

Having a firm grasp of how a Laravel application is built and bootstrapped via service providers is very valuable. Of course, your application's default service providers are stored in the app/Providers directory.

By default, the AppServiceProvider is fairly empty. This provider is a great place to add your application's own bootstrapping and service container bindings. Of course, for large applications, you may wish to create several service providers, each with a more granular type of bootstrapping.

#### **Architecture Concepts**

## **Service Container**

- <u>Introduction</u>
- Binding
  - o Binding Basics
  - Binding Interfaces To Implementations
  - Contextual Binding
  - o Tagging
  - Extending Bindings
- Resolving
  - The Make Method
  - Automatic Injection
- Container Events
- PSR-11

### Introduction

The Laravel service container is a powerful tool for managing class dependencies and performing dependency injection. Dependency injection is a fancy phrase that essentially means this: class dependencies are "injected" into the class via the constructor or, in some cases, "setter" methods.

Let's look at a simple example:

```
<?php
namespace App\Http\Controllers;
use App\Repositories\UserRepository;
use \ App \verb|\Http\Controllers\Controller;\\
class UserController extends Controller
     ^{\ast} The user repository implementation.
     * @var UserRepository
    protected $users;
     ^{\star} Create a new controller instance.
       @param UserRepository $users
    public function __construct(UserRepository $users)
        $this->users = $users;
    }
     ^{\ast} Show the profile for the given user.
       @param int $id
       @return Response
    public function show($id)
        $user = $this->users->find($id);
        return view('user.profile', ['user' => $user]);
    }
}
```

In this example, the UserController needs to retrieve users from a data source. So, we will **inject** a service that is able to retrieve users. In this context, our UserRepository most likely uses <u>Eloquent</u> to retrieve user information from the database. However, since the repository is injected, we are able to easily swap it out with another implementation. We are also able to easily "mock", or create a dummy implementation of the UserRepository when testing our application.

A deep understanding of the Laravel service container is essential to building a powerful, large application, as well as for contributing to the Laravel core itself.

## **Binding**

### **Binding Basics**

Almost all of your service container bindings will be registered within <u>service providers</u>, so most of these examples will demonstrate using the container in that context.

TIP There is no need to bind classes into the container if they do not depend on any interfaces. The container does not need to be instructed on how to build these objects, since it can automatically resolve these objects using reflection.

#### **Simple Bindings**

Within a service provider, you always have access to the container via the \$this->app property. We can register a binding using the bind method, passing the class or interface name that we wish to register along with a Closure that returns an instance of the class:

```
$this->app->bind('HelpSpot\API', function ($app) {
    return new HelpSpot\API($app->make('HttpClient'));
});
```

Note that we receive the container itself as an argument to the resolver. We can then use the container to resolve sub-dependencies of the object we are building.

#### **Binding A Singleton**

The singleton method binds a class or interface into the container that should only be resolved one time. Once a singleton binding is resolved, the same object instance will be returned on subsequent calls into the container:

```
$this->app->singleton('HelpSpot\API', function ($app) {
    return new HelpSpot\API($app->make('HttpClient'));
});
```

#### **Binding Instances**

You may also bind an existing object instance into the container using the instance method. The given instance will always be returned on subsequent calls into the container:

```
$api = new HelpSpot\API(new HttpClient);
$this->app->instance('HelpSpot\API', $api);
```

#### **Binding Primitives**

Sometimes you may have a class that receives some injected classes, but also needs an injected primitive value such as an integer. You may easily use contextual binding to inject any value your class may need:

#### **Binding Interfaces To Implementations**

A very powerful feature of the service container is its ability to bind an interface to a given implementation. For example, let's assume we have an EventPusher interface and a RedisEventPusher implementation. Once we have coded our RedisEventPusher implementation of this interface, we can register it with the service container like so:

```
$this->app->bind(
   'App\Contracts\EventPusher',
   'App\Services\RedisEventPusher');
```

This statement tells the container that it should inject the RedisEventPusher when a class needs an implementation of EventPusher. Now we can type-hint the EventPusher interface in a constructor, or any other location where dependencies are injected by the service container:

```
use App\Contracts\EventPusher;
/**
    * Create a new class instance.
    * @param EventPusher $pusher
    * @return void
    */
public function __construct(EventPusher $pusher)
{
         $this->pusher = $pusher;
}
```

### **Contextual Binding**

Sometimes you may have two classes that utilize the same interface, but you wish to inject different implementations into each class. For example, two controllers may depend on different implementations of the

Illuminate\Contracts\Filesystem\Filesystem contract. Laravel provides a simple, fluent interface for defining this behavior:

#### **Tagging**

Occasionally, you may need to resolve all of a certain "category" of binding. For example, perhaps you are building a report aggregator that receives an array of many different Report interface implementations. After registering the Report implementations, you can assign them a tag using the tag method:

```
$this->app->bind('SpeedReport', function () {
    //
});

$this->app->bind('MemoryReport', function () {
    //
});

$this->app->tag(['SpeedReport', 'MemoryReport'], 'reports');
```

Once the services have been tagged, you may easily resolve them all via the tagged method:

```
$this->app->bind('ReportAggregator', function ($app) {
    return new ReportAggregator($app->tagged('reports'));
});
```

## **Extending Bindings**

The extend method allows the modification of resolved services. For example, when a service is resolved, you may run additional code to decorate or configure the service. The extend method accepts a Closure, which should return the modified service, as its only argument:

```
$this->app->extend(Service::class, function ($service) {
    return new DecoratedService($service);
});
```

## Resolving

#### The make Method

You may use the make method to resolve a class instance out of the container. The make method accepts the name of the class or interface you wish to resolve:

```
$api = $this->app->make('HelpSpot\API');
```

If you are in a location of your code that does not have access to the \$app variable, you may use the global resolve helper:

```
api = resolve('HelpSpot\API');
```

If some of your class' dependencies are not resolvable via the container, you may inject them by passing them as an associative array into the makewith method:

```
\alpha = \frac{1}{y} = \frac{1}{y}
```

#### **Automatic Injection**

Alternatively, and importantly, you may "type-hint" the dependency in the constructor of a class that is resolved by the container,

including <u>controllers</u>, <u>event listeners</u>, <u>queue jobs</u>, <u>middleware</u>, and more. In practice, this is how most of your objects should be resolved by the container.

For example, you may type-hint a repository defined by your application in a controller's constructor. The repository will automatically be resolved and injected into the class:

```
namespace App\Http\Controllers;
use App\Users\Repository as UserRepository;
class UserController extends Controller
     * The user repository instance.
*/
    protected $users;
     ^{\star} Create a new controller instance.
       @param UserRepository $users
       @return void
    public function __construct(UserRepository $users)
        $this->users = $users;
    }
     ^{\star} Show the user with the given ID.
       @param int $id
       @return Response
    public function show($id)
    }
}
```

## **Container Events**

The service container fires an event each time it resolves an object. You may listen to this event using the resolving method:

```
$this->app->resolving(function ($object, $app) {
    // Called when container resolves object of any type...
});

$this->app->resolving(HelpSpot\API::class, function ($api, $app) {
    // Called when container resolves objects of type "HelpSpot\API"...
});
```

As you can see, the object being resolved will be passed to the callback, allowing you to set any additional properties on the object before it is given to its consumer.

### **PSR-11**

Laravel's service container implements the <u>PSR-11</u> interface. Therefore, you may type-hint the PSR-11 container interface to obtain an instance of the Laravel container:

```
use Psr\Container\ContainerInterface;
Route::get('/', function (ContainerInterface $container) {
    $service = $container->get('Service');
    //
});
```

An exception is thrown if the given identifier can't be resolved. The exception will be an instance of Psr\Container\NotFoundExceptionInterface if the identifier was never bound. If the identifier was bound but was unable to be resolved, an instance of Psr\Container\Container\Container\ExceptionInterface will be thrown.

#### **Architecture Concepts**

## Service Providers

- Introduction
- Writing Service Providers
  - o The Register Method
  - The Boot Method
- Registering Providers
- Deferred Providers

#### Introduction

Service providers are the central place of all Laravel application bootstrapping. Your own application, as well as all of Laravel's core services are bootstrapped via service providers.

But, what do we mean by "bootstrapped"? In general, we mean **registering** things, including registering service container bindings, event listeners, middleware, and even routes. Service providers are the central place to configure your application.

If you open the <code>config/app.php</code> file included with Laravel, you will see a <code>providers</code> array. These are all of the service provider classes that will be loaded for your application. Of course, many of these are "deferred" providers, meaning they will not be loaded on every request, but only when the services they provide are actually needed.

In this overview you will learn how to write your own service providers and register them with your Laravel application.

## Writing Service Providers

All service providers extend the <code>illuminate\Support\ServiceProvider</code> class. Most service providers contain a register and a boot method. Within the register method, you should **only bind things into the service container**. You should never attempt to register any event listeners, routes, or any other piece of functionality within the register method.

The Artisan CLI can generate a new provider via the make:provider command:

php artisan make:provider RiakServiceProvider

### The Register Method

As mentioned previously, within the register method, you should only bind things into the <u>service container</u>. You should never attempt to register any event listeners, routes, or any other piece of functionality within the register method. Otherwise, you may accidentally use a service that is provided by a service provider which has not loaded yet.

Let's take a look at a basic service provider. Within any of your service provider methods, you always have access to the \$app property which provides access to the service container:

This service provider only defines a register method, and uses that method to define an implementation of Riak\Connection in the service container. If you don't understand how the service container works, check out its documentation.

#### The bindings And singletons Properties

If your service provider registers many simple bindings, you may wish to use the bindings and singletons properties instead of

manually registering each container binding. When the service provider is loaded by the framework, it will automatically check for these properties and register their bindings:

```
namespace App\Providers;
use App\Contracts\ServerProvider;
use App\Contracts\DowntimeNotifier;
use Illuminate\Support\ServiceProvider;
use App\Services\PingdomDowntimeNotifier;
use App\Services\DigitalOceanServerProvider;
class AppServiceProvider extends ServiceProvider
     ^{\star} All of the container bindings that should be registered.
     * @var array
    public $bindings = [
        ServerProvider::class => DigitalOceanServerProvider::class,
     ^{\star} All of the container singletons that should be registered.
       @var array
    public $singletons = [
        DowntimeNotifier::class => PingdomDowntimeNotifier::class,
}
```

#### The Boot Method

So, what if we need to register a <u>view composer</u> within our service provider? This should be done within the boot method. **This method is called after all other service providers have been registered**, meaning you have access to all other services that have been registered by the framework:

#### **Boot Method Dependency Injection**

You may type-hint dependencies for your service provider's boot method. The <u>service container</u> will automatically inject any dependencies you need:

## **Registering Providers**

All service providers are registered in the <code>config/app.php</code> configuration file. This file contains a providers array where you can list the class names of your service providers. By default, a set of Laravel core service providers are listed in this array. These providers bootstrap the core Laravel components, such as the mailer, queue, cache, and others.

To register your provider, add it to the array:

```
'providers' => [
    // Other Service Providers

App\Providers\ComposerServiceProvider::class,
],
```

## **Deferred Providers**

If your provider is **only** registering bindings in the <u>service container</u>, you may choose to defer its registration until one of the registered bindings is actually needed. Deferring the loading of such a provider will improve the performance of your application, since it is not loaded from the filesystem on every request.

Laravel compiles and stores a list of all of the services supplied by deferred service providers, along with the name of its service provider class. Then, only when you attempt to resolve one of these services does Laravel load the service provider.

To defer the loading of a provider, set the defer property to true and define a provides method. The provides method should return the service container bindings registered by the provider:

```
namespace App\Providers;
use Riak\Connection;
use Illuminate\Support\ServiceProvider;
class RiakServiceProvider extends ServiceProvider
     ^{\star} Indicates if loading of the provider is deferred.
     * @var bool
    protected $defer = true;
     * Register the service provider.
      @return void
    public function register()
        $this->app->singleton(Connection::class, function ($app) {
            return new Connection($app['config']['riak']);
    }
     * Get the services provided by the provider.
       @return array
    public function provides()
        return [Connection::class];
}
```

#### **Architecture Concepts**

## **Facades**

- Introduction
- When To Use Facades
  - Facades Vs. Dependency Injection
  - Facades Vs. Helper Functions
- How Facades Work
- Real-Time Facades
- Facade Class Reference

## Introduction

Facades provide a "static" interface to classes that are available in the application's <u>service container</u>. Laravel ships with many facades which provide access to almost all of Laravel's features. Laravel facades serve as "static proxies" to underlying classes in the service container, providing the benefit of a terse, expressive syntax while maintaining more testability and flexibility than traditional static methods.

All of Laravel's facades are defined in the Illuminate\Support\Facades namespace. So, we can easily access a facade like so:

```
use Illuminate\Support\Facades\Cache;
Route::get('/cache', function () {
    return Cache::get('key');
});
```

Throughout the Laravel documentation, many of the examples will use facades to demonstrate various features of the framework.

#### When To Use Facades

Facades have many benefits. They provide a terse, memorable syntax that allows you to use Laravel's features without remembering long class names that must be injected or configured manually. Furthermore, because of their unique usage of PHP's dynamic methods, they are easy to test.

However, some care must be taken when using facades. The primary danger of facades is class scope creep. Since facades are so easy to use and do not require injection, it can be easy to let your classes continue to grow and use many facades in a single class. Using dependency injection, this potential is mitigated by the visual feedback a large constructor gives you that your class is growing too large. So, when using facades, pay special attention to the size of your class so that its scope of responsibility stays narrow.

TIP When building a third-party package that interacts with Laravel, it's better to inject <u>Laravel contracts</u> instead of using facades. Since packages are built outside of Laravel itself, you will not have access to Laravel's facade testing helpers.

## Facades Vs. Dependency Injection

One of the primary benefits of dependency injection is the ability to swap implementations of the injected class. This is useful during testing since you can inject a mock or stub and assert that various methods were called on the stub.

Typically, it would not be possible to mock or stub a truly static class method. However, since facades use dynamic methods to proxy method calls to objects resolved from the service container, we actually can test facades just as we would test an injected class instance. For example, given the following route:

```
use Illuminate\Support\Facades\Cache;
Route::get('/cache', function () {
    return Cache::get('key');
});
```

We can write the following test to verify that the Cache::get method was called with the argument we expected:

```
$this->visit('/cache')
    ->see('value');
}
```

### **Facades Vs. Helper Functions**

In addition to facades, Laravel includes a variety of "helper" functions which can perform common tasks like generating views, firing events, dispatching jobs, or sending HTTP responses. Many of these helper functions perform the same function as a corresponding facade. For example, this facade call and helper call are equivalent:

```
return View::make('profile');
return view('profile');
```

There is absolutely no practical difference between facades and helper functions. When using helper functions, you may still test them exactly as you would the corresponding facade. For example, given the following route:

```
Route::get('/cache', function () {
    return cache('key');
});
```

Under the hood, the cache helper is going to call the get method on the class underlying the cache facade. So, even though we are using the helper function, we can write the following test to verify that the method was called with the argument we expected:

use Illuminate\Support\Facades\Cache;

## **How Facades Work**

In a Laravel application, a facade is a class that provides access to an object from the container. The machinery that makes this work is in the Facade class. Laravel's facades, and any custom facades you create, will extend the base Illuminate\Support\Facades\Facades\Facade class.

The Facade base class makes use of the \_\_callstatic() magic-method to defer calls from your facade to an object resolved from the container. In the example below, a call is made to the Laravel cache system. By glancing at this code, one might assume that the static method get is being called on the Cache class:

Notice that near the top of the file we are "importing" the cache facade. This facade serves as a proxy to accessing the underlying implementation of the Illuminate\Contracts\Cache\Factory interface. Any calls we make using the facade will be passed to the underlying instance of Laravel's cache service.

If we look at that  ${\tt Illuminate\Support\Facades\Cache\ class}$ , you'll see that there is no static method get:

```
class Cache extends Facade
{
    /**
    * Get the registered name of the component.
    * @return string
    */
    protected static function getFacadeAccessor() { return 'cache'; }
}
```

Instead, the cache facade extends the base Facade class and defines the method <code>getFacadeAccessor()</code>. This method's job is to return the name of a service container binding. When a user references any static method on the cache facade, Laravel resolves the cache binding from the <code>service container</code> and runs the requested method (in this case, <code>get)</code> against that object.

## **Real-Time Facades**

Using real-time facades, you may treat any class in your application as if it were a facade. To illustrate how this can be used, let's examine an alternative. For example, let's assume our Podcast model has a publish method. However, in order to publish the podcast, we need to inject a Publisher instance:

Injecting a publisher implementation into the method allows us to easily test the method in isolation since we can mock the injected publisher. However, it requires us to always pass a publisher instance each time we call the publish method. Using real-time facades, we can maintain the same testability while not being required to explicitly pass a Publisher instance. To generate a real-time facade, prefix the namespace of the imported class with Facades:

```
<?php
namespace App;
use Facades\App\Contracts\Publisher;
use Illuminate\Database\Eloquent\Model;
class Podcast extends Model
{
    /**
    * Publish the podcast.
    *
    @return void
    */
    public function publish()
    {
        $this->update(['publishing' => now()]);
        Publisher::publish($this);
    }
}
```

When the real-time facade is used, the publisher implementation will be resolved out of the service container using the portion of the interface or class name that appears after the Facades prefix. When testing, we can use Laravel's built-in facade testing helpers to mock this method call:

```
namespace Tests\Feature;

use App\Podcast;

use Tests\TestCase;

use Facades\App\Contracts\Publisher;

use Illuminate\Foundation\Testing\RefreshDatabase;
```

```
class PodcastTest extends TestCase
{
    use RefreshDatabase;

    /**
     * A test example.
     *
     * @return void
     */
    public function test_podcast_can_be_published()
     {
           *podcast = factory(Podcast::class)->create();
           Publisher::shouldReceive('publish')->once()->with($podcast);
           *podcast->publish();
     }
}
```

## **Facade Class Reference**

Below you will find every facade and its underlying class. This is a useful tool for quickly digging into the API documentation for a given facade root. The <u>service container binding</u> key is also included where applicable.

Facade	Class	Service Container Binding
App	Illuminate\Foundation\Application	арр
Artisan	Illuminate\Contracts\Console\Kernel	artisan
Auth	Illuminate\Auth\AuthManager	auth
Auth (Instance)	Illuminate\Contracts\Auth\Guard	auth.driver
Blade	$\underline{Illuminate \backslash View \backslash Compilers \backslash Blade Compiler}$	blade.compiler
Broadcast	$\underline{Illuminate} \\ Contracts \\ Broadcasting \\ Factory$	
Broadcast (Instance)	$\underline{Illuminate \backslash Contracts \backslash Broadcasting \backslash Broadcaster}$	
Bus	<u>Illuminate\Contracts\Bus\Dispatcher</u>	
Cache	<u>Illuminate\Cache\CacheManager</u>	cache
Cache (Instance)	<u>Illuminate\Cache\Repository</u>	cache.store
Config	<u>Illuminate\Config\Repository</u>	config
Cookie	<u>Illuminate\Cookie\CookieJar</u>	cookie
Crypt	<u>Illuminate\Encryption\Encrypter</u>	encrypter
DB	$\underline{Illuminate \backslash Database \backslash Database Manager}$	db
DB (Instance)	Illuminate\Database\Connection	db.connection
Event	<u>Illuminate\Events\Dispatcher</u>	events
File	<u>Illuminate\Filesystem\Filesystem</u>	files
Gate	$\underline{Illuminate \backslash Contracts \backslash Auth \backslash Access \backslash Gate}$	
Hash	<u>Illuminate\Contracts\Hashing\Hasher</u>	hash
Lang	<u>Illuminate\Translation\Translator</u>	translator
Log	Illuminate\Log\LogManager	log
Mail	<u>Illuminate\Mail\Mailer</u>	mailer
Notification	<u>Illuminate\Notifications\ChannelManager</u>	
Password	$\underline{Illuminate} \land \underline{Nath} \land \underline{PasswordS} \land \underline{PasswordB} roker\underline{Manager}$	auth.password
Password (Instance)	$\underline{Illuminate \backslash Auth \backslash Passwords \backslash PasswordBroker}$	auth.password.broker
Queue	Illuminate\Queue\QueueManager	queue
Queue (Instance)	Illuminate\Contracts\Queue\Queue	queue.connection
Queue (Base Class)	<u>Illuminate\Queue\Queue</u>	
Redirect	<u>Illuminate\Routing\Redirector</u>	redirect
Redis	<u>Illuminate\Redis\RedisManager</u>	redis
Redis (Instance)	Illuminate\Redis\Connections\Connection	redis.connection
Request	<u>Illuminate\Http\Request</u>	request
Response	$\underline{Illuminate \backslash Contracts \backslash Routing \backslash Response Factory}$	
Response (Instance)	<u>Illuminate\Http\Response</u>	
Route	<u>Illuminate\Routing\Router</u>	router
Schema	<u>Illuminate\Database\Schema\Builder</u>	

 $\underline{Illuminate \backslash Session \backslash Session Manager} \qquad \qquad session$ 

 Session (Instance)
 Illuminate\Session\Store
 session.store

 Storage
 Illuminate\Filesystem\FilesystemManager
 filesystem

 Storage (Instance)
 Illuminate\Contracts\Filesystem\Filesystem
 filesystem.disk

Validator (Instance) <u>Illuminate\Validation\Validator</u>

View <u>Illuminate\View\Factory</u> view

View (Instance) <u>Illuminate\View\View</u>

#### **Architecture Concepts**

## **Contracts**

- Introduction
  - o Contracts Vs. Facades
- When To Use Contracts
  - Loose Coupling
  - Simplicity
- How To Use Contracts
- Contract Reference

## Introduction

Laravel's Contracts are a set of interfaces that define the core services provided by the framework. For example, a Illuminate\Contracts\Queue\Queue contract defines the methods needed for queueing jobs, while the Illuminate\Contracts\Mail\Mailer contract defines the methods needed for sending e-mail.

Each contract has a corresponding implementation provided by the framework. For example, Laravel provides a queue implementation with a variety of drivers, and a mailer implementation that is powered by <a href="SwiftMailer">SwiftMailer</a>.

All of the Laravel contracts live in their own GitHub repository. This provides a quick reference point for all available contracts, as well as a single, decoupled package that may be utilized by package developers.

#### **Contracts Vs. Facades**

Laravel's <u>facades</u> and helper functions provide a simple way of utilizing Laravel's services without needing to type-hint and resolve contracts out of the service container. In most cases, each facade has an equivalent contract.

Unlike facades, which do not require you to require them in your class' constructor, contracts allow you to define explicit dependencies for your classes. Some developers prefer to explicitly define their dependencies in this way and therefore prefer to use contracts, while other developers enjoy the convenience of facades.

TIP Most applications will be fine regardless of whether you prefer facades or contracts. However, if you are building a package, you should strongly consider using contracts since they will be easier to test in a package context.

### When To Use Contracts

As discussed elsewhere, much of the decision to use contracts or facades will come down to personal taste and the tastes of your development team. Both contracts and facades can be used to create robust, well-tested Laravel applications. As long as you are keeping your class' responsibilities focused, you will notice very few practical differences between using contracts and facades.

However, you may still have several questions regarding contracts. For example, why use interfaces at all? Isn't using interfaces more complicated? Let's distill the reasons for using interfaces to the following headings: loose coupling and simplicity.

#### **Loose Coupling**

First, let's review some code that is tightly coupled to a cache implementation. Consider the following:

```
*

* @param int $id

* @return Order

*/
public function find($id)
{

if ($this->cache->has($id)) {

//
}
}
```

In this class, the code is tightly coupled to a given cache implementation. It is tightly coupled because we are depending on a concrete Cache class from a package vendor. If the API of that package changes our code must change as well.

Likewise, if we want to replace our underlying cache technology (Memcached) with another technology (Redis), we again will have to modify our repository. Our repository should not have so much knowledge regarding who is providing them data or how they are providing it.

Instead of this approach, we can improve our code by depending on a simple, vendor agnostic interface:

```
<?php
namespace App\Orders;
use Illuminate\Contracts\Cache\Repository as Cache;
class Repository
{
    /**
     * The cache instance.
     */
    protected $cache;

    /**
     * Create a new repository instance.
     *
     * @param Cache $cache
     * @return void
     */
    public function __construct(Cache $cache)
     {
          $this->cache = $cache;
     }
}
```

Now the code is not coupled to any specific vendor, or even Laravel. Since the contracts package contains no implementation and no dependencies, you may easily write an alternative implementation of any given contract, allowing you to replace your cache implementation without modifying any of your cache consuming code.

#### **Simplicity**

When all of Laravel's services are neatly defined within simple interfaces, it is very easy to determine the functionality offered by a given service. The contracts serve as succinct documentation to the framework's features.

In addition, when you depend on simple interfaces, your code is easier to understand and maintain. Rather than tracking down which methods are available to you within a large, complicated class, you can refer to a simple, clean interface.

#### **How To Use Contracts**

So, how do you get an implementation of a contract? It's actually quite simple.

Many types of classes in Laravel are resolved through the <u>service container</u>, including controllers, event listeners, middleware, queued jobs, and even route Closures. So, to get an implementation of a contract, you can just "type-hint" the interface in the constructor of the class being resolved.

For example, take a look at this event listener:

```
<?php
namespace App\Listeners;
use App\User;
use App\Events\OrderWasPlaced;
use Illuminate\Contracts\Redis\Database;
class CacheOrderInformation
{
    /**
    * The Redis database implementation.</pre>
```

```
*/
protected $redis;

/**
    * Create a new event handler instance.
    *
    * @param Database $redis
    * @return void
    */
public function __construct(Database $redis)
{
        $this->redis = $redis;
}

/**
    * Handle the event.
    *
    * @param OrderWasPlaced $event
    * @return void
    */
public function handle(OrderWasPlaced $event)
{
        //
}
```

When the event listener is resolved, the service container will read the type-hints on the constructor of the class, and inject the appropriate value. To learn more about registering things in the service container, check out <u>its documentation</u>.

## **Contract Reference**

This table provides a quick reference to all of the Laravel contracts and their equivalent facades:

Contract	References Facade
Illuminate\Contracts\Auth\Access\Authorizable	
Illuminate\Contracts\Auth\Access\Gate	Gate
Illuminate\Contracts\Auth\Authenticatable	
Illuminate\Contracts\Auth\CanResetPassword	
Illuminate\Contracts\Auth\Factory	Auth
Illuminate\Contracts\Auth\Guard	Auth::guard()
Illuminate\Contracts\Auth\PasswordBroker	Password::broker()
$\underline{Illuminate}\backslash \underline{Contracts}\backslash \underline{Auth}\backslash \underline{PasswordBrokerFactory}$	Password
Illuminate\Contracts\Auth\StatefulGuard	
Illuminate\Contracts\Auth\SupportsBasicAuth	
<u>Illuminate\Contracts\Auth\UserProvider</u>	
Illuminate\Contracts\Bus\Dispatcher	Bus
Illuminate\Contracts\Bus\QueueingDispatcher	Bus::dispatchToQueue()
Illuminate\Contracts\Broadcasting\Factory	Broadcast
Illuminate\Contracts\Broadcasting\Broadcaster	Broadcast::connection()
Illuminate\Contracts\Broadcasting\ShouldBroadcast	
$\underline{Illuminate} \\ Contracts \\ Broadcasting \\ Should \\ Broadcast \\ Now$	
Illuminate\Contracts\Cache\Factory	Cache
Illuminate\Contracts\Cache\Lock	
Illuminate\Contracts\Cache\LockProvider	
Illuminate\Contracts\Cache\Repository	Cache::driver()
Illuminate\Contracts\Cache\Store	
Illuminate\Contracts\Config\Repository	Config
Illuminate\Contracts\Console\Application	
Illuminate\Contracts\Console\Kernel	Artisan
Illuminate\Contracts\Container\Container	Арр
Illuminate\Contracts\Cookie\Factory	Cookie
Illuminate\Contracts\Cookie\QueueingFactory	Cookie::queue()
$\underline{Illuminate} \\ Contracts \\ Database \\ Model Identifier$	
$\underline{Illuminate} \\ Contracts \\ \underline{Debug} \\ \underline{ExceptionHandler}$	
Illuminate\Contracts\Encryption\Encrypter	Crypt

<u>Illuminate\Contracts\Events\Dispatcher</u> Event

Illuminate\Contracts\Filesystem\Cloud Storage::cloud()

<u>Illuminate\Contracts\Filesystem\Factory</u> Storage

<u>Illuminate\Contracts\Filesystem\Filesystem</u> Storage::disk()

 Illuminate\Contracts\Foundation\Application
 App

 Illuminate\Contracts\Hashing\Hasher
 Hash

Illuminate\Contracts\Http\Kernel

<u>Illuminate\Contracts\Mail\MailQueue</u>

Mail::queue()

Illuminate\Contracts\Mail\Mailable

Illuminate\Contracts\Mail\Mailer Mail

 Illuminate\Contracts\Notifications\Dispatcher
 Notification

 Illuminate\Contracts\Notifications\Factory
 Notification

<u>Illuminate\Contracts\Pagination\LengthAwarePaginator</u>

Illuminate\Contracts\Pagination\Paginator

Illuminate\Contracts\Pipeline\Hub
Illuminate\Contracts\Pipeline\Pipeline
Illuminate\Contracts\Queue\EntityResolver

Illuminate\Contracts\Queue\Factory Queue

Illuminate\Contracts\Queue\Job

<u>Illuminate\Contracts\Queue\Monitor</u> Queue

<u>Illuminate\Contracts\Queue\Queue</u> Queue::connection()

Illuminate\Contracts\Queue\QueueableCollection
Illuminate\Contracts\Queue\QueueableEntity

Illuminate\Contracts\Queue\ShouldQueue

 Illuminate\Contracts\Redis\Factory
 Redis

 Illuminate\Contracts\Routing\BindingRegistrar
 Route

 Illuminate\Contracts\Routing\Registrar
 Route

 Illuminate\Contracts\Routing\ResponseFactory
 Response

 Illuminate\Contracts\Routing\UrlGenerator
 URL

 $\underline{Illuminate \backslash Contracts \backslash Routing \backslash UrlRoutable}$ 

<u>Illuminate\Contracts\Session\Session</u> Session::driver()

Illuminate\Contracts\Support\Arrayable
Illuminate\Contracts\Support\Htmlable
Illuminate\Contracts\Support\Jsonable
Illuminate\Contracts\Support\MessageBag
Illuminate\Contracts\Support\MessageProvider
Illuminate\Contracts\Support\Renderable
Illuminate\Contracts\Support\Responsable
Illuminate\Contracts\Translation\Loader

 Illuminate\Contracts\Translation\Translator
 Lang

 Illuminate\Contracts\Validation\Factory
 Validator

 $\underline{Illuminate \backslash Contracts \backslash Validation \backslash ImplicitRule}$ 

Illuminate\Contracts\Validation\Rule

 $\underline{Illuminate \backslash Contracts \backslash Validation \backslash Validates When Resolved}$ 

<u>Illuminate\Contracts\Validation\Validator</u> Validator::make()

<u>Illuminate\Contracts\View\Engine</u>

 Illuminate\Contracts\View\Factory
 View

 Illuminate\Contracts\View\View
 View::make()

#### The Basics

# **Routing**

- Basic Routing
  - Redirect Routes
  - o View Routes
- Route Parameters
  - o Required Parameters
  - o Optional Parameters
  - Regular Expression Constraints
- Named Routes
- Route Groups
  - Middleware
  - Namespaces
  - o Sub-Domain Routing
  - Route Prefixes
  - Route Name Prefixes
- Route Model Binding
  - o Implicit Binding
  - Explicit Binding
- Fallback Routes
- Rate Limiting
- Form Method Spoofing
- Accessing The Current Route

## **Basic Routing**

The most basic Laravel routes accept a URI and a closure, providing a very simple and expressive method of defining routes:

```
Route::get('foo', function () {
    return 'Hello World';
});
```

#### The Default Route Files

All Laravel routes are defined in your route files, which are located in the routes directory. These files are automatically loaded by the framework. The routes/web.php file defines routes that are for your web interface. These routes are assigned the web middleware group, which provides features like session state and CSRF protection. The routes in routes/api.php are stateless and are assigned the api middleware group.

For most applications, you will begin by defining routes in your routes/web.php file. The routes defined in routes/web.php may be accessed by entering the defined route's URL in your browser. For example, you may access the following route by navigating to http://your-app.test/user in your browser:

```
Route::get('/user', 'UserController@index');
```

Routes defined in the routes/api.php file are nested within a route group by the RouteServiceProvider. Within this group, the /api URI prefix is automatically applied so you do not need to manually apply it to every route in the file. You may modify the prefix and other route group options by modifying your RouteServiceProvider class.

### **Available Router Methods**

The router allows you to register routes that respond to any HTTP verb:

```
Route::get($uri, $callback);
Route::post($uri, $callback);
Route::put($uri, $callback);
Route::patch($uri, $callback);
Route::delete($uri, $callback);
Route::options($uri, $callback);
```

Sometimes you may need to register a route that responds to multiple HTTP verbs. You may do so using the match method. Or, you may even register a route that responds to all HTTP verbs using the any method:

});

#### **CSRF Protection**

Any HTML forms pointing to POST, PUT, or DELETE routes that are defined in the web routes file should include a CSRF token field. Otherwise, the request will be rejected. You can read more about CSRF protection in the CSRF documentation:

```
<form method="POST" action="/profile">
    @csrf
    ...
</form>
```

#### **Redirect Routes**

If you are defining a route that redirects to another URI, you may use the Route::redirect method. This method provides a convenient shortcut so that you do not have to define a full route or controller for performing a simple redirect:

```
Route::redirect('/here', '/there');
```

By default, Route::redirect returns a 302 status code. You may customize the status code using the optional third parameter:

```
Route::redirect('/here', '/there', 301);
```

You may use the Route::permanentRedirect method to return a 301 status code:

```
Route::permanentRedirect('/here', '/there');
```

#### **View Routes**

If your route only needs to return a view, you may use the Route::view method. Like the redirect method, this method provides a simple shortcut so that you do not have to define a full route or controller. The view method accepts a URI as its first argument and a view name as its second argument. In addition, you may provide an array of data to pass to the view as an optional third argument:

```
Route::view('/welcome', 'welcome');
Route::view('/welcome', 'welcome', ['name' => 'Taylor']);
```

#### **Route Parameters**

#### **Required Parameters**

Of course, sometimes you will need to capture segments of the URI within your route. For example, you may need to capture a user's ID from the URL. You may do so by defining route parameters:

```
Route::get('user/{id}', function ($id) {
    return 'User '.$id;
}):
```

You may define as many route parameters as required by your route:

Route parameters are always encased within {} braces and should consist of alphabetic characters, and may not contain a - character. Instead of using the - character, use an underscore (\_). Route parameters are injected into route callbacks / controllers based on their order - the names of the callback / controller arguments do not matter.

### **Optional Parameters**

Occasionally you may need to specify a route parameter, but make the presence of that route parameter optional. You may do so by placing a ? mark after the parameter name. Make sure to give the route's corresponding variable a default value:

```
Route::get('user/{name?}', function ($name = null) {
    return $name;
});
Route::get('user/{name?}', function ($name = 'John') {
    return $name;
});
```

#### **Regular Expression Constraints**

You may constrain the format of your route parameters using the where method on a route instance. The where method accepts the

name of the parameter and a regular expression defining how the parameter should be constrained:

#### **Global Constraints**

If you would like a route parameter to always be constrained by a given regular expression, you may use the pattern method. You should define these patterns in the boot method of your RouteServiceProvider:

```
/**
  * Define your route model bindings, pattern filters, etc.
  * @return void
  */
public function boot()
{
    Route::pattern('id', '[0-9]+');
    parent::boot();
}
```

Once the pattern has been defined, it is automatically applied to all routes using that parameter name:

```
Route::get('user/{id}', function ($id) {
    // Only executed if {id} is numeric...
}):
```

#### **Encoded Forward Slashes**

The Laravel routing component allows all characters except /. You must explicitly allow / to be part of your placeholder using a where condition regular expression:

```
Route::get('search/{search}', function ($search) {
    return $search;
})->where('search', '.*');
```

NOTE Encoded forward slashes are only supported within the last route segment.

#### **Named Routes**

Named routes allow the convenient generation of URLs or redirects for specific routes. You may specify a name for a route by chaining the name method onto the route definition:

```
Route::get('user/profile', function () {
    //
})->name('profile');
```

You may also specify route names for controller actions:

```
Route::get('user/profile', 'UserProfileController@show')->name('profile');
```

#### **Generating URLs To Named Routes**

Once you have assigned a name to a given route, you may use the route's name when generating URLs or redirects via the global route function:

```
// Generating URLs...
$url = route('profile');
// Generating Redirects...
return redirect()->route('profile');
```

If the named route defines parameters, you may pass the parameters as the second argument to the route function. The given parameters will automatically be inserted into the URL in their correct positions:

```
Route::get('user/{id}/profile', function ($id) {
    //
})->name('profile');
```

```
$url = route('profile', ['id' => 1]);
```

#### **Inspecting The Current Route**

If you would like to determine if the current request was routed to a given named route, you may use the named method on a Route instance. For example, you may check the current route name from a route middleware:

## **Route Groups**

Route groups allow you to share route attributes, such as middleware or namespaces, across a large number of routes without needing to define those attributes on each individual route. Shared attributes are specified in an array format as the first parameter to the Route::group method.

Nested groups attempt to intelligently "merge" attributes with their parent group. Middleware and where conditions are merged while names, namespaces, and prefixes are appended. Namespace delimiters and slashes in URI prefixes are automatically added where appropriate.

#### Middleware

To assign middleware to all routes within a group, you may use the middleware method before defining the group. Middleware are executed in the order they are listed in the array:

### Namespaces

Another common use-case for route groups is assigning the same PHP namespace to a group of controllers using the namespace method:

```
Route::namespace('Admin')->group(function () {
    // Controllers Within The "App\Http\Controllers\Admin" Namespace
}):
```

Remember, by default, the RouteServiceProvider includes your route files within a namespace group, allowing you to register controller routes without specifying the full App\http\Controllers namespace prefix. So, you only need to specify the portion of the namespace that comes after the base App\http\Controllers namespace.

#### **Sub-Domain Routing**

Route groups may also be used to handle sub-domain routing. Sub-domains may be assigned route parameters just like route URIs, allowing you to capture a portion of the sub-domain for usage in your route or controller. The sub-domain may be specified by calling the domain method before defining the group:

#### **Route Prefixes**

The prefix method may be used to prefix each route in the group with a given URI. For example, you may want to prefix all route URIs within the group with admin:

#### **Route Name Prefixes**

The name method may be used to prefix each route name in the group with a given string. For example, you may want to prefix all of the grouped route's names with admin. The given string is prefixed to the route name exactly as it is specified, so we will be sure to provide the trailing . character in the prefix:

## **Route Model Binding**

When injecting a model ID to a route or controller action, you will often query to retrieve the model that corresponds to that ID. Laravel route model binding provides a convenient way to automatically inject the model instances directly into your routes. For example, instead of injecting a user's ID, you can inject the entire user model instance that matches the given ID.

#### **Implicit Binding**

Laravel automatically resolves Eloquent models defined in routes or controller actions whose type-hinted variable names match a route segment name. For example:

```
Route::get('api/users/{user}', function (App\User $user) {
    return $user->email;
});
```

Since the \$user variable is type-hinted as the App\User Eloquent model and the variable name matches the {user} URI segment, Laravel will automatically inject the model instance that has an ID matching the corresponding value from the request URI. If a matching model instance is not found in the database, a 404 HTTP response will automatically be generated.

### **Customizing The Key Name**

If you would like model binding to use a database column other than id when retrieving a given model class, you may override the getRouteKeyName method on the Eloquent model:

```
/**
    * Get the route key for the model.
    * @return string
    */
public function getRouteKeyName()
{
       return 'slug';
}
```

#### **Explicit Binding**

To register an explicit binding, use the router's model method to specify the class for a given parameter. You should define your explicit model bindings in the boot method of the RouteServiceProvider class:

Since we have bound all {user} parameters to the App\user model, a user instance will be injected into the route. So, for example, a request to profile/1 will inject the user instance from the database which has an ID of 1.

If a matching model instance is not found in the database, a 404 HTTP response will be automatically generated.

#### **Customizing The Resolution Logic**

If you wish to use your own resolution logic, you may use the Route::bind method. The Closure you pass to the bind method will receive the value of the URI segment and should return the instance of the class that should be injected into the route:

```
public function boot()
{
   parent::boot();

   Route::bind('user', function ($value) {
       return App\User::where('name', $value)->first() ?? abort(404);
   });
}
```

## **Fallback Routes**

Using the Route::fallback method, you may define a route that will be executed when no other route matches the incoming request. Typically, unhandled requests will automatically render a "404" page via your application's exception handler. However, since you may define the fallback route within your routes/web.php file, all middleware in the web middleware group will apply to the route. Of course, you are free to add additional middleware to this route as needed:

```
Route::fallback(function () {
    //
});
```

NOTE The fallback route should always be the last route registered by your application.

## **Rate Limiting**

Laravel includes a <u>middleware</u> to rate limit access to routes within your application. To get started, assign the throttle middleware to a route or a group of routes. The throttle middleware accepts two parameters that determine the maximum number of requests that can be made in a given number of minutes. For example, let's specify that an authenticated user may access the following group of routes 60 times per minute:

#### **Dynamic Rate Limiting**

You may specify a dynamic request maximum based on an attribute of the authenticated user model. For example, if your user model contains a rate\_limit attribute, you may pass the name of the attribute to the throttle middleware so that it is used to calculate the maximum request count:

## Form Method Spoofing

HTML forms do not support PUT, PATCH Or DELETE actions. So, when defining PUT, PATCH Or DELETE routes that are called from an HTML form, you will need to add a hidden \_method field to the form. The value sent with the \_method field will be used as the HTTP request method:

```
<form action="/foo/bar" method="POST">
    @method('PUT')
    @csrf
</form>
```

## **Accessing The Current Route**

You may use the current, currentRouteName, and currentRouteAction methods on the Route facade to access information about the route handling the incoming request:

```
$route = Route::current();
$name = Route::currentRouteName();
$action = Route::currentRouteAction();
```

Refer to the API documentation for both the <u>underlying class of the Route facade</u> and <u>Route instance</u> to review all accessible methods.

The Basics

## **Middleware**

- Introduction
- Defining Middleware
- · Registering Middleware
  - o Global Middleware
  - o Assigning Middleware To Routes
  - o Middleware Groups
  - Sorting Middleware
  - Middleware Parameters
- Terminable Middleware

### Introduction

Middleware provide a convenient mechanism for filtering HTTP requests entering your application. For example, Laravel includes a middleware that verifies the user of your application is authenticated. If the user is not authenticated, the middleware will redirect the user to the login screen. However, if the user is authenticated, the middleware will allow the request to proceed further into the application.

Of course, additional middleware can be written to perform a variety of tasks besides authentication. A CORS middleware might be responsible for adding the proper headers to all responses leaving your application. A logging middleware might log all incoming requests to your application.

There are several middleware included in the Laravel framework, including middleware for authentication and CSRF protection. All of these middleware are located in the app/Http/Middleware directory.

## **Defining Middleware**

To create a new middleware, use the make:middleware Artisan command:

```
php artisan make:middleware CheckAge
```

This command will place a new CheckAge class within your app/Http/Middleware directory. In this middleware, we will only allow access to the route if the supplied age is greater than 200. Otherwise, we will redirect the users back to the home URI:

```
ramespace App\Http\Middleware;

use Closure;

class CheckAge
{
    /**
    * Handle an incoming request.
    * @param \Illuminate\Http\Request $request
    * @param \Closure $next
    * @return mixed
    */
    public function handle($request, Closure $next)
    {
        if ($request->age <= 200) {
            return redirect('home');
        }
        return $next($request);
    }
}
</pre>
```

As you can see, if the given age is less than or equal to 200, the middleware will return an HTTP redirect to the client; otherwise, the request will be passed further into the application. To pass the request deeper into the application (allowing the middleware to "pass"), call the \$next callback with the \$request.

It's best to envision middleware as a series of "layers" HTTP requests must pass through before they hit your application. Each layer can examine the request and even reject it entirely.

TIP All middleware are resolved via the <u>service container</u>, so you may type-hint any dependencies you need within a middleware's constructor.

### **Before & After Middleware**

Whether a middleware runs before or after a request depends on the middleware itself. For example, the following middleware would perform some task **before** the request is handled by the application:

However, this middleware would perform its task **after** the request is handled by the application:

### **Registering Middleware**

#### **Global Middleware**

If you want a middleware to run during every HTTP request to your application, list the middleware class in the <code>middleware</code> property of your app/Http/Kernel.php class.

## **Assigning Middleware To Routes**

If you would like to assign middleware to specific routes, you should first assign the middleware a key in your app/Http/Kernel.php file. By default, the \$routeMiddleware property of this class contains entries for the middleware included with Laravel. To add your own, append it to this list and assign it a key of your choosing:

```
// Within App\Http\Kernel Class...
protected $routeMiddleware = [
    'auth' => \App\Http\Middleware\Authenticate::class,
    'auth.basic' => \Illuminate\Auth\Middleware\AuthenticateWithBasicAuth::class,
    'bindings' => \Illuminate\Routing\Middleware\SubstituteBindings::class,
    'cache.headers' => \Illuminate\Http\Middleware\SetCacheHeaders::class,
    'can' => \Illuminate\Auth\Middleware\Authorize::class,
    'guest' => \App\Http\Middleware\RedirectIfAuthenticated::class,
    'signed' => \Illuminate\Routing\Middleware\ThrottleRequests::class,
    'throttle' => \Illuminate\Routing\Middleware\ThrottleRequests::class,
    'verified' => \Illuminate\Auth\Middleware\EnsureEmailIsVerified::class,
];
```

Once the middleware has been defined in the HTTP kernel, you may use the middleware method to assign middleware to a route:

```
Route::get('admin/profile', function () {
    //
})->middleware('auth');
```

You may also assign multiple middleware to the route:

```
Route::get('/', function () {
    //
})->middleware('first', 'second');
```

When assigning middleware, you may also pass the fully qualified class name:

```
use App\Http\Middleware\CheckAge;
```

```
Route::get('admin/profile', function () {
    //
})->middleware(CheckAge::class);
```

### **Middleware Groups**

Sometimes you may want to group several middleware under a single key to make them easier to assign to routes. You may do this using the <code>smiddlewareGroups</code> property of your HTTP kernel.

Out of the box, Laravel comes with web and api middleware groups that contain common middleware you may want to apply to your web UI and API routes:

```
^{\star} The application's route middleware groups. ^{\star}
 * @var array
protected $middlewareGroups = [
    'web' => [
        \App\Http\Middleware\EncryptCookies::class,
        \Illuminate\Cookie\Middleware\AddQueuedCookiesToResponse::class,
        \Illuminate\Session\Middleware\StartSession::class,
        \Illuminate\View\Middleware\ShareErrorsFromSession::class,
        \App\Http\Middleware\VerifyCsrfToken::class,
        \Illuminate\Routing\Middleware\SubstituteBindings::class,
    1,
    'api' => [
        'throttle:60,1',
        'auth:api',
    ],
1;
```

Middleware groups may be assigned to routes and controller actions using the same syntax as individual middleware. Again, middleware groups make it more convenient to assign many middleware to a route at once:

TIP Out of the box, the web middleware group is automatically applied to your routes/web.php file by the RouteServiceProvider.

#### **Sorting Middleware**

Rarely, you may need your middleware to execute in a specific order but not have control over their order when they are assigned to the route. In this case, you may specify your middleware priority using the <code>\$middlewarePriority</code> property of your <code>app/Http/Kernel.php</code> file:

```
/**
 * The priority-sorted list of middleware.
 *
 * This forces non-global middleware to always be in the given order.
 *
 * @var array
 */
protected $middlewarePriority = [
    \Illuminate\Session\Middleware\StartSession::class,
    \Illuminate\View\Middleware\ShareErrorsFromSession::class,
    \App\Http\Middleware\Authenticate::class,
    \Illuminate\Session\Middleware\AuthenticateSession::class,
    \Illuminate\Routing\Middleware\SubstituteBindings::class,
    \Illuminate\Auth\Middleware\Authorize::class,
}
```

## **Middleware Parameters**

Middleware can also receive additional parameters. For example, if your application needs to verify that the authenticated user has a given "role" before performing a given action, you could create a CheckRole middleware that receives a role name as an additional argument.

Additional middleware parameters will be passed to the middleware after the \$next argument:

```
<?php
```

```
namespace App\Http\Middleware;
use Closure;
class CheckRole
{
    /**
    * Handle the incoming request.
    * @param \Illuminate\Http\Request $request
    * @param \Closure $next
    * @param string $role
    * @return mixed
    */
    public function handle($request, Closure $next, $role)
    {
        if (! $request->user()->hasRole($role)) {
            // Redirect...
        }
        return $next($request);
    }
}
```

Middleware parameters may be specified when defining the route by separating the middleware name and parameters with a :. Multiple parameters should be delimited by commas:

```
Route::put('post/{id}', function ($id) {
    //
})->middleware('role:editor');
```

#### **Terminable Middleware**

Sometimes a middleware may need to do some work after the HTTP response has been prepared. For example, the "session" middleware included with Laravel writes the session data to storage after the response has been fully prepared. If you define a terminate method on your middleware, it will automatically be called after the response is ready to be sent to the browser.

```
<?php
namespace Illuminate\Session\Middleware;
use Closure;
class StartSession
{
    public function handle($request, Closure $next)
    {
        return $next($request);
    }
    public function terminate($request, $response)
    {
        // Store the session data...
    }
}</pre>
```

The terminate method should receive both the request and the response. Once you have defined a terminable middleware, you should add it to the list of route or global middleware in the app/Http/Kernel.php file.

When calling the terminate method on your middleware, Laravel will resolve a fresh instance of the middleware from the <u>service container</u>. If you would like to use the same middleware instance when the handle and terminate methods are called, register the middleware with the container using the container's singleton method.

# **CSRF** Protection

- Introduction
- Excluding URIs
- X-CSRF-Token
- X-XSRF-Token

# Introduction

Laravel makes it easy to protect your application from <u>cross-site request forgery</u> (CSRF) attacks. Cross-site request forgeries are a type of malicious exploit whereby unauthorized commands are performed on behalf of an authenticated user.

Laravel automatically generates a CSRF "token" for each active user session managed by the application. This token is used to verify that the authenticated user is the one actually making the requests to the application.

Anytime you define a HTML form in your application, you should include a hidden CSRF token field in the form so that the CSRF protection middleware can validate the request. You may use the @csrf Blade directive to generate the token field:

```
<form method="POST" action="/profile">
    @csrf
    ...
</form>
```

The VerifyCsrfToken middleware, which is included in the web middleware group, will automatically verify that the token in the request input matches the token stored in the session.

#### **CSRF Tokens & JavaScript**

When building JavaScript driven applications, it is convenient to have your JavaScript HTTP library automatically attach the CSRF token to every outgoing request. By default, the resources/js/bootstrap.js file registers the value of the csrf-token meta tag with the Axios HTTP library. If you are not using this library, you will need to manually configure this behavior for your application.

# **Excluding URIs From CSRF Protection**

Sometimes you may wish to exclude a set of URIs from CSRF protection. For example, if you are using <u>Stripe</u> to process payments and are utilizing their webhook system, you will need to exclude your Stripe webhook handler route from CSRF protection since Stripe will not know what CSRF token to send to your routes.

Typically, you should place these kinds of routes outside of the web middleware group that the RouteServiceProvider applies to all routes in the routes/web.php file. However, you may also exclude the routes by adding their URIs to the \$except property of the VerifyCsrfToken middleware:

TIP The CSRF middleware is automatically disabled when running tests.

# X-CSRF-TOKEN

In addition to checking for the CSRF token as a POST parameter, the VerifycsrfToken middleware will also check for the X-CSRF-TOKEN request header. You could, for example, store the token in a HTML meta tag:

```
<meta name="csrf-token" content="{{ csrf_token() }}">
```

Then, once you have created the meta tag, you can instruct a library like jQuery to automatically add the token to all request headers. This provides simple, convenient CSRF protection for your AJAX based applications:

```
$.ajaxSetup({
   headers: {
        'X-CSRF-TOKEN': $('meta[name="csrf-token"]').attr('content')
   }
});
```

TIP By default, the resources/js/bootstrap.js file registers the value of the csrf-token meta tag with the Axios HTTP library. If you are not using this library, you will need to manually configure this behavior for your application.

# X-XSRF-TOKEN

Laravel stores the current CSRF token in a XSRF-TOKEN cookie that is included with each response generated by the framework. You can use the cookie value to set the X-XSRF-TOKEN request header.

This cookie is primarily sent as a convenience since some JavaScript frameworks and libraries, like Angular and Axios, automatically place its value in the X-XSRF-TOKEN header.

# **Controllers**

- Introduction
- Basic Controllers
  - o Defining Controllers
  - Controllers & Namespaces
  - Single Action Controllers
- Controller Middleware
- Resource Controllers
  - Partial Resource Routes
  - o Naming Resource Routes
  - Naming Resource Route Parameters
  - Localizing Resource URIs
  - Supplementing Resource Controllers
- Dependency Injection & Controllers
- Route Caching

### Introduction

Instead of defining all of your request handling logic as Closures in route files, you may wish to organize this behavior using Controller classes. Controllers can group related request handling logic into a single class. Controllers are stored in the app/Http/Controllers directory.

### **Basic Controllers**

# **Defining Controllers**

Below is an example of a basic controller class. Note that the controller extends the base controller class included with Laravel. The base class provides a few convenience methods such as the middleware method, which may be used to attach middleware to controller actions:

You can define a route to this controller action like so:

```
Route::get('user/{id}', 'UserController@show');
```

Now, when a request matches the specified route URI, the show method on the UserController class will be executed. Of course, the route parameters will also be passed to the method.

TIP Controllers are not **required** to extend a base class. However, you will not have access to convenience features such as the middleware, validate, and dispatch methods.

# **Controllers & Namespaces**

It is very important to note that we did not need to specify the full controller namespace when defining the controller route. Since the RouteServiceProvider loads your route files within a route group that contains the namespace, we only specified the portion of the class name that comes after the App\http\controllers portion of the namespace.

If you choose to nest your controllers deeper into the App\Http\Controllers directory, use the specific class name relative to the App\Http\Controllers root namespace. So, if your full controller class is App\Http\Controllers\Photos\AdminController, you

should register routes to the controller like so:

```
Route::get('foo', 'Photos\AdminController@method');
```

# **Single Action Controllers**

If you would like to define a controller that only handles a single action, you may place a single \_\_invoke method on the controller:

```
<?php

namespace App\Http\Controllers;

use App\User;
use App\Http\Controllers\Controller;

class ShowProfile extends Controller
{
     /**
     * Show the profile for the given user.
     *
     * @param int $id
     * @return View
     */
    public function __invoke($id)
     {
          return view('user.profile', ['user' => User::findOrFail($id)]);
     }
}
```

When registering routes for single action controllers, you do not need to specify a method:

```
Route::get('user/{id}', 'ShowProfile');
```

You may generate an invokable controller by using the --invokable option of the make:controller Artisan command:

```
php artisan make:controller ShowProfile --invokable
```

### **Controller Middleware**

Middleware may be assigned to the controller's routes in your route files:

```
Route::get('profile', 'UserController@show')->middleware('auth');
```

However, it is more convenient to specify middleware within your controller's constructor. Using the middleware method from your controller's constructor, you may easily assign middleware to the controller's action. You may even restrict the middleware to only certain methods on the controller class:

```
class UserController extends Controller
{
    /**
    * Instantiate a new controller instance.
    *
    @return void
    */
    public function __construct()
    {
        $this->middleware('auth');
        $this->middleware('log')->only('index');
        $this->middleware('subscribed')->except('store');
    }
}
```

Controllers also allow you to register middleware using a Closure. This provides a convenient way to define a middleware for a single controller without defining an entire middleware class:

```
$this->middleware(function ($request, $next) {
    // ...
    return $next($request);
});
```

TIP You may assign middleware to a subset of controller actions; however, it may indicate your controller is growing too large. Instead, consider breaking your controller into multiple, smaller controllers.

# **Resource Controllers**

Laravel resource routing assigns the typical "CRUD" routes to a controller with a single line of code. For example, you may wish to create a controller that handles all HTTP requests for "photos" stored by your application. Using the make:controller Artisan command, we can quickly create such a controller:

```
php artisan make:controller PhotoController --resource
```

This command will generate a controller at app/Http/Controllers/PhotoController.php. The controller will contain a method for each of the available resource operations.

Next, you may register a resourceful route to the controller:

```
Route::resource('photos', 'PhotoController');
```

This single route declaration creates multiple routes to handle a variety of actions on the resource. The generated controller will already have methods stubbed for each of these actions, including notes informing you of the HTTP verbs and URIs they handle.

You may register many resource controllers at once by passing an array to the resources method:

```
Route::resources([
   'photos' => 'PhotoController',
   'posts' => 'PostController'
]);
```

#### **Actions Handled By Resource Controller**

Verb	URI	Action	Route Name
GET	/photos	index	photos.index
GET	/photos/create	create	photos.create
POST	/photos	store	photos.store
GET	/photos/{photo}	show	photos.show
GET	/photos/{photo}/edit	edit	photos.edit
PUT/PATCH	/photos/{photo}	update	photos.update
DELETE	/photos/{photo}	destroy	photos.destroy

# **Specifying The Resource Model**

If you are using route model binding and would like the resource controller's methods to type-hint a model instance, you may use the --model option when generating the controller:

```
php artisan make:controller PhotoController --resource --model=Photo
```

### **Spoofing Form Methods**

Since HTML forms can't make PUT, PATCH, or DELETE requests, you will need to add a hidden \_method field to spoof these HTTP verbs. The @method Blade directive can create this field for you:

```
<form action="/foo/bar" method="POST">
    @method('PUT')
</form>
```

### **Partial Resource Routes**

When declaring a resource route, you may specify a subset of actions the controller should handle instead of the full set of default actions:

```
Route::resource('photos', 'PhotoController')->only([
    'index', 'show'
]);
Route::resource('photos', 'PhotoController')->except([
    'create', 'store', 'update', 'destroy'
]);
```

#### **API Resource Routes**

When declaring resource routes that will be consumed by APIs, you will commonly want to exclude routes that present HTML templates such as create and edit. For convenience, you may use the apiResource method to automatically exclude these two routes:

```
Route::apiResource('photos', 'PhotoController');
```

You may register many API resource controllers at once by passing an array to the apiResources method:

```
Route::apiResources([
    'photos' => 'PhotoController',
    'posts' => 'PostController'
]);
```

To quickly generate an API resource controller that does not include the create or edit methods, use the --api switch when executing the make:controller command:

```
php artisan make:controller API/PhotoController --api
```

# **Naming Resource Routes**

By default, all resource controller actions have a route name; however, you can override these names by passing a names array with your options:

```
Route::resource('photos', 'PhotoController')->names([
    'create' => 'photos.build'
1):
```

### **Naming Resource Route Parameters**

By default, Route::resource will create the route parameters for your resource routes based on the "singularized" version of the resource name. You can easily override this on a per resource basis by using the parameters method. The array passed into the parameters method should be an associative array of resource names and parameter names:

```
Route::resource('users', 'AdminUserController')->parameters([
    'users' => 'admin_user'
]);
```

The example above generates the following URIs for the resource's show route:

```
/users/{admin_user}
```

#### **Localizing Resource URIs**

By default, Route::resource will create resource URIs using English verbs. If you need to localize the create and edit action verbs, you may use the Route::resourceVerbs method. This may be done in the boot method of your AppServiceProvider:

use Illuminate\Support\Facades\Route;

```
/**
  * Bootstrap any application services.
  *
  * @return void
  */
public function boot()
{
    Route::resourceVerbs([
         'create' => 'crear',
         'edit' => 'editar',
    ]);
}
```

Once the verbs have been customized, a resource route registration such as Route::resource('fotos', 'PhotoController') will produce the following URIs:

```
/fotos/crear
/fotos/{foto}/editar
```

# **Supplementing Resource Controllers**

If you need to add additional routes to a resource controller beyond the default set of resource routes, you should define those routes before your call to Route::resource; otherwise, the routes defined by the resource method may unintentionally take precedence over your supplemental routes:

```
Route::get('photos/popular', 'PhotoController@method');
Route::resource('photos', 'PhotoController');
```

TIP Remember to keep your controllers focused. If you find yourself routinely needing methods outside of the typical set of resource actions, consider splitting your controller into two, smaller controllers.

# **Dependency Injection & Controllers**

#### **Constructor Injection**

The Laravel <u>service container</u> is used to resolve all Laravel controllers. As a result, you are able to type-hint any dependencies your controller may need in its constructor. The declared dependencies will automatically be resolved and injected into the controller instance:

```
<?php

namespace App\Http\Controllers;

use App\Repositories\UserRepository;

class UserController extends Controller
{
    /**
    * The user repository instance.
    */
    protected $users;

    /**
    * Create a new controller instance.
    *
    * @param UserRepository $users
    * @return void
    */
    public function __construct(UserRepository $users)
    {
        $this->users = $users;
    }
}
```

Of course, you may also type-hint any <u>Laravel contract</u>. If the container can resolve it, you can type-hint it. Depending on your application, injecting your dependencies into your controller may provide better testability.

#### **Method Injection**

In addition to constructor injection, you may also type-hint dependencies on your controller's methods. A common use-case for method injection is injecting the Illuminate\Http\Request instance into your controller methods:

If your controller method is also expecting input from a route parameter, list your route arguments after your other dependencies. For example, if your route is defined like so:

```
Route::put('user/{id}', 'UserController@update');
```

You may still type-hint the Illuminate\Http\Request and access your id parameter by defining your controller method as follows:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
class UserController extends Controller
{
    /**
    * Update the given user.
    *
    * @param Request $request
    * @param string $id
    * @return Response
    */
    */
}</pre>
```

# **Route Caching**

NOTE Closure based routes cannot be cached. To use route caching, you must convert any Closure routes to controller classes.

If your application is exclusively using controller based routes, you should take advantage of Laravel's route cache. Using the route cache will drastically decrease the amount of time it takes to register all of your application's routes. In some cases, your route registration may even be up to 100x faster. To generate a route cache, just execute the route cache Artisan command:

```
php artisan route:cache
```

After running this command, your cached routes file will be loaded on every request. Remember, if you add any new routes you will need to generate a fresh route cache. Because of this, you should only run the route:cache command during your project's deployment.

You may use the route:clear command to clear the route cache:

```
php artisan route:clear
```

# **HTTP Requests**

- Accessing The Request
  - o Request Path & Method
  - o PSR-7 Requests
- Input Trimming & Normalization
- Retrieving Input
  - Old Input
  - Cookies
- <u>Files</u>
  - Retrieving Uploaded Files
  - Storing Uploaded Files
- Configuring Trusted Proxies

# **Accessing The Request**

To obtain an instance of the current HTTP request via dependency injection, you should type-hint the <code>illuminate\Http\Request</code> class on your controller method. The incoming request instance will automatically be injected by the <a href="mailto:service container">service container</a>:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
class UserController extends Controller
{
    /**
    * Store a new user.
    * @param Request $request
    * @return Response
    */
    public function store(Request $request)
    {
        $name = $request->input('name');
        //
}
```

# **Dependency Injection & Route Parameters**

If your controller method is also expecting input from a route parameter you should list your route parameters after your other dependencies. For example, if your route is defined like so:

```
Route::put('user/{id}', 'UserController@update');
```

You may still type-hint the Illuminate\Http\Request and access your route parameter id by defining your controller method as follows:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
class UserController extends Controller
{
    /**
    * Update the specified user.
    *
    * @param Request $request
    * @param string $id
    * @return Response
    */
    public function update(Request $request, $id)
    {
        //
     }
}</pre>
```

# **Accessing The Request Via Route Closures**

You may also type-hint the Illuminate\Http\Request class on a route Closure. The service container will automatically inject the incoming request into the Closure when it is executed:

# **Request Path & Method**

The Illuminate\http\Request instance provides a variety of methods for examining the HTTP request for your application and extends the Symfony\Component\httpFoundation\Request class. We will discuss a few of the most important methods below.

#### **Retrieving The Request Path**

The path method returns the request's path information. So, if the incoming request is targeted at http://domain.com/foo/bar, the path method will return foo/bar:

```
$uri = $request->path();
```

The is method allows you to verify that the incoming request path matches a given pattern. You may use the \* character as a wildcard when utilizing this method:

```
if ($request->is('admin/*')) {
     //
}
```

#### **Retrieving The Request URL**

To retrieve the full URL for the incoming request you may use the url or fullurl methods. The url method will return the URL without the query string, while the fullurl method includes the query string:

```
// Without Query String...
$url = $request->url();
// With Query String...
$url = $request->fullUrl();
```

#### **Retrieving The Request Method**

The method method will return the HTTP verb for the request. You may use the isMethod method to verify that the HTTP verb matches a given string:

```
$method = $request->method();
if ($request->isMethod('post')) {
    //
}
```

# **PSR-7 Requests**

The <u>PSR-7 standard</u> specifies interfaces for HTTP messages, including requests and responses. If you would like to obtain an instance of a PSR-7 request instead of a Laravel request, you will first need to install a few libraries. Laravel uses the *Symfony HTTP Message Bridge* component to convert typical Laravel requests and responses into PSR-7 compatible implementations:

```
composer require symfony/psr-http-message-bridge composer require zendframework/zend-diactoros
```

Once you have installed these libraries, you may obtain a PSR-7 request by type-hinting the request interface on your route Closure or controller method:

TIP If you return a PSR-7 response instance from a route or controller, it will automatically be converted back to a Laravel response instance and be displayed by the framework.

# **Input Trimming & Normalization**

By default, Laravel includes the TrimStrings and ConvertEmptyStringsTONull middleware in your application's global middleware

stack. These middleware are listed in the stack by the App\Http\Kernel class. These middleware will automatically trim all incoming string fields on the request, as well as convert any empty string fields to null. This allows you to not have to worry about these normalization concerns in your routes and controllers.

If you would like to disable this behavior, you may remove the two middleware from your application's middleware stack by removing them from the <code>\$middleware</code> property of your <code>App\Http\Kernel</code> class.

# **Retrieving Input**

#### **Retrieving All Input Data**

You may also retrieve all of the input data as an array using the all method:

```
$input = $request->all();
```

#### **Retrieving An Input Value**

Using a few simple methods, you may access all of the user input from your <code>illuminate\Http\Request</code> instance without worrying about which HTTP verb was used for the request. Regardless of the HTTP verb, the <code>input</code> method may be used to retrieve user input:

```
$name = $request->input('name');
```

You may pass a default value as the second argument to the input method. This value will be returned if the requested input value is not present on the request:

```
$name = $request->input('name', 'Sally');
```

When working with forms that contain array inputs, use "dot" notation to access the arrays:

```
$name = $request->input('products.0.name');
$names = $request->input('products.*.name');
```

You may call the input method without any arguments in order to retrieve all of the input values as an associative array:

```
$input = $request->input();
```

# **Retrieving Input From The Query String**

While the input method retrieves values from entire request payload (including the query string), the query method will only retrieve values from the query string:

```
$name = $request->query('name');
```

If the requested query string value data is not present, the second argument to this method will be returned:

```
$name = $request->query('name', 'Helen');
```

You may call the query method without any arguments in order to retrieve all of the query string values as an associative array:

```
$query = $request->query();
```

# **Retrieving Input Via Dynamic Properties**

You may also access user input using dynamic properties on the Illuminate\Http\Request instance. For example, if one of your application's forms contains a name field, you may access the value of the field like so:

```
$name = $request->name;
```

When using dynamic properties, Laravel will first look for the parameter's value in the request payload. If it is not present, Laravel will search for the field in the route parameters.

### **Retrieving JSON Input Values**

When sending JSON requests to your application, you may access the JSON data via the input method as long as the content-type header of the request is properly set to application/json. You may even use "dot" syntax to dig into JSON arrays:

```
$name = $request->input('user.name');
```

# **Retrieving A Portion Of The Input Data**

If you need to retrieve a subset of the input data, you may use the only and except methods. Both of these methods accept a single array or a dynamic list of arguments:

```
$input = $request->only(['username', 'password']);
$input = $request->only('username', 'password');
$input = $request->except(['credit_card']);
$input = $request->except('credit_card');
```

TIP The only method returns all of the key / value pairs that you request; however, it will not return key / value pairs that are not present on the request.

#### **Determining If An Input Value Is Present**

You should use the has method to determine if a value is present on the request. The has method returns true if the value is present on the request:

When given an array, the has method will determine if all of the specified values are present:

If you would like to determine if a value is present on the request and is not empty, you may use the filled method:

```
if ($request->filled('name')) {
    //
}
```

### **Old Input**

Laravel allows you to keep input from one request during the next request. This feature is particularly useful for re-populating forms after detecting validation errors. However, if you are using Laravel's included <u>validation features</u>, it is unlikely you will need to manually use these methods, as some of Laravel's built-in validation facilities will call them automatically.

### Flashing Input To The Session

The flash method on the Illuminate\Http\Request class will flash the current input to the <u>session</u> so that it is available during the user's next request to the application:

```
$request->flash();
```

You may also use the flashonly and flashExcept methods to flash a subset of the request data to the session. These methods are useful for keeping sensitive information such as passwords out of the session:

```
$request->flashOnly(['username', 'email']);
$request->flashExcept('password');
```

# **Flashing Input Then Redirecting**

Since you often will want to flash input to the session and then redirect to the previous page, you may easily chain input flashing onto a redirect using the withInput method:

# **Retrieving Old Input**

To retrieve flashed input from the previous request, use the old method on the Request instance. The old method will pull the previously flashed input data from the <u>session</u>:

```
$username = $request->old('username');
```

Laravel also provides a global old helper. If you are displaying old input within a <u>Blade template</u>, it is more convenient to use the old helper. If no old input exists for the given field, null will be returned:

```
<input type="text" name="username" value="{{ old('username') }}">
```

### **Cookies**

#### **Retrieving Cookies From Requests**

All cookies created by the Laravel framework are encrypted and signed with an authentication code, meaning they will be considered invalid if they have been changed by the client. To retrieve a cookie value from the request, use the cookie method on a Illuminate\Http\Request instance:

```
$value = $request->cookie('name');
```

Alternatively, you may use the cookie facade to access cookie values:

```
$value = Cookie::get('name');
```

#### **Attaching Cookies To Responses**

You may attach a cookie to an outgoing Illuminate\Http\Response instance using the cookie method. You should pass the name, value, and number of minutes the cookie should be considered valid to this method:

```
return response('Hello World')->cookie(
    'name', 'value', $minutes
);
```

The cookie method also accepts a few more arguments which are used less frequently. Generally, these arguments have the same purpose and meaning as the arguments that would be given to PHP's native <a href="setcookie">setcookie</a> method:

```
return response('Hello World')->cookie(
    'name', 'value', $minutes, $path, $domain, $secure, $httpOnly
);
```

Alternatively, you can use the cookie facade to "queue" cookies for attachment to the outgoing response from your application. The queue method accepts a cookie instance or the arguments needed to create a cookie instance. These cookies will be attached to the outgoing response before it is sent to the browser:

```
Cookie::queue(Cookie::make('name', 'value', $minutes));
Cookie::queue('name', 'value', $minutes);
```

### **Generating Cookie Instances**

If you would like to generate a Symfony\Component\HttpFoundation\Cookie instance that can be given to a response instance at a later time, you may use the global cookie helper. This cookie will not be sent back to the client unless it is attached to a response instance:

```
$cookie = cookie('name', 'value', $minutes);
return response('Hello World')->cookie($cookie);
```

### **Files**

#### **Retrieving Uploaded Files**

You may access uploaded files from a Illuminate\http\Request instance using the file method or using dynamic properties. The file method returns an instance of the Illuminate\http\UploadedFile class, which extends the PHP SplFileInfo class and provides a variety of methods for interacting with the file:

```
$file = $request->file('photo');
$file = $request->photo;
```

You may determine if a file is present on the request using the hasFile method:

```
if ($request->hasFile('photo')) {
    //
}
```

# Validating Successful Uploads

In addition to checking if the file is present, you may verify that there were no problems uploading the file via the isValid method:

```
if ($request->file('photo')->isValid()) {
```

```
//
}
```

### File Paths & Extensions

The UploadedFile class also contains methods for accessing the file's fully-qualified path and its extension. The extension method will attempt to guess the file's extension based on its contents. This extension may be different from the extension that was supplied by the client:

```
$path = $request->photo->path();
$extension = $request->photo->extension();
```

#### Other File Methods

There are a variety of other methods available on UploadedFile instances. Check out the <u>API documentation for the class</u> for more information regarding these methods.

# **Storing Uploaded Files**

To store an uploaded file, you will typically use one of your configured <u>filesystems</u>. The uploadedFile class has a store method which will move an uploaded file to one of your disks, which may be a location on your local filesystem or even a cloud storage location like Amazon S3.

The store method accepts the path where the file should be stored relative to the filesystem's configured root directory. This path should not contain a file name, since a unique ID will automatically be generated to serve as the file name.

The store method also accepts an optional second argument for the name of the disk that should be used to store the file. The method will return the path of the file relative to the disk's root:

```
$path = $request->photo->store('images');

$path = $request->photo->store('images', 's3');
```

If you do not want a file name to be automatically generated, you may use the storeAs method, which accepts the path, file name, and disk name as its arguments:

```
$path = $request->photo->storeAs('images', 'filename.jpg');
$path = $request->photo->storeAs('images', 'filename.jpg', 's3');
```

# **Configuring Trusted Proxies**

When running your applications behind a load balancer that terminates TLS / SSL certificates, you may notice your application sometimes does not generate HTTPS links. Typically this is because your application is being forwarded traffic from your load balancer on port 80 and does not know it should generate secure links.

To solve this, you may use the App\Http\Middleware\TrustProxies middleware that is included in your Laravel application, which allows you to quickly customize the load balancers or proxies that should be trusted by your application. Your trusted proxies should be listed as an array on the \$proxies property of this middleware. In addition to configuring the trusted proxies, you may configure the proxy \$headers that should be trusted:

}

TIP If you are using AWS Elastic Load Balancing, your \$headers value should be Request::HEADER\_X\_FORWARDED\_AWS\_ELB. For more information on the constants that may be used in the \$headers property, check out Symfony's documentation on trusting proxies.

# **Trusting All Proxies**

If you are using Amazon AWS or another "cloud" load balancer provider, you may not know the IP addresses of your actual balancers. In this case, you may use \* to trust all proxies:

```
/**
  * The trusted proxies for this application.
  *
  * @var array
  */
protected $proxies = '*';
```

# **HTTP Responses**

- Creating Responses
  - Attaching Headers To Responses
  - Attaching Cookies To Responses
  - Cookies & Encryption
- Redirects
  - Redirecting To Named Routes
  - o Redirecting To Controller Actions
  - Redirecting To External Domains
  - o Redirecting With Flashed Session Data
- Other Response Types
  - View Responses
  - JSON Responses
  - File Downloads
  - File Responses
- Response Macros

# **Creating Responses**

#### **Strings & Arrays**

All routes and controllers should return a response to be sent back to the user's browser. Laravel provides several different ways to return responses. The most basic response is returning a string from a route or controller. The framework will automatically convert the string into a full HTTP response:

```
Route::get('/', function () {
    return 'Hello World';
});
```

In addition to returning strings from your routes and controllers, you may also return arrays. The framework will automatically convert the array into a JSON response:

```
Route::get('/', function () {
    return [1, 2, 3];
});
```

TIP Did you know you can also return <u>Eloquent collections</u> from your routes or controllers? They will automatically be converted to JSON. Give it a shot!

### **Response Objects**

Typically, you won't just be returning simple strings or arrays from your route actions. Instead, you will be returning full <code>illuminate\Http\Response</code> instances or <code>views</code>.

Returning a full Response instance allows you to customize the response's HTTP status code and headers. A Response instance inherits from the Symfony\Component\HttpFoundation\Response class, which provides a variety of methods for building HTTP responses:

#### **Attaching Headers To Responses**

Keep in mind that most response methods are chainable, allowing for the fluent construction of response instances. For example, you may use the header method to add a series of headers to the response before sending it back to the user:

```
return response($content)
->header('Content-Type', $type)
->header('X-Header-One', 'Header Value')
->header('X-Header-Two', 'Header Value');
```

Or, you may use the withHeaders method to specify an array of headers to be added to the response:

```
'X-Header-One' => 'Header Value',
'X-Header-Two' => 'Header Value',
]);
```

#### **Attaching Cookies To Responses**

The cookie method on response instances allows you to easily attach cookies to the response. For example, you may use the cookie method to generate a cookie and fluently attach it to the response instance like so:

The cookie method also accepts a few more arguments which are used less frequently. Generally, these arguments have the same purpose and meaning as the arguments that would be given to PHP's native <a href="setcookie">setcookie</a> method:

```
->cookie($name, $value, $minutes, $path, $domain, $secure, $httpOnly)
```

Alternatively, you can use the <code>cookie</code> facade to "queue" cookies for attachment to the outgoing response from your application. The queue method accepts a <code>cookie</code> instance or the arguments needed to create a <code>cookie</code> instance. These cookies will be attached to the outgoing response before it is sent to the browser:

```
Cookie::queue(Cookie::make('name', 'value', $minutes));
Cookie::queue('name', 'value', $minutes);
```

#### **Cookies & Encryption**

By default, all cookies generated by Laravel are encrypted and signed so that they can't be modified or read by the client. If you would like to disable encryption for a subset of cookies generated by your application, you may use the <code>\$except</code> property of the <code>App\Http\Middleware\EncryptCookies</code> middleware, which is located in the <code>app/Http/Middleware</code> directory:

```
/**
 * The names of the cookies that should not be encrypted.
 *
 * @var array
 */
protected $except = [
    'cookie_name',
];
```

# Redirects

Redirect responses are instances of the <code>illuminate\Http\RedirectResponse</code> class, and contain the proper headers needed to redirect the user to another URL. There are several ways to generate a <code>RedirectResponse</code> instance. The simplest method is to use the global <code>redirect</code> helper:

```
Route::get('dashboard', function () {
    return redirect('home/dashboard');
}):
```

Sometimes you may wish to redirect the user to their previous location, such as when a submitted form is invalid. You may do so by using the global back helper function. Since this feature utilizes the <u>session</u>, make sure the route calling the back function is using the web middleware group or has all of the session middleware applied:

```
Route::post('user/profile', function () {
    // Validate the request...
    return back()->withInput();
});
```

# **Redirecting To Named Routes**

When you call the redirect helper with no parameters, an instance of Illuminate\Routing\Redirector is returned, allowing you to call any method on the Redirector instance. For example, to generate a RedirectResponse to a named route, you may use the route method:

```
return redirect()->route('login');
```

If your route has parameters, you may pass them as the second argument to the route method:

```
// For a route with the following URI: profile/{id}
return redirect()->route('profile', ['id' => 1]);
```

#### **Populating Parameters Via Eloquent Models**

If you are redirecting to a route with an "ID" parameter that is being populated from an Eloquent model, you may pass the model itself. The ID will be extracted automatically:

```
// For a route with the following URI: profile/{id}
return redirect()->route('profile', [$user]);
```

If you would like to customize the value that is placed in the route parameter, you should override the <code>getRouteKey</code> method on your Eloquent model:

```
/**
  * Get the value of the model's route key.
  * @return mixed
  */
public function getRouteKey()
{
    return $this->slug;
}
```

# **Redirecting To Controller Actions**

You may also generate redirects to <u>controller actions</u>. To do so, pass the controller and action name to the action method. Remember, you do not need to specify the full namespace to the controller since Laravel's RouteServiceProvider will automatically set the base controller namespace:

```
return redirect()->action('HomeController@index');
```

If your controller route requires parameters, you may pass them as the second argument to the action method:

```
return redirect()->action(
   'UserController@profile', ['id' => 1]
):
```

### **Redirecting To External Domains**

Sometimes you may need to redirect to a domain outside of your application. You may do so by calling the away method, which creates a RedirectResponse without any additional URL encoding, validation, or verification:

```
return redirect()->away('https://www.google.com');
```

### **Redirecting With Flashed Session Data**

Redirecting to a new URL and <u>flashing data to the session</u> are usually done at the same time. Typically, this is done after successfully performing an action when you flash a success message to the session. For convenience, you may create a RedirectResponse instance and flash data to the session in a single, fluent method chain:

```
Route::post('user/profile', function () {
    // Update the user's profile...
    return redirect('dashboard')->with('status', 'Profile updated!');
});
```

After the user is redirected, you may display the flashed message from the session. For example, using Blade syntax:

# **Other Response Types**

The response helper may be used to generate other types of response instances. When the response helper is called without arguments, an implementation of the Illuminate\Contracts\Routing\ResponseFactory contract is returned. This contract provides several helpful methods for generating responses.

# View Responses

If you need control over the response's status and headers but also need to return a <u>view</u> as the response's content, you should use the view method:

```
return response()
->view('hello', $data, 200)
->header('Content-Type', $type);
```

Of course, if you do not need to pass a custom HTTP status code or custom headers, you should use the global view helper function.

# **JSON Responses**

The json method will automatically set the Content-Type header to application/json, as well as convert the given array to JSON using the json\_encode PHP function:

```
return response()->json([
   'name' => 'Abigail',
   'state' => 'CA'
]);
```

If you would like to create a JSONP response, you may use the json method in combination with the withcallback method:

#### File Downloads

The download method may be used to generate a response that forces the user's browser to download the file at the given path. The download method accepts a file name as the second argument to the method, which will determine the file name that is seen by the user downloading the file. Finally, you may pass an array of HTTP headers as the third argument to the method:

```
return response()->download($pathToFile);
return response()->download($pathToFile, $name, $headers);
return response()->download($pathToFile)->deleteFileAfterSend();
```

NOTE Symfony HttpFoundation, which manages file downloads, requires the file being downloaded to have an ASCII file name.

#### **Streamed Downloads**

Sometimes you may wish to turn the string response of a given operation into a downloadable response without having to write the contents of the operation to disk. You may use the streamDownload method in this scenario. This method accepts a callback, file name, and an optional array of headers as its arguments:

# File Responses

The file method may be used to display a file, such as an image or PDF, directly in the user's browser instead of initiating a download. This method accepts the path to the file as its first argument and an array of headers as its second argument:

```
return response()->file($pathToFile);
return response()->file($pathToFile, $headers);
```

# **Response Macros**

If you would like to define a custom response that you can re-use in a variety of your routes and controllers, you may use the macro method on the Response facade. For example, from a <u>service provider's</u> boot method:

```
return Response::make(strtoupper($value));
};
}
```

The macro function accepts a name as its first argument, and a Closure as its second. The macro's Closure will be executed when calling the macro name from a ResponseFactory implementation or the response helper:

```
return response()->caps('foo');
```

# Views

- Creating Views
- Passing Data To Views
  - Sharing Data With All Views
- View Composers

# **Creating Views**

TIP Looking for more information on how to write Blade templates? Check out the full Blade documentation to get started.

Views contain the HTML served by your application and separate your controller / application logic from your presentation logic. Views are stored in the resources/views directory. A simple view might look something like this:

Since this view is stored at resources/views/greeting.blade.php, we may return it using the global view helper like so:

```
Route::get('/', function () {
    return view('greeting', ['name' => 'James']);
}):
```

As you can see, the first argument passed to the view helper corresponds to the name of the view file in the resources/views directory. The second argument is an array of data that should be made available to the view. In this case, we are passing the name variable, which is displayed in the view using <u>Blade syntax</u>.

Of course, views may also be nested within sub-directories of the resources/views directory. "Dot" notation may be used to reference nested views. For example, if your view is stored at resources/views/admin/profile.blade.php, you may reference it like so:

```
return view('admin.profile', $data);
```

# **Determining If A View Exists**

If you need to determine if a view exists, you may use the View facade. The exists method will return true if the view exists:

#### **Creating The First Available View**

Using the first method, you may create the first view that exists in a given array of views. This is useful if your application or package allows views to be customized or overwritten:

```
return view()->first(['custom.admin', 'admin'], $data);
Of course, you may also call this method via the View facade:
use Illuminate\Support\Facades\View;
return View::first(['custom.admin', 'admin'], $data);
```

# **Passing Data To Views**

As you saw in the previous examples, you may pass an array of data to views:

```
return view('greetings', ['name' => 'Victoria']);
```

When passing information in this manner, the data should be an array with key / value pairs. Inside your view, you can then access each value using its corresponding key, such as <?php echo \$key; ?>. As an alternative to passing a complete array of data to the view helper function, you may use the with method to add individual pieces of data to the view:

```
return view('greeting')->with('name', 'Victoria');
```

#### **Sharing Data With All Views**

Occasionally, you may need to share a piece of data with all views that are rendered by your application. You may do so using the view facade's share method. Typically, you should place calls to share within a service provider's boot method. You are free to add them to the AppServiceProvider or generate a separate service provider to house them:

# **View Composers**

View composers are callbacks or class methods that are called when a view is rendered. If you have data that you want to be bound to a view each time that view is rendered, a view composer can help you organize that logic into a single location.

For this example, let's register the view composers within a <u>service provider</u>. We'll use the view facade to access the underlying <code>Illuminate\Contracts\View\Factory</code> contract implementation. Remember, Laravel does not include a default directory for view composers. You are free to organize them however you wish. For example, you could create an <code>app/Http/View/Composers</code> directory:

```
<?php
namespace App\Providers;
use Illuminate\Support\Facades\View;
use Illuminate\Support\ServiceProvider;
class ViewServiceProvider extends ServiceProvider
     * Register bindings in the container.
       @return void
    public function boot()
        // Using class based composers...
        View::composer(
   'profile', 'App\Http\View\Composers\ProfileComposer'
        // Using Closure based composers...
        View::composer('dashboard', function ($view) {
        });
    }
      Register the service provider.
      @return void
    public function register()
        //
```

```
}
```

NOTE Remember, if you create a new service provider to contain your view composer registrations, you will need to add the service provider to the providers array in the config/app.php configuration file.

Now that we have registered the composer, the ProfileComposer@compose method will be executed each time the profile view is being rendered. So, let's define the composer class:

```
namespace App\Http\View\Composers;
use Illuminate\View\View;
use App\Repositories\UserRepository;
class ProfileComposer
     * The user repository implementation.
     * @var UserRepository
    protected $users;
    * Create a new profile composer.
       @param UserRepository $users
       @return void
    public function __construct(UserRepository $users)
        // Dependencies automatically resolved by service container...
        $this->users = $users;
    }
     * Bind data to the view.
       @param View $view
       @return void
    public function compose(View $view)
        $view->with('count', $this->users->count());
    }
}
```

Just before the view is rendered, the composer's compose method is called with the Illuminate\View\View instance. You may use the with method to bind data to the view.

TIP All view composers are resolved via the <u>service container</u>, so you may type-hint any dependencies you need within a composer's constructor.

#### **Attaching A Composer To Multiple Views**

You may attach a view composer to multiple views at once by passing an array of views as the first argument to the composer method:

```
View::composer(
    ['profile', 'dashboard'],
    'App\Http\View\Composers\MyViewComposer'
);
```

The composer method also accepts the \* character as a wildcard, allowing you to attach a composer to all views:

### **View Creators**

View **creators** are very similar to view composers; however, they are executed immediately after the view is instantiated instead of waiting until the view is about to render. To register a view creator, use the creator method:

```
View::creator('profile', 'App\Http\View\Creators\ProfileCreator');
```

# **URL Generation**

- Introduction
- The Basics
  - o Generating Basic URLs
  - Accessing The Current URL
- URLs For Named Routes
  - Signed URLs
- URLs For Controller Actions
- Default Values

# Introduction

Laravel provides several helpers to assist you in generating URLs for your application. Of course, these are mainly helpful when building links in your templates and API responses, or when generating redirect responses to another part of your application.

### The Basics

# **Generating Basic URLs**

The url helper may be used to generate arbitrary URLs for your application. The generated URL will automatically use the scheme (HTTP or HTTPS) and host from the current request:

```
$post = App\Post::find(1);
echo url("/posts/{$post->id}");
// http://example.com/posts/1
```

#### **Accessing The Current URL**

If no path is provided to the url helper, a Illuminate\Routing\UrlGenerator instance is returned, allowing you to access information about the current URL:

```
// Get the current URL without the query string...
echo url()->current();

// Get the current URL including the query string...
echo url()->full();

// Get the full URL for the previous request...
echo url()->previous();

Each of these methods may also be accessed via the URL facade:
use Illuminate\Support\Facades\URL;
echo URL::current();
```

### **URLs For Named Routes**

The route helper may be used to generate URLs to named routes. Named routes allow you to generate URLs without being coupled to the actual URL defined on the route. Therefore, if the route's URL changes, no changes need to be made to your route function calls. For example, imagine your application contains a route defined like the following:

```
Route::get('/post/{post}', function () {
    //
})->name('post.show');

To generate a URL to this route, you may use the route helper like so:
echo route('post.show', ['post' => 1]);
// http://example.com/post/1
```

You will often be generating URLs using the primary key of <u>Eloquent models</u>. For this reason, you may pass Eloquent models as parameter values. The route helper will automatically extract the model's primary key:

```
echo route('post.show', ['post' => $post]);
```

The route helper may also be used to generate URLs for routes with multiple parameters:

### Signed URLs

Laravel allows you to easily create "signed" URLs to named routes. These URLs have a "signature" hash appended to the query string which allows Laravel to verify that the URL has not been modified since it was created. Signed URLs are especially useful for routes that are publicly accessible yet need a layer of protection against URL manipulation.

For example, you might use signed URLs to implement a public "unsubscribe" link that is emailed to your customers. To create a signed URL to a named route, use the signedRoute method of the URL facade:

```
use Illuminate\Support\Facades\URL;
return URL::signedRoute('unsubscribe', ['user' => 1]);
```

If you would like to generate a temporary signed route URL that expires, you may use the temporarySignedRoute method:

```
use Illuminate\Support\Facades\URL;
return URL::temporarySignedRoute(
    'unsubscribe', now()->addMinutes(30), ['user' => 1]
);
```

#### **Validating Signed Route Requests**

To verify that an incoming request has a valid signature, you should call the hasValidSignature method on the incoming Request:

```
use Illuminate\Http\Request;
Route::get('/unsubscribe/{user}', function (Request $request) {
   if (! $request->hasValidSignature()) {
      abort(401);
   }
   // ...
})->name('unsubscribe');
```

Alternatively, you may assign the Illuminate\Routing\Middleware\ValidateSignature middleware to the route. If it is not already present, you should assign this middleware a key in your HTTP kernel's routeMiddleware array:

```
/**

* The application's route middleware.

*

* These middleware may be assigned to groups or used individually.

*

* @var array

*/

protected $routeMiddleware = [
    'signed' => \Illuminate\Routing\Middleware\ValidateSignature::class,
];
```

Once you have registered the middleware in your kernel, you may attach it to a route. If the incoming request does not have a valid signature, the middleware will automatically return a 403 error response:

```
Route::post('/unsubscribe/{user}', function (Request $request) {
    // ...
})->name('unsubscribe')->middleware('signed');
```

# **URLs For Controller Actions**

The action function generates a URL for the given controller action. You do not need to pass the full namespace of the controller. Instead, pass the controller class name relative to the App\http\Controllers namespace:

```
$url = action('HomeController@index');
```

You may also reference actions with a "callable" array syntax:

```
use App\Http\Controllers\HomeController;
$url = action([HomeController::class, 'index']);
```

If the controller method accepts route parameters, you may pass them as the second argument to the function:

```
$url = action('UserController@profile', ['id' => 1]);
```

# **Default Values**

For some applications, you may wish to specify request-wide default values for certain URL parameters. For example, imagine many of your routes define a {locale} parameter:

```
Route::get('/{locale}/posts', function () {
    //
})->name('post.index');
```

It is cumbersome to always pass the locale every time you call the route helper. So, you may use the URL::defaults method to define a default value for this parameter that will always be applied during the current request. You may wish to call this method from a route middleware so that you have access to the current request:

```
<?php
namespace App\Http\Middleware;
use Closure;
use Illuminate\Support\Facades\URL;
class SetDefaultLocaleForUrls
{
    public function handle($request, Closure $next)
    {
        URL::defaults(['locale' => $request->user()->locale]);
        return $next($request);
    }
}
```

Once the default value for the locale parameter has been set, you are no longer required to pass its value when generating URLs via the route helper.

# **HTTP Session**

- Introduction
  - Configuration
  - Driver Prerequisites
- Using The Session
  - o Retrieving Data
  - Storing Data
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  - o Deleting Data
  - Regenerating The Session ID
- Adding Custom Session Drivers
  - Implementing The Driver
  - Registering The Driver

### Introduction

Since HTTP driven applications are stateless, sessions provide a way to store information about the user across multiple requests. Laravel ships with a variety of session backends that are accessed through an expressive, unified API. Support for popular backends such as <a href="Memcached">Memcached</a>, <a href="Redis">Redis</a>, and databases is included out of the box.

#### Configuration

The session configuration file is stored at config/session.php. Be sure to review the options available to you in this file. By default, Laravel is configured to use the file session driver, which will work well for many applications. In production applications, you may consider using the memcached or redis drivers for even faster session performance.

The session driver configuration option defines where session data will be stored for each request. Laravel ships with several great drivers out of the box:

- file sessions are stored in storage/framework/sessions.
- cookie sessions are stored in secure, encrypted cookies.
- database sessions are stored in a relational database.
- memcached / redis sessions are stored in one of these fast, cache based stores.
- array sessions are stored in a PHP array and will not be persisted.

TIP The array driver is used during testing and prevents the data stored in the session from being persisted.

### **Driver Prerequisites**

#### **Database**

When using the database session driver, you will need to create a table to contain the session items. Below is an example Schema declaration for the table:

```
Schema::create('sessions', function ($table) {
    $table->string('id')->unique();
    $table->unsignedInteger('user_id')->nullable();
    $table->string('ip_address', 45)->nullable();
    $table->text('user_agent')->nullable();
    $table->text('payload');
    $table->integer('last_activity');
});
```

You may use the session: table Artisan command to generate this migration:

```
php artisan session:table
php artisan migrate
```

# Redis

Before using Redis sessions with Laravel, you will need to install the predis/predis package (~1.0) via Composer. You may configure your Redis connections in the database configuration file. In the session configuration file, the connection option may be used to specify which Redis connection is used by the session.

### **Using The Session**

# **Retrieving Data**

There are two primary ways of working with session data in Laravel: the global session helper and via a Request instance. First, let's look at accessing the session via a Request instance, which can be type-hinted on a controller method. Remember, controller method dependencies are automatically injected via the Laravel service container:

When you retrieve an item from the session, you may also pass a default value as the second argument to the get method. This default value will be returned if the specified key does not exist in the session. If you pass a closure as the default value to the get method and the requested key does not exist, the Closure will be executed and its result returned:

```
$value = $request->session()->get('key', 'default');

$value = $request->session()->get('key', function () {
    return 'default';
});
```

#### The Global Session Helper

You may also use the global session PHP function to retrieve and store data in the session. When the session helper is called with a single, string argument, it will return the value of that session key. When the helper is called with an array of key / value pairs, those values will be stored in the session:

```
Route::get('home', function () {
    // Retrieve a piece of data from the session...
    $value = session('key');

    // Specifying a default value...
    $value = session('key', 'default');

    // Store a piece of data in the session...
    session(['key' => 'value']);
});
```

TIP There is little practical difference between using the session via an HTTP request instance versus using the global session helper. Both methods are <u>testable</u> via the assertSessionHas method which is available in all of your test cases.

# **Retrieving All Session Data**

If you would like to retrieve all the data in the session, you may use the all method:

```
$data = $request->session()->all();
```

### **Determining If An Item Exists In The Session**

To determine if an item is present in the session, you may use the has method. The has method returns true if the item is present and is not pull:

```
if ($request->session()->has('users')) {
    //
}
```

To determine if an item is present in the session, even if its value is null, you may use the exists method. The exists method returns true if the item is present:

```
if ($request->session()->exists('users')) {
    //
}
```

#### **Storing Data**

To store data in the session, you will typically use the put method or the session helper:

```
// Via a request instance...
$request->session()->put('key', 'value');
// Via the global helper...
session(['key' => 'value']);
```

#### **Pushing To Array Session Values**

The push method may be used to push a new value onto a session value that is an array. For example, if the user.teams key contains an array of team names, you may push a new value onto the array like so:

```
$request->session()->push('user.teams', 'developers');
```

#### **Retrieving & Deleting An Item**

The pull method will retrieve and delete an item from the session in a single statement:

```
$value = $request->session()->pull('key', 'default');
```

#### Flash Data

Sometimes you may wish to store items in the session only for the next request. You may do so using the flash method. Data stored in the session using this method will only be available during the subsequent HTTP request, and then will be deleted. Flash data is primarily useful for short-lived status messages:

```
$request->session()->flash('status', 'Task was successful!');
```

If you need to keep your flash data around for several requests, you may use the reflash method, which will keep all of the flash data for an additional request. If you only need to keep specific flash data, you may use the keep method:

```
$request->session()->reflash();
$request->session()->keep(['username', 'email']);
```

### **Deleting Data**

The forget method will remove a piece of data from the session. If you would like to remove all data from the session, you may use the flush method:

```
// Forget a single key...
$request->session()->forget('key');
// Forget multiple keys...
$request->session()->forget(['key1', 'key2']);
$request->session()->flush();
```

# **Regenerating The Session ID**

Regenerating the session ID is often done in order to prevent malicious users from exploiting a <u>session fixation</u> attack on your application.

Laravel automatically regenerates the session ID during authentication if you are using the built-in LoginController; however, if you need to manually regenerate the session ID, you may use the regenerate method.

```
$request->session()->regenerate();
```

# **Adding Custom Session Drivers**

# **Implementing The Driver**

Your custom session driver should implement the SessionHandlerInterface. This interface contains just a few simple methods we need to implement. A stubbed MongoDB implementation looks something like this:

```
<?php
```

```
namespace App\Extensions;

class MongoSessionHandler implements \SessionHandlerInterface
{
    public function open($savePath, $sessionName) {}
    public function close() {}
    public function read($sessionId) {}
    public function write($sessionId, $data) {}
    public function destroy($sessionId) {}
    public function gc($lifetime) {}
}
```

TIP Laravel does not ship with a directory to contain your extensions. You are free to place them anywhere you like. In this example, we have created an Extensions directory to house the MongoSessionHandler.

Since the purpose of these methods is not readily understandable, let's quickly cover what each of the methods do:

- The open method would typically be used in file based session store systems. Since Laravel ships with a file session driver, you will almost never need to put anything in this method. You can leave it as an empty stub. It is a fact of poor interface design (which we'll discuss later) that PHP requires us to implement this method.
- The close method, like the open method, can also usually be disregarded. For most drivers, it is not needed.
- The read method should return the string version of the session data associated with the given \$sessionId. There is no
  need to do any serialization or other encoding when retrieving or storing session data in your driver, as Laravel will
  perform the serialization for you.
- The write method should write the given \$data string associated with the \$sessionId to some persistent storage system, such as MongoDB, Dynamo, etc. Again, you should not perform any serialization Laravel will have already handled that for you.
- The destroy method should remove the data associated with the \$sessionId from persistent storage.
- The gc method should destroy all session data that is older than the given \$lifetime, which is a UNIX timestamp. For self-expiring systems like Memcached and Redis, this method may be left empty.

#### **Registering The Driver**

Once your driver has been implemented, you are ready to register it with the framework. To add additional drivers to Laravel's session backend, you may use the extend method on the Session facade. You should call the extend method from the boot method of a <u>service provider</u>. You may do this from the existing AppServiceProvider or create an entirely new provider:

```
namespace App\Providers;
use App\Extensions\MongoSessionHandler;
use Illuminate\Support\Facades\Session;
use Illuminate\Support\ServiceProvider;
class SessionServiceProvider extends ServiceProvider
     * Perform post-registration booting of services.
      @return void
    public function boot()
        Session::extend('mongo', function ($app) {
            // Return implementation of SessionHandlerInterface...
            return new MongoSessionHandler;
        });
    }
      Register bindings in the container.
       @return void
    public function register()
    {
    }
}
```

Once the session driver has been registered, you may use the mongo driver in your config/session.php configuration file.

# **Validation**

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# Introduction

Laravel provides several different approaches to validate your application's incoming data. By default, Laravel's base controller class uses a ValidatesRequests trait which provides a convenient method to validate incoming HTTP request with a variety of powerful validation rules.

# **Validation Quickstart**

To learn about Laravel's powerful validation features, let's look at a complete example of validating a form and displaying the error messages back to the user.

# **Defining The Routes**

First, let's assume we have the following routes defined in our routes/web.php file:

```
Route::get('post/create', 'PostController@create');
Route::post('post', 'PostController@store');
```

Of course, the GET route will display a form for the user to create a new blog post, while the POST route will store the new blog post in the database.

### **Creating The Controller**

Next, let's take a look at a simple controller that handles these routes. We'll leave the store method empty for now:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
use App\Http\Controllers\Controller;
class PostController extends Controller
{
    /**
    * Show the form to create a new blog post.
    *
        * @return Response
        */
    public function create()</pre>
```

```
{
    return view('post.create');
}

/**
    * Store a new blog post.
    *
    * @param Request $request
    * @return Response
    */
    public function store(Request $request)
    {
        // Validate and store the blog post...
    }
}
```

# **Writing The Validation Logic**

Now we are ready to fill in our store method with the logic to validate the new blog post. To do this, we will use the validate method provided by the <code>Illuminate\Http\Request</code> object. If the validation rules pass, your code will keep executing normally; however, if validation fails, an exception will be thrown and the proper error response will automatically be sent back to the user. In the case of a traditional HTTP request, a redirect response will be generated, while a JSON response will be sent for AJAX requests.

To get a better understanding of the validate method, let's jump back into the store method:

As you can see, we pass the desired validation rules into the validate method. Again, if the validation fails, the proper response will automatically be generated. If the validation passes, our controller will continue executing normally.

# **Stopping On First Validation Failure**

Sometimes you may wish to stop running validation rules on an attribute after the first validation failure. To do so, assign the bail rule to the attribute:

```
$request->validate([
   'title' => 'bail|required|unique:posts|max:255',
   'body' => 'required',
]):
```

In this example, if the unique rule on the title attribute fails, the max rule will not be checked. Rules will be validated in the order they are assigned.

#### A Note On Nested Attributes

If your HTTP request contains "nested" parameters, you may specify them in your validation rules using "dot" syntax:

```
$request->validate([
   'title' => 'required|unique:posts|max:255',
   'author.name' => 'required',
   'author.description' => 'required',
]);
```

# **Displaying The Validation Errors**

So, what if the incoming request parameters do not pass the given validation rules? As mentioned previously, Laravel will automatically redirect the user back to their previous location. In addition, all of the validation errors will automatically be <u>flashed</u> to the session.

Again, notice that we did not have to explicitly bind the error messages to the view in our GET route. This is because Laravel will check for errors in the session data, and automatically bind them to the view if they are available. The <code>\$errors</code> variable will be an instance of <code>Illuminate\Support\MessageBag</code>. For more information on working with this object, <code>check</code> out its documentation.

TIP The <code>\$errors</code> variable is bound to the view by the <code>Illuminate\View\Middleware\ShareErrorsFromSession</code> middleware, which is provided by the web middleware group. When this middleware is applied an <code>\$errors</code> variable will always be available in your views, allowing you to conveniently assume the <code>\$errors</code> variable is always defined and can be safely used.

So, in our example, the user will be redirected to our controller's create method when validation fails, allowing us to display the error messages in the view:

```
<!-- /resources/views/post/create.blade.php -->
<h1>Create Post</h1>
@if ($errors->any())
```

Accepted Active URL After (Date) After Or Equal (Date) Alpha Alpha Dash Alpha Numeric Array Bail Before (Date) Before Or Equal (Date) Between Boolean Confirmed Date Date Equals Date Format Different Digits Digits Between Dimensions (Image Files) Distinct E-Mail Exists (Database) File Filled Greater Than Greater Than Or Equal Image (File) In In Array Integer IP Address JSON Less Than Less Than Or Equal Max MIME Types MIME Type By File Extension Min Not In Not Regex Nullable Numeric Present Regular Expression Required Required Unless Required With Required With All Required Without Required Without All Same Size Starts With String Timezone Unique (Database) URL UUID

#### accepted

The field under validation must be yes, on, 1, or true. This is useful for validating "Terms of Service" acceptance.

#### active\_url

The field under validation must have a valid A or AAAA record according to the dns\_get\_record PHP function.

#### after:date

The field under validation must be a value after a given date. The dates will be passed into the strtotime PHP function:

```
'start_date' => 'required|date|after:tomorrow'
```

Instead of passing a date string to be evaluated by strtotime, you may specify another field to compare against the date:

```
'finish_date' => 'required|date|after:start_date'
```

### after\_or\_equal:date

The field under validation must be a value after or equal to the given date. For more information, see the after rule.

#### alpha

The field under validation must be entirely alphabetic characters.

### alpha\_dash

The field under validation may have alpha-numeric characters, as well as dashes and underscores.

#### alpha\_num

The field under validation must be entirely alpha-numeric characters.

# array

The field under validation must be a PHP array.

#### bail

Stop running validation rules after the first validation failure.

# before:date

The field under validation must be a value preceding the given date. The dates will be passed into the PHP strtotime function. In addition, like the <u>after</u> rule, the name of another field under validation may be supplied as the value of date.

### before\_or\_equal:date

The field under validation must be a value preceding or equal to the given date. The dates will be passed into the PHP strtotime function. In addition, like the <u>after</u> rule, the name of another field under validation may be supplied as the value of date.

#### between:min,max

The field under validation must have a size between the given *min* and *max*. Strings, numerics, arrays, and files are evaluated in the same fashion as the <u>size</u> rule.

#### boolean

The field under validation must be able to be cast as a boolean. Accepted input are true, false, 1, 0, "1", and "0".

#### confirmed

The field under validation must have a matching field of foo\_confirmation. For example, if the field under validation is password, a matching password\_confirmation field must be present in the input.

#### date

The field under validation must be a valid, non-relative date according to the strtotime PHP function.

### date\_equals:date

The field under validation must be equal to the given date. The dates will be passed into the PHP strtotime function.

### date\_format:format

The field under validation must match the given *format*. You should use **either** date or date\_format when validating a field, not both.

### different:field

The field under validation must have a different value than field.

### digits:value

The field under validation must be *numeric* and must have an exact length of *value*.

# digits\_between:min,max

The field under validation must have a length between the given *min* and *max*.

# dimensions

The file under validation must be an image meeting the dimension constraints as specified by the rule's parameters:

```
'avatar' => 'dimensions:min_width=100,min_height=200'
```

Available constraints are: min\_width, max\_width, min\_height, max\_height, width, height, ratio.

A *ratio* constraint should be represented as width divided by height. This can be specified either by a statement like 3/2 or a float like 1.5:

```
'avatar' => 'dimensions:ratio=3/2'
```

Since this rule requires several arguments, you may use the Rule::dimensions method to fluently construct the rule:

```
use \ Illuminate \verb|\Validation\Rule|;
```

```
Validator::make($data, [
   'avatar' => [
        'required',
        Rule::dimensions()->maxWidth(1000)->maxHeight(500)->ratio(3 / 2),
    ],
]);
```

#### distinct

When working with arrays, the field under validation must not have any duplicate values.

```
'foo.*.id' => 'distinct'
```

#### email

The field under validation must be formatted as an e-mail address.

#### exists:table,column

The field under validation must exist on a given database table.

#### **Basic Usage Of Exists Rule**

```
'state' => 'exists:states'
```

If the column option is not specified, the field name will be used.

#### **Specifying A Custom Column Name**

```
'state' => 'exists:states,abbreviation'
```

Occasionally, you may need to specify a specific database connection to be used for the exists query. You can accomplish this by prepending the connection name to the table name using "dot" syntax:

```
'email' => 'exists:connection.staff,email'
```

If you would like to customize the query executed by the validation rule, you may use the Rule class to fluently define the rule. In this example, we'll also specify the validation rules as an array instead of using the | character to delimit them:

use Illuminate\Validation\Rule;

# file

The field under validation must be a successfully uploaded file.

# filled

The field under validation must not be empty when it is present.

#### gt:field

The field under validation must be greater than the given *field*. The two fields must be of the same type. Strings, numerics, arrays, and files are evaluated using the same conventions as the size rule.

### gte:field

The field under validation must be greater than or equal to the given *field*. The two fields must be of the same type. Strings, numerics, arrays, and files are evaluated using the same conventions as the size rule.

# image

The file under validation must be an image (jpeg, png, bmp, gif, or svg)

# in:foo,bar,...

The field under validation must be included in the given list of values. Since this rule often requires you to implode an array, the Rule::in method may be used to fluently construct the rule:

```
use Illuminate\Validation\Rule;
Validator::make($data, [
```

```
'zones' => [
          'required',
          Rule::in(['first-zone', 'second-zone']),
     ],
]);
```

#### in\_array:anotherfield.\*

The field under validation must exist in anotherfield's values.

#### integer

The field under validation must be an integer.

### ip

The field under validation must be an IP address.

#### ipv4

The field under validation must be an IPv4 address.

#### ipv6

The field under validation must be an IPv6 address.

#### json

The field under validation must be a valid JSON string.

#### lt:field

The field under validation must be less than the given *field*. The two fields must be of the same type. Strings, numerics, arrays, and files are evaluated using the same conventions as the size rule.

# lte:field

The field under validation must be less than or equal to the given *field*. The two fields must be of the same type. Strings, numerics, arrays, and files are evaluated using the same conventions as the size rule.

#### max:value

The field under validation must be less than or equal to a maximum *value*. Strings, numerics, arrays, and files are evaluated in the same fashion as the <u>size</u> rule.

#### mimetypes:text/plain,...

The file under validation must match one of the given MIME types:

```
'video' => 'mimetypes:video/avi,video/mpeg,video/quicktime'
```

To determine the MIME type of the uploaded file, the file's contents will be read and the framework will attempt to guess the MIME type, which may be different from the client provided MIME type.

#### mimes:foo,bar,...

The file under validation must have a MIME type corresponding to one of the listed extensions.

#### **Basic Usage Of MIME Rule**

```
'photo' => 'mimes:jpeg,bmp,png'
```

Even though you only need to specify the extensions, this rule actually validates against the MIME type of the file by reading the file's contents and guessing its MIME type.

A full listing of MIME types and their corresponding extensions may be found at the following location: <a href="https://svn.apache.org/repos/asf/httpd/trunk/docs/conf/mime.types">https://svn.apache.org/repos/asf/httpd/trunk/docs/conf/mime.types</a>

#### min:value

The field under validation must have a minimum *value*. Strings, numerics, arrays, and files are evaluated in the same fashion as the <u>size</u> rule.

#### not\_in:foo,bar,...

The field under validation must not be included in the given list of values. The Rule::notIn method may be used to fluently construct the rule:

```
use Illuminate\Validation\Rule;
Validator::make($data, [
    'toppings' => [
        'required',
        Rule::notIn(['sprinkles', 'cherries']),
    ],
]);
```

#### not\_regex:pattern

The field under validation must not match the given regular expression.

Internally, this rule uses the PHP preg\_match function. The pattern specified should obey the same formatting required by preg\_match and thus also include valid delimiters. For example: 'email' => 'not\_regex:/^.+\$/i'.

**Note:** When using the regex / not\_regex patterns, it may be necessary to specify rules in an array instead of using pipe delimiters, especially if the regular expression contains a pipe character.

#### nullable

The field under validation may be null. This is particularly useful when validating primitive such as strings and integers that can contain null values.

### numeric

The field under validation must be numeric.

### present

The field under validation must be present in the input data but can be empty.

### regex:pattern

The field under validation must match the given regular expression.

Internally, this rule uses the PHP preg\_match function. The pattern specified should obey the same formatting required by preg\_match and thus also include valid delimiters. For example: 'email' => 'regex:/^.+@.+\$/i'.

**Note:** When using the regex / not\_regex patterns, it may be necessary to specify rules in an array instead of using pipe delimiters, especially if the regular expression contains a pipe character.

#### required

The field under validation must be present in the input data and not empty. A field is considered "empty" if one of the following conditions are true:

- The value is null.
- The value is an empty string.
- The value is an empty array or empty countable object.
- The value is an uploaded file with no path.

### required\_if:anotherfield,value,...

The field under validation must be present and not empty if the *anotherfield* field is equal to any *value*.

### required\_unless:anotherfield,value,...

The field under validation must be present and not empty unless the anotherfield field is equal to any value.

### required\_with:foo,bar,...

The field under validation must be present and not empty *only if* any of the other specified fields are present.

#### required\_with\_all:foo,bar,...

The field under validation must be present and not empty *only if* all of the other specified fields are present.

#### required\_without:foo,bar,...

The field under validation must be present and not empty only when any of the other specified fields are not present.

#### required\_without\_all:foo,bar,...

The field under validation must be present and not empty *only when* all of the other specified fields are not present.

#### same:field

The given *field* must match the field under validation.

#### size:value

The field under validation must have a size matching the given *value*. For string data, *value* corresponds to the number of characters. For numeric data, *value* corresponds to a given integer value. For an array, *size* corresponds to the count of the array. For files, *size* corresponds to the file size in kilobytes.

#### starts\_with:foo,bar,...

The field under validation must start with one of the given values.

#### string

The field under validation must be a string. If you would like to allow the field to also be null, you should assign the nullable rule to the field.

#### timezone

The field under validation must be a valid timezone identifier according to the timezone\_identifiers\_list PHP function.

### unique:table,column,except,idColumn

The field under validation must be unique in a given database table. If the column option is not specified, the field name will be used.

### **Specifying A Custom Column Name:**

```
'email' => 'unique:users,email_address'
```

### **Custom Database Connection**

Occasionally, you may need to set a custom connection for database queries made by the Validator. As seen above, setting unique:users as a validation rule will use the default database connection to query the database. To override this, specify the connection and the table name using "dot" syntax:

```
'email' => 'unique:connection.users,email_address'
```

#### Forcing A Unique Rule To Ignore A Given ID:

Sometimes, you may wish to ignore a given ID during the unique check. For example, consider an "update profile" screen that includes the user's name, e-mail address, and location. Of course, you will want to verify that the e-mail address is unique. However, if the user only changes the name field and not the e-mail field, you do not want a validation error to be thrown because the user is already the owner of the e-mail address.

To instruct the validator to ignore the user's ID, we'll use the Rule class to fluently define the rule. In this example, we'll also specify the validation rules as an array instead of using the | character to delimit the rules:

```
use Illuminate\Validation\Rule;
```

Validator::make(\$data, [

```
'email' => [
    'required',
    Rule::unique('users')->ignore($user->id),
],
]);
```

If your table uses a primary key column name other than id, you may specify the name of the column when calling the ignore method:

```
Rule::unique('users')->ignore($user->id, 'user_id')
```

By default, the unique rule will check the uniqueness of the column matching the name of the attribute being validated. However, you may pass a different column name as the second argument to the unique method:

```
Rule::unique('users', 'email_address')->ignore($user->id),
```

#### **Adding Additional Where Clauses:**

You may also specify additional query constraints by customizing the query using the where method. For example, let's add a constraint that verifies the account\_id is 1:

```
'email' => Rule::unique('users')->where(function ($query) {
    return $query->where('account_id', 1);
})
```

#### url

The field under validation must be a valid URL.

#### uuid

The field under validation must be a valid RFC 4122 (version 1, 3, 4, or 5) universally unique identifier (UUID).

# **Conditionally Adding Rules**

### **Validating When Present**

In some situations, you may wish to run validation checks against a field **only** if that field is present in the input array. To quickly accomplish this, add the sometimes rule to your rule list:

```
$v = Validator::make($data, [
    'email' => 'sometimes|required|email',
]);
```

In the example above, the email field will only be validated if it is present in the \$data array.

TIP If you are attempting to validate a field that should always be present but may be empty, check out this note on optional fields

### **Complex Conditional Validation**

Sometimes you may wish to add validation rules based on more complex conditional logic. For example, you may wish to require a given field only if another field has a greater value than 100. Or, you may need two fields to have a given value only when another field is present. Adding these validation rules doesn't have to be a pain. First, create a validator instance with your *static rules* that never change:

```
$v = Validator::make($data, [
    'email' => 'required|email',
    'games' => 'required|numeric',
]):
```

Let's assume our web application is for game collectors. If a game collector registers with our application and they own more than 100 games, we want them to explain why they own so many games. For example, perhaps they run a game resale shop, or maybe they just enjoy collecting. To conditionally add this requirement, we can use the sometimes method on the Validator instance.

```
$v->sometimes('reason', 'required|max:500', function ($input) {
    return $input->games >= 100;
}):
```

The first argument passed to the sometimes method is the name of the field we are conditionally validating. The second argument is the rules we want to add. If the Closure passed as the third argument returns true, the rules will be added. This method makes it a breeze to build complex conditional validations. You may even add conditional validations for several fields at once:

```
v->sometimes(['reason', 'cost'], 'required', function (<math>sinput) {
```

```
return $input->games >= 100;
});
```

TIP The \$input parameter passed to your closure will be an instance of Illuminate\Support\Fluent and may be used to access your input and files.

# **Validating Arrays**

Validating array based form input fields doesn't have to be a pain. You may use "dot notation" to validate attributes within an array. For example, if the incoming HTTP request contains a photos[profile] field, you may validate it like so:

```
$validator = Validator::make($request->all(), [
    'photos.profile' => 'required|image',
]);
```

You may also validate each element of an array. For example, to validate that each e-mail in a given array input field is unique, you may do the following:

```
$validator = Validator::make($request->all(), [
   'person.*.email' => 'email|unique:users',
   'person.*.first_name' => 'required_with:person.*.last_name',
]):
```

Likewise, you may use the \* character when specifying your validation messages in your language files, making it a breeze to use a single validation message for array based fields:

```
'custom' => [
   'person.*.email' => [
        'unique' => 'Each person must have a unique e-mail address',
   ]
],
```

# **Custom Validation Rules**

### **Using Rule Objects**

Laravel provides a variety of helpful validation rules; however, you may wish to specify some of your own. One method of registering custom validation rules is using rule objects. To generate a new rule object, you may use the make:rule Artisan command. Let's use this command to generate a rule that verifies a string is uppercase. Laravel will place the new rule in the app/Rules directory:

```
php artisan make:rule Uppercase
```

Once the rule has been created, we are ready to define its behavior. A rule object contains two methods: passes and message. The passes method receives the attribute value and name, and should return true or false depending on whether the attribute value is valid or not. The message method should return the validation error message that should be used when validation fails:

```
namespace App\Rules;
use Illuminate\Contracts\Validation\Rule;
class Uppercase implements Rule
     * Determine if the validation rule passes.
       @param string $attribute
       @param mixed
                     $value
       @return bool
    public function passes($attribute, $value)
        return strtoupper($value) === $value;
    }
     * Get the validation error message.
     * @return string
    public function message()
        return 'The :attribute must be uppercase.';
    }
}
```

Of course, you may call the trans helper from your message method if you would like to return an error message from your

translation files:

```
/**
  * Get the validation error message.
  *
  * @return string
  */
public function message()
{
    return trans('validation.uppercase');
}
```

Once the rule has been defined, you may attach it to a validator by passing an instance of the rule object with your other validation rules:

```
use App\Rules\Uppercase;
$request->validate([
    'name' => ['required', 'string', new Uppercase],
1);
```

### **Using Closures**

If you only need the functionality of a custom rule once throughout your application, you may use a Closure instead of a rule object. The Closure receives the attribute's name, the attribute's value, and a \$fail callback that should be called if validation fails:

### **Using Extensions**

Another method of registering custom validation rules is using the extend method on the Validator <u>facade</u>. Let's use this method within a <u>service provider</u> to register a custom validation rule:

```
<?php
namespace App\Providers;
use Illuminate\Support\ServiceProvider;
use Illuminate\Support\Facades\Validator;
class AppServiceProvider extends ServiceProvider
     * Bootstrap any application services.
      @return void
    public function boot()
        Validator::extend('foo', function ($attribute, $value, $parameters, $validator) {
            return $value == 'foo';
    }
     * Register the service provider.
     * @return void
    public function register()
    {
    }
}
```

The custom validator Closure receives four arguments: the name of the <code>\$attribute</code> being validated, the <code>\$value</code> of the attribute, an array of <code>\$parameters</code> passed to the rule, and the <code>Validator</code> instance.

You may also pass a class and method to the extend method instead of a Closure:

```
Validator::extend('foo', 'FooValidator@validate');
```

#### **Defining The Error Message**

You will also need to define an error message for your custom rule. You can do so either using an inline custom message array or by adding an entry in the validation language file. This message should be placed in the first level of the array, not within the custom array, which is only for attribute-specific error messages:

```
"foo" => "Your input was invalid!",
"accepted" => "The :attribute must be accepted.",
// The rest of the validation error messages...
```

When creating a custom validation rule, you may sometimes need to define custom placeholder replacements for error messages. You may do so by creating a custom Validator as described above then making a call to the replacer method on the Validator facade. You may do this within the boot method of a <u>service provider</u>:

```
/**
  * Bootstrap any application services.
  * @return void
  */
public function boot()
{
    Validator::extend(...);
    Validator::replacer('foo', function ($message, $attribute, $rule, $parameters) {
        return str_replace(...);
    });
}
```

#### **Implicit Extensions**

By default, when an attribute being validated is not present or contains an empty string, normal validation rules, including custom extensions, are not run. For example, the <u>unique</u> rule will not be run against an empty string:

```
$rules = ['name' => 'unique:users,name'];
$input = ['name' => ''];
Validator::make($input, $rules)->passes(); // true
```

For a rule to run even when an attribute is empty, the rule must imply that the attribute is required. To create such an "implicit" extension, use the Validator::extendImplicit() method:

```
Validator::extendImplicit('foo', function ($attribute, $value, $parameters, $validator) {
    return $value == 'foo';
}):
```

NOTE An "implicit" extension only *implies* that the attribute is required. Whether it actually invalidates a missing or empty attribute is up to you.

The Basics

# **Error Handling**

- Introduction
- Configuration
- The Exception Handler
  - Report Method
  - Render Method
  - Reportable & Renderable Exceptions
- HTTP Exceptions
  - Custom HTTP Error Pages

### Introduction

When you start a new Laravel project, error and exception handling is already configured for you. The App\Exceptions\Handler class is where all exceptions triggered by your application are logged and then rendered back to the user. We'll dive deeper into this class throughout this documentation.

# Configuration

The debug option in your config/app.php configuration file determines how much information about an error is actually displayed to the user. By default, this option is set to respect the value of the APP\_DEBUG environment variable, which is stored in your .env file

For local development, you should set the APP\_DEBUG environment variable to true. In your production environment, this value should always be false. If the value is set to true in production, you risk exposing sensitive configuration values to your application's end users.

# The Exception Handler

### The Report Method

All exceptions are handled by the App\Exceptions\Handler class. This class contains two methods: report and render. We'll examine each of these methods in detail. The report method is used to log exceptions or send them to an external service like <a href="Bugsnag">Bugsnag</a> or <a href="Sentry">Sentry</a>. By default, the report method passes the exception to the base class where the exception is logged. However, you are free to log exceptions however you wish.

For example, if you need to report different types of exceptions in different ways, you may use the PHP instanceof comparison operator:

```
/**
  * Report or log an exception.
  *
  * This is a great spot to send exceptions to Sentry, Bugsnag, etc.
  * @param \Exception \$exception
  * @return void
  */
public function report(Exception \$exception)
{
    if (\$exception instanceof CustomException) {
        //
    }
    parent::report(\$exception);
}
```

TIP Instead of making a lot of instanceof checks in your report method, consider using reportable exceptions

## The report Helper

Sometimes you may need to report an exception but continue handling the current request. The report helper function allows you to quickly report an exception using your exception handler's report method without rendering an error page:

```
public function isValid($value)
{
    try {
        // Validate the value...
} catch (Exception $e) {
        report($e);
```

```
return false;
}
```

### **Ignoring Exceptions By Type**

The \$dontReport property of the exception handler contains an array of exception types that will not be logged. For example, exceptions resulting from 404 errors, as well as several other types of errors, are not written to your log files. You may add other exception types to this array as needed:

```
/**
 * A list of the exception types that should not be reported.
 *
 * @var array
 */
protected $dontReport = [
   \Illuminate\Auth\AuthenticationException::class,
   \Illuminate\Auth\Access\AuthorizationException::class,
   \Symfony\Component\HttpKernel\Exception\HttpException::class,
   \Illuminate\Database\Eloquent\ModelNotFoundException::class,
   \Illuminate\Validation\ValidationException::class,
];
```

#### The Render Method

The render method is responsible for converting a given exception into an HTTP response that should be sent back to the browser. By default, the exception is passed to the base class which generates a response for you. However, you are free to check the exception type or return your own custom response:

```
/**
  * Render an exception into an HTTP response.
  *
  * @param \Illuminate\Http\Request $request
  * @param \Exception $exception
  * @return \Illuminate\Http\Response
  */
public function render($request, Exception $exception)
{
    if ($exception instanceof CustomException) {
        return response()->view('errors.custom', [], 500);
    }
    return parent::render($request, $exception);
}
```

### **Reportable & Renderable Exceptions**

Instead of type-checking exceptions in the exception handler's report and render methods, you may define report and render methods directly on your custom exception. When these methods exist, they will be called automatically by the framework:

# **HTTP Exceptions**

Some exceptions describe HTTP error codes from the server. For example, this may be a "page not found" error (404), an "unauthorized error" (401) or even a developer generated 500 error. In order to generate such a response from anywhere in your application, you may use the abort helper:

```
abort(404);
```

The abort helper will immediately raise an exception which will be rendered by the exception handler. Optionally, you may provide the response text:

```
abort(403, 'Unauthorized action.');
```

### **Custom HTTP Error Pages**

Laravel makes it easy to display custom error pages for various HTTP status codes. For example, if you wish to customize the error page for 404 HTTP status codes, create a resources/views/errors/404.blade.php. This file will be served on all 404 errors generated by your application. The views within this directory should be named to match the HTTP status code they correspond to. The HttpException instance raised by the abort function will be passed to the view as an \$exception variable:

```
<h2>{{ $exception->getMessage() }}</h2>
```

You may publish Laravel's error page templates using the vendor:publish Artisan command. Once the templates have been published, you may customize them to your liking:

```
php artisan vendor:publish --tag=laravel-errors
```

The Basics

# Logging

- Introduction
- Configuration
  - Building Log Stacks
- Writing Log Messages
  - Writing To Specific Channels
- Advanced Monolog Channel Customization
  - Customizing Monolog For Channels
  - Creating Monolog Handler Channels
  - o Creating Channels Via Factories

# Introduction

To help you learn more about what's happening within your application, Laravel provides robust logging services that allow you to log messages to files, the system error log, and even to Slack to notify your entire team.

Under the hood, Laravel utilizes the Monolog library, which provides support for a variety of powerful log handlers. Laravel makes it a cinch to configure these handlers, allowing you to mix and match them to customize your application's log handling.

# **Configuration**

All of the configuration for your application's logging system is housed in the configuration. Php configuration file. This file allows you to configure your application's log channels, so be sure to review each of the available channels and their options. Of course, we'll review a few common options below.

By default, Laravel will use the stack channel when logging messages. The stack channel is used to aggregate multiple log channels into a single channel. For more information on building stacks, check out the <u>documentation below</u>.

### **Configuring The Channel Name**

By default, Monolog is instantiated with a "channel name" that matches the current environment, such as production or local. To change this value, add a name option to your channel's configuration:

```
'stack' => [
   'driver' => 'stack',
   'name' => 'channel-name',
   'channels' => ['single', 'slack'],
].
```

#### **Available Channel Drivers**

Name	Description
stack	A wrapper to facilitate creating "multi-channel" channels
single	A single file or path based logger channel (StreamHandler)
daily	$A \ {\tt RotatingFileHandler} \ based \ Monolog \ driver \ which \ rotates \ daily$
slack	A SlackWebhookHandler based Monolog driver
syslog	A SyslogHandler based Monolog driver
errorlog	A ErrorLogHandler based Monolog driver
monolog	A Monolog factory driver that may use any supported Monolog handler
custom	A driver that calls a specified factory to create a channel

TIP Check out the documentation on <u>advanced channel customization</u> to learn more about the monolog and custom drivers.

### **Configuring The Slack Channel**

The slack channel requires a url configuration option. This URL should match a URL for an <u>incoming webhook</u> that you have configured for your Slack team.

### **Building Log Stacks**

As previously mentioned, the stack driver allows you to combine multiple channels into a single log channel. To illustrate how to use log stacks, let's take a look at an example configuration that you might see in a production application:

```
'channels' => [
    'stack' => [
        'driver' => 'stack',
        'channels' => ['syslog', 'slack'],
],

'syslog' => [
        'driver' => 'syslog',
        'level' => 'debug',
],

'slack' => [
        'driver' => 'slack',
        'url' => env('LOG_SLACK_WEBHOOK_URL'),
        'username' => 'Laravel Log',
        'emoji' => ':boom:',
        'level' => 'critical',
],
],
```

Let's dissect this configuration. First, notice our stack channel aggregates two other channels via its channels option: syslog and slack. So, when logging messages, both of these channels will have the opportunity to log the message.

### Log Levels

Take note of the level configuration option present on the syslog and slack channel configurations in the example above. This option determines the minimum "level" a message must be in order to be logged by the channel. Monolog, which powers Laravel's logging services, offers all of the log levels defined in the <a href="RFC 5424 specification">RFC 5424 specification</a>: emergency, alert, critical, error, warning, notice, info, and debug.

So, imagine we log a message using the debug method:

```
Log::debug('An informational message.');
```

Given our configuration, the syslog channel will write the message to the system log; however, since the error message is not critical or above, it will not be sent to Slack. However, if we log an emergency message, it will be sent to both the system log and Slack since the emergency level is above our minimum level threshold for both channels:

```
Log::emergency('The system is down!');
```

# **Writing Log Messages**

You may write information to the logs using the Log <u>facade</u>. As previously mentioned, the logger provides the eight logging levels defined in the <u>RFC 5424 specification</u>: **emergency**, **alert**, **critical**, **error**, **warning**, **notice**, **info** and **debug**:

```
Log::emergency($message);
Log::alert($message);
Log::critical($message);
Log::error($message);
Log::warning($message);
Log::notice($message);
Log::info($message);
Log::debug($message);
```

So, you may call any of these methods to log a message for the corresponding level. By default, the message will be written to the default log channel as configured by your configuration file:

```
<?php

namespace App\Http\Controllers;

use App\User;
use Illuminate\Support\Facades\Log;
use App\Http\Controllers\Controller;

class UserController extends Controller
{
    /**
     * Show the profile for the given user.
     *
     * @param int $id
     * @return Response
     */
    public function showProfile($id)
     {
        Log::info('Showing user profile for user: '.$id);
        return view('user.profile', ['user' => User::findOrFail($id)]);
     }
}
```

#### **Contextual Information**

An array of contextual data may also be passed to the log methods. This contextual data will be formatted and displayed with the log message:

```
Log::info('User failed to login.', ['id' => $user->id]);
```

### **Writing To Specific Channels**

Sometimes you may wish to log a message to a channel other than your application's default channel. You may use the channel method on the Log facade to retrieve and log to any channel defined in your configuration file:

```
Log::channel('slack')->info('Something happened!');
```

If you would like to create an on-demand logging stack consisting of multiple channels, you may use the stack method:

```
Log::stack(['single', 'slack'])->info('Something happened!');
```

# **Advanced Monolog Channel Customization**

### **Customizing Monolog For Channels**

Sometimes you may need complete control over how Monolog is configured for an existing channel. For example, you may want to configure a custom Monolog FormatterInterface implementation for a given channel's handlers.

To get started, define a tap array on the channel's configuration. The tap array should contain a list of classes that should have an opportunity to customize (or "tap" into) the Monolog instance after it is created:

```
'single' => [
  'driver' => 'single',
  'tap' => [App\Logging\CustomizeFormatter::class],
  'path' => storage_path('logs/laravel.log'),
  'level' => 'debug',
],
```

Once you have configured the tap option on your channel, you're ready to define the class that will customize your Monolog instance. This class only needs a single method: \_\_invoke, which receives an Illuminate\Log\Logger instance. The Illuminate\Log\Logger instance proxies all method calls to the underlying Monolog instance:

TIP All of your "tap" classes are resolved by the <u>service container</u>, so any constructor dependencies they require will automatically be injected.

### **Creating Monolog Handler Channels**

Monolog has a variety of <u>available handlers</u>. In some cases, the type of logger you wish to create is merely a Monolog driver with an instance of a specific handler. These channels can be created using the monolog driver.

When using the monolog driver, the handler configuration option is used to specify which handler will be instantiated. Optionally, any constructor parameters the handler needs may be specified using the handler\_with configuration option:

```
'logentries' => [
   'driver' => 'monolog',
   'handler' => Monolog\Handler\SyslogUdpHandler::class,
   'handler_with' => [
        'host' => 'my.logentries.internal.datahubhost.company.com',
        'port' => '10000',
   ],
```

],

### **Monolog Formatters**

When using the monolog driver, the Monolog LineFormatter will be used as the default formatter. However, you may customize the type of formatter passed to the handler using the formatter and formatter\_with configuration options:

```
'browser' => [
   'driver' => 'monolog',
   'handler' => Monolog\Handler\BrowserConsoleHandler::class,
   'formatter' => Monolog\Formatter\HtmlFormatter::class,
   'formatter_with' => [
        'dateFormat' => 'Y-m-d',
   ],
],
```

If you are using a Monolog handler that is capable of providing its own formatter, you may set the value of the formatter configuration option to default:

```
'newrelic' => [
   'driver' => 'monolog',
   'handler' => Monolog\Handler\NewRelicHandler::class,
   'formatter' => 'default',
],
```

### **Creating Channels Via Factories**

If you would like to define an entirely custom channel in which you have full control over Monolog's instantiation and configuration, you may specify a custom driver type in your configuration php configuration file. Your configuration should include a via option to point to the factory class which will be invoked to create the Monolog instance:

```
'channels' => [
   'custom' => [
     'driver' => 'custom',
     'via' => App\Logging\CreateCustomLogger::class,
   ],
],
```

Once you have configured the custom channel, you're ready to define the class that will create your Monolog instance. This class only needs a single method: \_\_invoke, which should return the Monolog instance:

```
<?php
namespace App\Logging;
use Monolog\Logger;

class CreateCustomLogger
{
     /**
     * Create a custom Monolog instance.
     *
     * @param array $config
     * @return \Monolog\Logger
     */
    public function __invoke(array $config)
     {
          return new Logger(...);
     }
}</pre>
```

#### **Frontend**

# **Blade Templates**

- Introduction
- Template Inheritance
  - o Defining A Layout
  - Extending A Layout
- Components & Slots
- Displaying Data
  - o Blade & JavaScript Frameworks
- Control Structures
  - If Statements
  - Switch Statements
  - Loops
  - The Loop Variable
  - Comments
  - o PHP
- Forms
  - CSRF Field
  - o Method Field
- Including Sub-Views
  - Rendering Views For Collections
- Stacks
- Service Injection
- Extending Blade
  - Custom If Statements

### Introduction

Blade is the simple, yet powerful templating engine provided with Laravel. Unlike other popular PHP templating engines, Blade does not restrict you from using plain PHP code in your views. In fact, all Blade views are compiled into plain PHP code and cached until they are modified, meaning Blade adds essentially zero overhead to your application. Blade view files use the .blade.php file extension and are typically stored in the resources/views directory.

# **Template Inheritance**

## **Defining A Layout**

Two of the primary benefits of using Blade are *template inheritance* and *sections*. To get started, let's take a look at a simple example. First, we will examine a "master" page layout. Since most web applications maintain the same general layout across various pages, it's convenient to define this layout as a single Blade view:

As you can see, this file contains typical HTML mark-up. However, take note of the @section and @yield directives. The @section directive, as the name implies, defines a section of content, while the @yield directive is used to display the contents of a given section.

Now that we have defined a layout for our application, let's define a child page that inherits the layout.

### **Extending A Layout**

When defining a child view, use the Blade @extends directive to specify which layout the child view should "inherit". Views which extend a Blade layout may inject content into the layout's sections using @section directives. Remember, as seen in the

example above, the contents of these sections will be displayed in the layout using @yield:

```
<!-- Stored in resources/views/child.blade.php -->
@extends('layouts.app')
@section('title', 'Page Title')
@section('sidebar')
    @parent
    This is appended to the master sidebar.
@endsection
@section('content')
    This is my body content.
@endsection
```

In this example, the sidebar section is utilizing the <code>@@parent</code> directive to append (rather than overwriting) content to the layout's sidebar. The <code>@@parent</code> directive will be replaced by the content of the layout when the view is rendered.

TIP Contrary to the previous example, this sidebar section ends with @endsection instead of @show. The @endsection directive will only define a section while @show will define and **immediately yield** the section.

Blade views may be returned from routes using the global view helper:

```
Route::get('blade', function () {
    return view('child');
});
```

# **Components & Slots**

Components and slots provide similar benefits to sections and layouts; however, some may find the mental model of components and slots easier to understand. First, let's imagine a reusable "alert" component we would like to reuse throughout our application:

The {{ \$slot }} variable will contain the content we wish to inject into the component. Now, to construct this component use the @component Blade directive:

Sometimes it is helpful to define multiple slots for a component. Let's modify our alert component to allow for the injection of a "title". Named slots may be displayed by "echoing" the variable that matches their name:

Now, we can inject content into the named slot using the @slot directive. Any content not within a @slot directive will be passed to the component in the \$slot variable:

```
@component('alert')
    @slot('title')
        Forbidden
    @endslot

You are not allowed to access this resource!
@endcomponent
```

#### **Passing Additional Data To Components**

Sometimes you may need to pass additional data to a component. For this reason, you can pass an array of data as the second argument to the @component directive. All of the data will be made available to the component template as variables:

```
@component('alert', ['foo' => 'bar'])
    ...
@endcomponent
```

#### **Aliasing Components**

If your Blade components are stored in a sub-directory, you may wish to alias them for easier access. For example, imagine a Blade component that is stored at resources/views/components/alert.blade.php. You may use the component method to alias the component from components.alert to alert. Typically, this should be done in the boot method of your AppServiceProvider:

```
use Illuminate\Support\Facades\Blade;
Blade::component('components.alert', 'alert');
Once the component has been aliased, you may render it using a directive:
@alert(['type' => 'danger'])
    You are not allowed to access this resource!
@endalert
You may omit the component parameters if it has no additional slots:
@alert
    You are not allowed to access this resource!
@endalert
```

# **Displaying Data**

You may display data passed to your Blade views by wrapping the variable in curly braces. For example, given the following route:

```
Route::get('greeting', function () {
    return view('welcome', ['name' => 'Samantha']);
});
```

You may display the contents of the name variable like so:

```
Hello, {{ $name }}.
```

TIP Blade {{ }} statements are automatically sent through PHP's htmlspecialchars function to prevent XSS attacks.

Of course, you are not limited to displaying the contents of the variables passed to the view. You may also echo the results of any PHP function. In fact, you can put any PHP code you wish inside of a Blade echo statement:

```
The current UNIX timestamp is \{\{\ time()\ \}\}.
```

#### **Displaying Unescaped Data**

By default, Blade {{ }} statements are automatically sent through PHP's htmlspecialchars function to prevent XSS attacks. If you do not want your data to be escaped, you may use the following syntax:

```
Hello, {!! $name !!}.
```

NOTE Be very careful when echoing content that is supplied by users of your application. Always use the escaped, double curly brace syntax to prevent XSS attacks when displaying user supplied data.

### Rendering JSON

Sometimes you may pass an array to your view with the intention of rendering it as JSON in order to initialize a JavaScript variable. For example:

```
<script>
   var app = <?php echo json_encode($array); ?>;
</script>
```

However, instead of manually calling json\_encode, you may use the @json Blade directive:

```
<script>
  var app = @json($array);
</script>
```

### **HTML Entity Encoding**

By default, Blade (and the Laravel e helper) will double encode HTML entities. If you would like to disable double encoding, call the Blade::withoutDoubleEncoding method from the boot method of your AppServiceProvider:

```
<?php
namespace App\Providers;</pre>
```

```
use Illuminate\Support\Facades\Blade;
use Illuminate\Support\ServiceProvider;

class AppServiceProvider extends ServiceProvider
{
     /**
     * Bootstrap any application services.
     *
     * @return void
     */
    public function boot()
     {
          Blade::withoutDoubleEncoding();
     }
}
```

### **Blade & JavaScript Frameworks**

Since many JavaScript frameworks also use "curly" braces to indicate a given expression should be displayed in the browser, you may use the @ symbol to inform the Blade rendering engine an expression should remain untouched. For example:

```
<h1>Laravel</h1>
Hello, @{{ name }}.
```

In this example, the @ symbol will be removed by Blade; however, {{ name }} expression will remain untouched by the Blade engine, allowing it to instead be rendered by your JavaScript framework.

### The @verbatim Directive

If you are displaying JavaScript variables in a large portion of your template, you may wrap the HTML in the @verbatim directive so that you do not have to prefix each Blade echo statement with an @ symbol:

### **Control Structures**

In addition to template inheritance and displaying data, Blade also provides convenient shortcuts for common PHP control structures, such as conditional statements and loops. These shortcuts provide a very clean, terse way of working with PHP control structures, while also remaining familiar to their PHP counterparts.

### If Statements

You may construct if statements using the @if, @elseif, @else, and @endif directives. These directives function identically to their PHP counterparts:

```
@if (count($records) === 1)
    I have one record!
@elseif (count($records) > 1)
    I have multiple records!
@else
    I don't have any records!
@endif
```

For convenience, Blade also provides an @unless directive:

```
@unless (Auth::check())
   You are not signed in.
@endunless
```

In addition to the conditional directives already discussed, the @isset and @empty directives may be used as convenient shortcuts for their respective PHP functions:

```
@isset($records)
    // $records is defined and is not null...
@endisset

@empty($records)
    // $records is "empty"...
@endempty
```

### **Authentication Directives**

The @auth and @guest directives may be used to quickly determine if the current user is authenticated or is a guest:

```
@auth
    // The user is authenticated...
@endauth

@guest
    // The user is not authenticated...
@endguest
```

If needed, you may specify the authentication guard that should be checked when using the @auth and @guest directives:

```
@auth('admin')
    // The user is authenticated...
@endauth

@guest('admin')
    // The user is not authenticated...
@endguest
```

#### **Section Directives**

You may check if a section has content using the @hasSection directive:

### **Switch Statements**

Switch statements can be constructed using the <code>@switch</code>, <code>@case</code>, <code>@break</code>, <code>@default</code> and <code>@endswitch</code> directives:

```
@switch($i)
    @case(1)
        First case...
    @break

@case(2)
        Second case...
    @break

@default
        Default case...
@endswitch
```

### Loops

In addition to conditional statements, Blade provides simple directives for working with PHP's loop structures. Again, each of these directives functions identically to their PHP counterparts:

TIP When looping, you may use the <u>loop variable</u> to gain valuable information about the loop, such as whether you are in the first or last iteration through the loop.

When using loops you may also end the loop or skip the current iteration:

```
@foreach ($users as $user)
  @if ($user->type == 1)
          @continue
  @endif
```

```
{{ $user->name }}
@if ($user->number == 5)
    @break
    @endif
@endforeach
```

You may also include the condition with the directive declaration in one line:

```
@foreach ($users as $user)
    @continue($user->type == 1)
    {{ $user->name }}
          @break($user->number == 5)
@endforeach
```

## The Loop Variable

When looping, a \$100p variable will be available inside of your loop. This variable provides access to some useful bits of information such as the current loop index and whether this is the first or last iteration through the loop:

```
@foreach ($users as $user)
   @if ($loop->first)
        This is the first iteration.
   @endif

   @if ($loop->last)
        This is the last iteration.
   @endif

   This is user {{ $user->id }}
@endforeach
```

If you are in a nested loop, you may access the parent loop's \$loop variable via the parent property:

The \$loop variable also contains a variety of other useful properties:

Property	Description
<pre>\$loop-&gt;index</pre>	The index of the current loop iteration (starts at 0).
<pre>\$loop-&gt;iteration</pre>	The current loop iteration (starts at 1).
<pre>\$loop-&gt;remaining</pre>	The iterations remaining in the loop.
\$loop->count	The total number of items in the array being iterated.
<pre>\$loop-&gt;first</pre>	Whether this is the first iteration through the loop.
<pre>\$loop-&gt;last</pre>	Whether this is the last iteration through the loop.
\$loop->depth	The nesting level of the current loop.
<pre>\$loop-&gt;parent</pre>	When in a nested loop, the parent's loop variable.

### **Comments**

Blade also allows you to define comments in your views. However, unlike HTML comments, Blade comments are not included in the HTML returned by your application:

```
{{-- This comment will not be present in the rendered HTML --}}
```

### **PHP**

In some situations, it's useful to embed PHP code into your views. You can use the Blade <code>@php</code> directive to execute a block of plain PHP within your template:

```
@php
    //
@endphp
```

TIP While Blade provides this feature, using it frequently may be a signal that you have too much logic embedded within your template.

### **Forms**

#### **CSRF Field**

Anytime you define a HTML form in your application, you should include a hidden CSRF token field in the form so that the CSRF protection middleware can validate the request. You may use the @csrf Blade directive to generate the token field:

```
<form method="POST" action="/profile">
@csrf
...
</form>
```

#### **Method Field**

Since HTML forms can't make PUT, PATCH, or DELETE requests, you will need to add a hidden \_method field to spoof these HTTP verbs. The @method Blade directive can create this field for you:

```
<form action="/foo/bar" method="POST">
@method('PUT')
...
</form>
```

# **Including Sub-Views**

Blade's @include directive allows you to include a Blade view from within another view. All variables that are available to the parent view will be made available to the included view:

```
<div>
@include('shared.errors')

<form>
    <!-- Form Contents -->
    </form>
</div>
```

Even though the included view will inherit all data available in the parent view, you may also pass an array of extra data to the included view:

```
@include('view.name', ['some' => 'data'])
```

Of course, if you attempt to @include a view which does not exist, Laravel will throw an error. If you would like to include a view that may or may not be present, you should use the @includeIf directive:

```
@includeIf('view.name', ['some' => 'data'])
```

If you would like to @include a view depending on a given boolean condition, you may use the @includeWhen directive:

```
@includeWhen($boolean, 'view.name', ['some' => 'data'])
```

To include the first view that exists from a given array of views, you may use the includeFirst directive:

```
@includeFirst(['custom.admin', 'admin'], ['some' => 'data'])
```

NOTE You should avoid using the \_\_DIR\_\_ and \_\_FILE\_\_ constants in your Blade views, since they will refer to the location of the cached, compiled view.

### **Rendering Views For Collections**

You may combine loops and includes into one line with Blade's @each directive:

```
@each('view.name', $jobs, 'job')
```

The first argument is the view partial to render for each element in the array or collection. The second argument is the array or collection you wish to iterate over, while the third argument is the variable name that will be assigned to the current iteration within the view. So, for example, if you are iterating over an array of jobs, typically you will want to access each job as a job variable within your view partial. The key for the current iteration will be available as the key variable within your view partial.

You may also pass a fourth argument to the @each directive. This argument determines the view that will be rendered if the given array is empty.

```
@each('view.name', $jobs, 'job', 'view.empty')
```

NOTE Views rendered via @each do not inherit the variables from the parent view. If the child view requires these variables,

you should use @foreach and @include instead.

### **Stacks**

Blade allows you to push to named stacks which can be rendered somewhere else in another view or layout. This can be particularly useful for specifying any JavaScript libraries required by your child views:

You may push to a stack as many times as needed. To render the complete stack contents, pass the name of the stack to the @stack directive:

```
<head>
     <!-- Head Contents -->
     @stack('scripts')
</head>
```

If you would like to prepend content onto the beginning of a stack, you should use the @prepend directive:

```
@push('scripts')
   This will be second...
@endpush
// Later...
@prepend('scripts')
   This will be first...
@endprepend
```

## **Service Injection**

The @inject directive may be used to retrieve a service from the Laravel service container. The first argument passed to @inject is the name of the variable the service will be placed into, while the second argument is the class or interface name of the service you wish to resolve:

# **Extending Blade**

Blade allows you to define your own custom directives using the directive method. When the Blade compiler encounters the custom directive, it will call the provided callback with the expression that the directive contains.

The following example creates a @datetime(\$var) directive which formats a given \$var, which should be an instance of DateTime:

```
}
```

As you can see, we will chain the format method onto whatever expression is passed into the directive. So, in this example, the final PHP generated by this directive will be:

```
<?php echo ($var)->format('m/d/Y H:i'); ?>
```

NOTE After updating the logic of a Blade directive, you will need to delete all of the cached Blade views. The cached Blade views may be removed using the view:clear Artisan command.

#### **Custom If Statements**

Programming a custom directive is sometimes more complex than necessary when defining simple, custom conditional statements. For that reason, Blade provides a Blade::if method which allows you to quickly define custom conditional directives using Closures. For example, let's define a custom conditional that checks the current application environment. We may do this in the boot method of our AppServiceProvider:

use Illuminate\Support\Facades\Blade;

```
/**
  * Perform post-registration booting of services.
  *
  *@return void
  */
public function boot()
{
    Blade::if('env', function ($environment) {
        return app()->environment($environment);
    });
}
```

Once the custom conditional has been defined, we can easily use it on our templates:

```
@env('local')
   // The application is in the local environment...
@elseenv('testing')
   // The application is in the testing environment...
@else
   // The application is not in the local or testing environment...
@endenv
```

#### **Frontend**

# Localization

- Introduction
  - o Configuring The Locale
- Defining Translation Strings
  - Using Short Keys
  - o Using Translation Strings As Keys
- Retrieving Translation Strings
  - o Replacing Parameters In Translation Strings
  - Pluralization
- Overriding Package Language Files

# Introduction

Laravel's localization features provide a convenient way to retrieve strings in various languages, allowing you to easily support multiple languages within your application. Language strings are stored in files within the resources/lang directory. Within this directory there should be a subdirectory for each language supported by the application:

```
/resources
/lang
/en
messages.php
/es
messages.php
```

All language files return an array of keyed strings. For example:

```
<?php
return [
    'welcome' => 'Welcome to our application'
];
```

### **Configuring The Locale**

The default language for your application is stored in the <code>config/app.php</code> configuration file. Of course, you may modify this value to suit the needs of your application. You may also change the active language at runtime using the <code>setLocale</code> method on the <code>App</code> facade:

```
Route::get('welcome/{locale}', function ($locale) {
   App::setLocale($locale);
   //
});
```

You may configure a "fallback language", which will be used when the active language does not contain a given translation string. Like the default language, the fallback language is also configured in the config/app.php configuration file:

```
'fallback_locale' => 'en',
```

### **Determining The Current Locale**

You may use the getLocale and isLocale methods on the App facade to determine the current locale or check if the locale is a given value:

```
$locale = App::getLocale();
if (App::isLocale('en')) {
    //
}
```

# **Defining Translation Strings**

### **Using Short Keys**

Typically, translation strings are stored in files within the resources/lang directory. Within this directory there should be a subdirectory for each language supported by the application:

```
/resources
/lang
/e
```

```
messages.php
/es
messages.php
```

All language files return an array of keyed strings. For example:

```
<?php
// resources/lang/en/messages.php
return [
    'welcome' => 'Welcome to our application'
];
```

### **Using Translation Strings As Keys**

For applications with heavy translation requirements, defining every string with a "short key" can become quickly confusing when referencing them in your views. For this reason, Laravel also provides support for defining translation strings using the "default" translation of the string as the key.

Translation files that use translation strings as keys are stored as JSON files in the resources/lang directory. For example, if your application has a Spanish translation, you should create a resources/lang/es.json file:

```
{
    "I love programming.": "Me encanta programar."
}
```

# **Retrieving Translation Strings**

You may retrieve lines from language files using the \_\_ helper function. The \_\_ method accepts the file and key of the translation string as its first argument. For example, let's retrieve the welcome translation string from the resources/lang/messages.php language file:

```
echo __('messages.welcome');
echo __('I love programming.');
```

Of course if you are using the <u>Blade templating engine</u>, you may use the {{ }} syntax to echo the translation string or use the @lang directive:

```
{{ __('messages.welcome') }}
@lang('messages.welcome')
```

If the specified translation string does not exist, the \_\_ function will return the translation string key. So, using the example above, the \_\_ function would return messages.welcome if the translation string does not exist.

NOTE The @lang directive does not escape any output. You are **fully responsible** for escaping your own output when using this directive.

### **Replacing Parameters In Translation Strings**

If you wish, you may define placeholders in your translation strings. All placeholders are prefixed with a :. For example, you may define a welcome message with a placeholder name:

```
'welcome' => 'Welcome, :name',
```

To replace the placeholders when retrieving a translation string, pass an array of replacements as the second argument to the \_\_ function:

```
echo __('messages.welcome', ['name' => 'dayle']);
```

If your placeholder contains all capital letters, or only has its first letter capitalized, the translated value will be capitalized accordingly:

```
'welcome' => 'Welcome, :NAME', // Welcome, DAYLE 'goodbye' => 'Goodbye, :Name', // Goodbye, Dayle
```

### **Pluralization**

Pluralization is a complex problem, as different languages have a variety of complex rules for pluralization. By using a "pipe" character, you may distinguish singular and plural forms of a string:

```
'apples' => 'There is one apple|There are many apples',
```

You may even create more complex pluralization rules which specify translation strings for multiple number ranges:

```
'apples' => '{0} There are none|[1,19] There are some|[20,*] There are many',
```

After defining a translation string that has pluralization options, you may use the trans\_choice function to retrieve the line for a given "count". In this example, since the count is greater than one, the plural form of the translation string is returned:

```
echo trans_choice('messages.apples', 10);
```

You may also define placeholder attributes in pluralization strings. These placeholders may be replaced by passing an array as the third argument to the trans\_choice function:

```
'minutes_ago' => '{1} :value minute ago|[2,*] :value minutes ago',
echo trans_choice('time.minutes_ago', 5, ['value' => 5]);
```

If you would like to display the integer value that was passed to the trans\_choice function, you may use the :count placeholder:

```
'apples' \Rightarrow '{0} There are none|{1} There is one|[2,*] There are :count',
```

# **Overriding Package Language Files**

Some packages may ship with their own language files. Instead of changing the package's core files to tweak these lines, you may override them by placing files in the resources/lang/vendor/{package}/{locale} directory.

So, for example, if you need to override the English translation strings in messages.php for a package named skyrim/hearthfire, you should place a language file at: resources/lang/vendor/hearthfire/en/messages.php. Within this file, you should only define the translation strings you wish to override. Any translation strings you don't override will still be loaded from the package's original language files.

#### **Frontend**

# **JavaScript & CSS Scaffolding**

- Introduction
- Writing CSS
- Writing JavaScript
  - Writing Vue Components
  - Using React

### Introduction

While Laravel does not dictate which JavaScript or CSS pre-processors you use, it does provide a basic starting point using Bootstrap and Vue that will be helpful for many applications. By default, Laravel uses NPM to install both of these frontend packages.

### CSS

<u>Laravel Mix</u> provides a clean, expressive API over compiling SASS or Less, which are extensions of plain CSS that add variables, mixins, and other powerful features that make working with CSS much more enjoyable. In this document, we will briefly discuss CSS compilation in general; however, you should consult the full <u>Laravel Mix documentation</u> for more information on compiling SASS or Less.

#### **JavaScript**

Laravel does not require you to use a specific JavaScript framework or library to build your applications. In fact, you don't have to use JavaScript at all. However, Laravel does include some basic scaffolding to make it easier to get started writing modern JavaScript using the <u>Vue</u> library. Vue provides an expressive API for building robust JavaScript applications using components. As with CSS, we may use Laravel Mix to easily compile JavaScript components into a single, browser-ready JavaScript file.

#### **Removing The Frontend Scaffolding**

If you would like to remove the frontend scaffolding from your application, you may use the preset Artisan command. This command, when combined with the none option, will remove the Bootstrap and Vue scaffolding from your application, leaving only a blank SASS file and a few common JavaScript utility libraries:

php artisan preset none

### **Writing CSS**

Laravel's package.json file includes the bootstrap package to help you get started prototyping your application's frontend using Bootstrap. However, feel free to add or remove packages from the package.json file as needed for your own application. You are not required to use the Bootstrap framework to build your Laravel application - it is provided as a good starting point for those who choose to use it.

Before compiling your CSS, install your project's frontend dependencies using the Node package manager (NPM):

npm install

Once the dependencies have been installed using npm install, you can compile your SASS files to plain CSS using <u>Laravel Mix</u>. The npm run dev command will process the instructions in your webpack.mix.js file. Typically, your compiled CSS will be placed in the public/css directory:

npm run dev

The default webpack.mix.js included with Laravel will compile the resources/sass/app.scss SASS file. This app.scss file imports a file of SASS variables and loads Bootstrap, which provides a good starting point for most applications. Feel free to customize the app.scss file however you wish or even use an entirely different pre-processor by configuring Laravel Mix.

# **Writing JavaScript**

All of the JavaScript dependencies required by your application can be found in the package.json file in the project's root directory. This file is similar to a composer.json file except it specifies JavaScript dependencies instead of PHP dependencies. You can install these dependencies using the <a href="Node package manager">Node package manager</a> (NPM):

npm install

TIP By default, the Laravel package.json file includes a few packages such as vue and axios to help you get started building your JavaScript application. Feel free to add or remove from the package.json file as needed for your own application.

Once the packages are installed, you can use the <code>npm run dev</code> command to <code>compile your assets</code>. Webpack is a module bundler for modern JavaScript applications. When you run the <code>npm run dev</code> command, Webpack will execute the instructions in your <code>webpack.mix.js</code> file:

```
npm run dev
```

By default, the Laravel webpack.mix.js file compiles your SASS and the resources/js/app.js file. Within the app.js file you may register your Vue components or, if you prefer a different framework, configure your own JavaScript application. Your compiled JavaScript will typically be placed in the public/js directory.

TIP The app.js file will load the resources/js/bootstrap.js file which bootstraps and configures Vue, Axios, jQuery, and all other JavaScript dependencies. If you have additional JavaScript dependencies to configure, you may do so in this file.

### **Writing Vue Components**

By default, fresh Laravel applications contain an <code>ExampleComponent.vue</code> Vue component located in the <code>resources/js/components</code> directory. The <code>ExampleComponent.vue</code> file is an example of a <a href="single-file-Vue component">single-file-Vue component</a> which defines its JavaScript and HTML template in the same file. Single file components provide a very convenient approach to building JavaScript driven applications. The example component is registered in your <code>app.js</code> file:

```
Vue.component(
    'example-component',
    require('./components/ExampleComponent.vue'));
```

To use the component in your application, you may drop it into one of your HTML templates. For example, after running the make:auth Artisan command to scaffold your application's authentication and registration screens, you could drop the component into the home.blade.php Blade template:

TIP Remember, you should run the npm run dev command each time you change a Vue component. Or, you may run the npm run watch command to monitor and automatically recompile your components each time they are modified.

Of course, if you are interested in learning more about writing Vue components, you should read the <u>Vue documentation</u>, which provides a thorough, easy-to-read overview of the entire Vue framework.

# **Using React**

If you prefer to use React to build your JavaScript application, Laravel makes it a cinch to swap the Vue scaffolding with React scaffolding. On any fresh Laravel application, you may use the preset command with the react option:

```
php artisan preset react
```

This single command will remove the Vue scaffolding and replace it with React scaffolding, including an example component.

#### **Frontend**

# **Compiling Assets (Mix)**

- Introduction
- Installation & Setup
- Running Mix
- Working With Stylesheets
  - o <u>Less</u>
  - o Sass
  - o Stylus
  - PostCSS
  - Plain CSS
  - URL Processing
  - Source Maps
- Working With JavaScript
  - <u>Vendor Extraction</u>
  - o React
  - <u>Vanilla JS</u>
  - Custom Webpack Configuration
- Copying Files & Directories
- Versioning / Cache Busting
- Browsersync Reloading
- Environment Variables
- Notifications

### Introduction

<u>Laravel Mix</u> provides a fluent API for defining Webpack build steps for your Laravel application using several common CSS and JavaScript pre-processors. Through simple method chaining, you can fluently define your asset pipeline. For example:

```
mix.js('resources/js/app.js', 'public/js')
    .sass('resources/sass/app.scss', 'public/css');
```

If you've ever been confused and overwhelmed about getting started with Webpack and asset compilation, you will love Laravel Mix. However, you are not required to use it while developing your application. Of course, you are free to use any asset pipeline tool you wish, or even none at all.

# **Installation & Setup**

### **Installing Node**

Before triggering Mix, you must first ensure that Node.js and NPM are installed on your machine.

```
node -v
npm -v
```

By default, Laravel Homestead includes everything you need; however, if you aren't using Vagrant, then you can easily install the latest version of Node and NPM using simple graphical installers from their download page.

### Laravel Mix

The only remaining step is to install Laravel Mix. Within a fresh installation of Laravel, you'll find a package.json file in the root of your directory structure. The default package.json file includes everything you need to get started. Think of this like your composer.json file, except it defines Node dependencies instead of PHP. You may install the dependencies it references by running:

npm install

# **Running Mix**

Mix is a configuration layer on top of Webpack, so to run your Mix tasks you only need to execute one of the NPM scripts that is included with the default Laravel package.json file:

```
// Run all Mix tasks...
npm run dev
// Run all Mix tasks and minify output...
npm run production
```

#### **Watching Assets For Changes**

The npm run watch command will continue running in your terminal and watch all relevant files for changes. Webpack will then automatically recompile your assets when it detects a change:

```
npm run watch
```

You may find that in certain environments Webpack isn't updating when your files change. If this is the case on your system, consider using the watch-poll command:

```
npm run watch-poll
```

# **Working With Stylesheets**

The webpack.mix.js file is your entry point for all asset compilation. Think of it as a light configuration wrapper around Webpack. Mix tasks can be chained together to define exactly how your assets should be compiled.

#### Less

The less method may be used to compile Less into CSS. Let's compile our primary app.less file to public/css/app.css.

```
mix.less('resources/less/app.less', 'public/css');
```

Multiple calls to the less method may be used to compile multiple files:

```
mix.less('resources/less/app.less', 'public/css')
   .less('resources/less/admin.less', 'public/css');
```

If you wish to customize the file name of the compiled CSS, you may pass a full file path as the second argument to the less method:

```
mix.less('resources/less/app.less', 'public/stylesheets/styles.css');
```

If you need to override the underlying Less plug-in options, you may pass an object as the third argument to mix.less():

```
mix.less('resources/less/app.less', 'public/css', {
    strictMath: true
});
```

### Sass

The sass method allows you to compile Sass into CSS. You may use the method like so:

```
mix.sass('resources/sass/app.scss', 'public/css');
```

Again, like the less method, you may compile multiple Sass files into their own respective CSS files and even customize the output directory of the resulting CSS:

```
mix.sass('resources/sass/app.sass', 'public/css')
    .sass('resources/sass/admin.sass', 'public/css/admin');
```

Additional Node-Sass plug-in options may be provided as the third argument:

```
mix.sass('resources/sass/app.sass', 'public/css', {
    precision: 5
});
```

#### Stylus

Similar to Less and Sass, the stylus method allows you to compile **Stylus** into CSS:

```
mix.stylus('resources/stylus/app.styl', 'public/css');
```

You may also install additional Stylus plug-ins, such as <a href="Rupture">Rupture</a>. First, install the plug-in in question through NPM (npm install rupture) and then require it in your call to mix.stylus():

### **PostCSS**

PostCSS, a powerful tool for transforming your CSS, is included with Laravel Mix out of the box. By default, Mix leverages the

popular <u>Autoprefixer</u> plug-in to automatically apply all necessary CSS3 vendor prefixes. However, you're free to add any additional plug-ins that are appropriate for your application. First, install the desired plug-in through NPM and then reference it in your webpack.mix.js file:

#### **Plain CSS**

If you would just like to concatenate some plain CSS stylesheets into a single file, you may use the styles method.

```
mix.styles([
    'public/css/vendor/normalize.css',
    'public/css/vendor/videojs.css'
], 'public/css/all.css');
```

#### **URL Processing**

Because Laravel Mix is built on top of Webpack, it's important to understand a few Webpack concepts. For CSS compilation, Webpack will rewrite and optimize any url() calls within your stylesheets. While this might initially sound strange, it's an incredibly powerful piece of functionality. Imagine that we want to compile Sass that includes a relative URL to an image:

```
.example {
    background: url('../images/example.png');
}
```

NOTE Absolute paths for any given url() will be excluded from URL-rewriting. For example, url('/images/thing.png') or url('http://example.com/images/thing.png') won't be modified.

By default, Laravel Mix and Webpack will find example.png, copy it to your public/images folder, and then rewrite the url() within your generated stylesheet. As such, your compiled CSS will be:

```
.example {
  background: url(/images/example.png?d41d8cd98f00b204e9800998ecf8427e);
}
```

As useful as this feature may be, it's possible that your existing folder structure is already configured in a way you like. If this is the case, you may disable url() rewriting like so:

```
mix.sass('resources/app/app.scss', 'public/css')
    .options({
        processCssUrls: false
    }):
```

With this addition to your webpack.mix.js file, Mix will no longer match any url() or copy assets to your public directory. In other words, the compiled CSS will look just like how you originally typed it:

```
.example {
    background: url("../images/thing.png");
}
```

#### **Source Maps**

Though disabled by default, source maps may be activated by calling the mix.sourceMaps() method in your webpack.mix.js file. Though it comes with a compile/performance cost, this will provide extra debugging information to your browser's developer tools when using compiled assets.

```
mix.js('resources/js/app.js', 'public/js')
    .sourceMaps();
```

# **Working With JavaScript**

Mix provides several features to help you work with your JavaScript files, such as compiling ECMAScript 2015, module bundling, minification, and concatenating plain JavaScript files. Even better, this all works seamlessly, without requiring an ounce of custom configuration:

```
mix.js('resources/js/app.js', 'public/js');
```

With this single line of code, you may now take advantage of:

- ES2015 syntax.
- Modules

- Compilation of .vue files.
- · Minification for production environments.

#### **Vendor Extraction**

One potential downside to bundling all application-specific JavaScript with your vendor libraries is that it makes long-term caching more difficult. For example, a single update to your application code will force the browser to re-download all of your vendor libraries even if they haven't changed.

If you intend to make frequent updates to your application's JavaScript, you should consider extracting all of your vendor libraries into their own file. This way, a change to your application code will not affect the caching of your large vendor.js file. Mix's extract method makes this a breeze:

```
mix.js('resources/js/app.js', 'public/js')
    .extract(['vue'])
```

The extract method accepts an array of all libraries or modules that you wish to extract into a vendor.js file. Using the above snippet as an example, Mix will generate the following files:

- public/js/manifest.js: The Webpack manifest runtime
- public/js/vendor.js: Your vendor libraries
- public/js/app.js: Your application code

To avoid JavaScript errors, be sure to load these files in the proper order:

```
<script src="/js/manifest.js"></script>
<script src="/js/vendor.js"></script>
<script src="/js/app.js"></script>
```

#### React

Mix can automatically install the Babel plug-ins necessary for React support. To get started, replace your mix.js() call with mix.react():

```
mix.react('resources/js/app.jsx', 'public/js');
```

Behind the scenes, Mix will download and include the appropriate babel-preset-react Babel plug-in.

### Vanilla JS

Similar to combining stylesheets with mix.styles(), you may also combine and minify any number of JavaScript files with the scripts() method:

```
mix.scripts([
    'public/js/admin.js',
    'public/js/dashboard.js'
], 'public/js/all.js');
```

This option is particularly useful for legacy projects where you don't require Webpack compilation for your JavaScript.

TIP A slight variation of mix.scripts() is mix.babel(). Its method signature is identical to scripts; however, the concatenated file will receive Babel compilation, which translates any ES2015 code to vanilla JavaScript that all browsers will understand.

#### **Custom Webpack Configuration**

Behind the scenes, Laravel Mix references a pre-configured webpack.config.js file to get you up and running as quickly as possible. Occasionally, you may need to manually modify this file. You might have a special loader or plug-in that needs to be referenced, or maybe you prefer to use Stylus instead of Sass. In such instances, you have two choices:

#### **Merging Custom Configuration**

Mix provides a useful webpackconfig method that allows you to merge any short Webpack configuration overrides. This is a particularly appealing choice, as it doesn't require you to copy and maintain your own copy of the webpack.config.js file. The webpackconfig method accepts an object, which should contain any Webpack-specific configuration that you wish to apply.

#### **Custom Configuration Files**

If you would like to completely customize your Webpack configuration, copy the node\_modules/laravel-mix/setup/webpack.config.js file to your project's root directory. Next, point all of the --config references in your package.json file to the newly copied configuration file. If you choose to take this approach to customization, any future upstream updates to Mix's webpack.config.js must be manually merged into your customized file.

# **Copying Files & Directories**

The copy method may be used to copy files and directories to new locations. This can be useful when a particular asset within your node\_modules directory needs to be relocated to your public folder.

```
mix.copy('node_modules/foo/bar.css', 'public/css/bar.css');
```

When copying a directory, the copy method will flatten the directory's structure. To maintain the directory's original structure, you should use the copydirectory method instead:

```
mix.copyDirectory('resources/img', 'public/img');
```

# **Versioning / Cache Busting**

Many developers suffix their compiled assets with a timestamp or unique token to force browsers to load the fresh assets instead of serving stale copies of the code. Mix can handle this for you using the version method.

The version method will automatically append a unique hash to the filenames of all compiled files, allowing for more convenient cache busting:

```
mix.js('resources/js/app.js', 'public/js')
    .version();
```

After generating the versioned file, you won't know the exact file name. So, you should use Laravel's global mix function within your <u>views</u> to load the appropriately hashed asset. The mix function will automatically determine the current name of the hashed file:

```
<script src="{{ mix('/js/app.js') }}"></script>
```

Because versioned files are usually unnecessary in development, you may instruct the versioning process to only run during npm run production:

```
mix.js('resources/js/app.js', 'public/js');
if (mix.inProduction()) {
     mix.version();
}
```

# **Browsersync Reloading**

<u>BrowserSync</u> can automatically monitor your files for changes, and inject your changes into the browser without requiring a manual refresh. You may enable support by calling the mix.browserSync() method:

```
mix.browserSync('my-domain.test');
// Or...
// https://browsersync.io/docs/options
mix.browserSync({
    proxy: 'my-domain.test'
});
```

You may pass either a string (proxy) or object (BrowserSync settings) to this method. Next, start Webpack's dev server using the npm run watch command. Now, when you modify a script or PHP file, watch as the browser instantly refreshes the page to reflect your changes.

### **Environment Variables**

You may inject environment variables into Mix by prefixing a key in your .env file with MIX\_:

```
MIX_SENTRY_DSN_PUBLIC=http://example.com
```

After the variable has been defined in your .env file, you may access via the process.env object. If the value changes while you are running a watch task, you will need to restart the task:

```
process.env.MIX_SENTRY_DSN_PUBLIC
```

# **Notifications**

When available, Mix will automatically display OS notifications for each bundle. This will give you instant feedback, as to whether the compilation was successful or not. However, there may be instances when you'd prefer to disable these notifications. One such example might be triggering Mix on your production server. Notifications may be deactivated, via the disableNotifications method.

mix.disableNotifications();

#### Security

# Authentication

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### Introduction

TIP Want to get started fast? Just run php artisan make: auth and php artisan migrate in a fresh Laravel application. Then, navigate your browser to http://your-app.test/register or any other URL that is assigned to your application. These two commands will take care of scaffolding your entire authentication system!

Laravel makes implementing authentication very simple. In fact, almost everything is configured for you out of the box. The authentication configuration file is located at config/auth.php, which contains several well documented options for tweaking the behavior of the authentication services.

At its core, Laravel's authentication facilities are made up of "guards" and "providers". Guards define how users are authenticated for each request. For example, Laravel ships with a session guard which maintains state using session storage and cookies.

Providers define how users are retrieved from your persistent storage. Laravel ships with support for retrieving users using Eloquent and the database query builder. However, you are free to define additional providers as needed for your application.

Don't worry if this all sounds confusing now! Many applications will never need to modify the default authentication configuration.

### **Database Considerations**

By default, Laravel includes an App\User Eloquent model in your app directory. This model may be used with the default Eloquent authentication driver. If your application is not using Eloquent, you may use the database authentication driver which uses the Laravel query builder.

When building the database schema for the App\user model, make sure the password column is at least 60 characters in length. Maintaining the default string column length of 255 characters would be a good choice.

Also, you should verify that your users (or equivalent) table contains a nullable, string remember\_token column of 100 characters. This column will be used to store a token for users that select the "remember me" option when logging into your application.

# **Authentication Quickstart**

Laravel ships with several pre-built authentication controllers, which are located in the App\Http\Controllers\Auth namespace. The RegisterController handles new user registration, the LoginController handles authentication, the ForgotPasswordController handles e-mailing links for resetting passwords, and the ResetPasswordController contains the logic to reset passwords. Each of these controllers uses a trait to include their necessary methods. For many applications, you will not need to modify these controllers at all.

### Routing

Laravel provides a quick way to scaffold all of the routes and views you need for authentication using one simple command:

```
php artisan make:auth
```

This command should be used on fresh applications and will install a layout view, registration and login views, as well as routes for all authentication end-points. A HomeController will also be generated to handle post-login requests to your application's dashboard.

TIP If your application doesn't need registration, you may disable it by removing the newly created RegisterController and modifying your route declaration: Auth::routes(['register' => false]);.

#### Views

As mentioned in the previous section, the php artisan make:auth command will create all of the views you need for authentication and place them in the resources/views/auth directory.

The make: auth command will also create a resources/views/layouts directory containing a base layout for your application. All of these views use the Bootstrap CSS framework, but you are free to customize them however you wish.

### Authenticating

Now that you have routes and views setup for the included authentication controllers, you are ready to register and authenticate new users for your application! You may access your application in a browser since the authentication controllers already contain the logic (via their traits) to authenticate existing users and store new users in the database.

#### **Path Customization**

When a user is successfully authenticated, they will be redirected to the /home URI. You can customize the post-authentication redirect location by defining a redirectTo property on the LoginController, RegisterController, ResetPasswordController, and VerificationController:

```
protected $redirectTo = '/';
```

Next, you should modify the RedirectIfAuthenticated middleware's handle method to use your new URI when redirecting the

If the redirect path needs custom generation logic you may define a redirectTo method instead of a redirectTo property:

```
protected function redirectTo()
{
    return '/path';
}
```

TIP The redirectTo method will take precedence over the redirectTo attribute.

### **Username Customization**

By default, Laravel uses the email field for authentication. If you would like to customize this, you may define a username method on your LoginController:

```
public function username()
{
    return 'username';
}
```

#### **Guard Customization**

You may also customize the "guard" that is used to authenticate and register users. To get started, define a guard method on your LoginController, RegisterController, and ResetPasswordController. The method should return a guard instance:

```
use Illuminate\Support\Facades\Auth;
protected function guard()
{
    return Auth::guard('guard-name');
}
```

### Validation / Storage Customization

To modify the form fields that are required when a new user registers with your application, or to customize how new users are

stored into your database, you may modify the RegisterController class. This class is responsible for validating and creating new users of your application.

The validator method of the RegisterController contains the validation rules for new users of the application. You are free to modify this method as you wish.

The create method of the RegisterController is responsible for creating new App\User records in your database using the Eloquent ORM. You are free to modify this method according to the needs of your database.

### **Retrieving The Authenticated User**

You may access the authenticated user via the Auth facade:

```
use Illuminate\Support\Facades\Auth;

// Get the currently authenticated user...
$user = Auth::user();

// Get the currently authenticated user's ID...
$id = Auth::id();
```

Alternatively, once a user is authenticated, you may access the authenticated user via an Illuminate\Http\Request instance. Remember, type-hinted classes will automatically be injected into your controller methods:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
class ProfileController extends Controller
{
    /**
    * Update the user's profile.
    *
    * @param Request $request
    * @return Response
    */
    public function update(Request $request)
    {
        // $request->user() returns an instance of the authenticated user...
    }
}
```

### **Determining If The Current User Is Authenticated**

To determine if the user is already logged into your application, you may use the check method on the Auth facade, which will return true if the user is authenticated:

```
use Illuminate\Support\Facades\Auth;
if (Auth::check()) {
    // The user is logged in...
}
```

TIP Even though it is possible to determine if a user is authenticated using the check method, you will typically use a middleware to verify that the user is authenticated before allowing the user access to certain routes / controllers. To learn more about this, check out the documentation on protecting routes.

### **Protecting Routes**

Route middleware can be used to only allow authenticated users to access a given route. Laravel ships with an auth middleware, which is defined at Illuminate\Auth\Middleware\Authenticate. Since this middleware is already registered in your HTTP kernel, all you need to do is attach the middleware to a route definition:

```
Route::get('profile', function () {
    // Only authenticated users may enter...
})->middleware('auth');
```

Of course, if you are using <u>controllers</u>, you may call the <u>middleware</u> method from the controller's constructor instead of attaching it in the route definition directly:

### **Redirecting Unauthenticated Users**

When the auth middleware detects an unauthorized user, it will redirect the user to the login <u>named route</u>. You may modify this behavior by updating the redirectTo function in your app/Http/Middleware/Authenticate.php file:

```
/**
  * Get the path the user should be redirected to.
  * @param \Illuminate\Http\Request $request
  * @return string
  */
protected function redirectTo($request)
{
    return route('login');
}
```

#### **Specifying A Guard**

When attaching the auth middleware to a route, you may also specify which guard should be used to authenticate the user. The guard specified should correspond to one of the keys in the guards array of your auth.php configuration file:

### **Login Throttling**

If you are using Laravel's built-in LoginController class, the Illuminate\Foundation\Auth\ThrottlesLogins trait will already be included in your controller. By default, the user will not be able to login for one minute if they fail to provide the correct credentials after several attempts. The throttling is unique to the user's username / e-mail address and their IP address.

# **Manually Authenticating Users**

Of course, you are not required to use the authentication controllers included with Laravel. If you choose to remove these controllers, you will need to manage user authentication using the Laravel authentication classes directly. Don't worry, it's a cinch!

We will access Laravel's authentication services via the Auth <u>facade</u>, so we'll need to make sure to import the Auth facade at the top of the class. Next, let's check out the attempt method:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request:
use Illuminate\Support\Facades\Auth:
class LoginController extends Controller
      Handle an authentication attempt.
       @param \Illuminate\Http\Request $request
       @return Response
    public function authenticate(Request $request)
        $credentials = $request->only('email', 'password');
        if (Auth::attempt($credentials)) {
            // Authentication passed.
            return redirect()->intended('dashboard');
        }
    }
}
```

The attempt method accepts an array of key / value pairs as its first argument. The values in the array will be used to find the user in your database table. So, in the example above, the user will be retrieved by the value of the email column. If the user is found, the hashed password stored in the database will be compared with the password value passed to the method via the array. You should not hash the password specified as the password value, since the framework will automatically hash the value before comparing it to the hashed password in the database. If the two hashed passwords match an authenticated session will be started for the user.

The attempt method will return true if authentication was successful. Otherwise, false will be returned.

The intended method on the redirector will redirect the user to the URL they were attempting to access before being intercepted by the authentication middleware. A fallback URI may be given to this method in case the intended destination is not available.

#### **Specifying Additional Conditions**

If you wish, you may also add extra conditions to the authentication query in addition to the user's e-mail and password. For example, we may verify that user is marked as "active":

```
if (Auth::attempt(['email' => $email, 'password' => $password, 'active' => 1])) {
    // The user is active, not suspended, and exists.
}
```

NOTE In these examples, email is not a required option, it is merely used as an example. You should use whatever column name corresponds to a "username" in your database.

### **Accessing Specific Guard Instances**

You may specify which guard instance you would like to utilize using the guard method on the Auth facade. This allows you to manage authentication for separate parts of your application using entirely separate authenticatable models or user tables.

The guard name passed to the guard method should correspond to one of the guards configured in your auth.php configuration file:

```
if (Auth::guard('admin')->attempt($credentials)) {
    //
}
```

#### **Logging Out**

To log users out of your application, you may use the logout method on the Auth facade. This will clear the authentication information in the user's session:

```
Auth::logout();
```

#### **Remembering Users**

If you would like to provide "remember me" functionality in your application, you may pass a boolean value as the second argument to the attempt method, which will keep the user authenticated indefinitely, or until they manually logout. Of course, your users table must include the string remember\_token column, which will be used to store the "remember me" token.

```
if (Auth::attempt(['email' => $email, 'password' => $password], $remember)) {
    // The user is being remembered...
}
```

TIP If you are using the built-in LoginController that is shipped with Laravel, the proper logic to "remember" users is already implemented by the traits used by the controller.

If you are "remembering" users, you may use the viaRemember method to determine if the user was authenticated using the "remember me" cookie:

```
if (Auth::viaRemember()) {
    //
}
```

### **Other Authentication Methods**

#### **Authenticate A User Instance**

If you need to log an existing user instance into your application, you may call the login method with the user instance. The given object must be an implementation of the Illuminate\Contracts\Auth\Authenticatable contract. Of course, the App\User model included with Laravel already implements this interface:

```
Auth::login($user);
// Login and "remember" the given user...
Auth::login($user, true);
```

Of course, you may specify the guard instance you would like to use:

```
Auth::guard('admin')->login($user);
```

#### **Authenticate A User By ID**

To log a user into the application by their ID, you may use the <code>loginUsingId</code> method. This method accepts the primary key of the user you wish to authenticate:

```
Auth::loginUsingId(1);
// Login and "remember" the given user...
Auth::loginUsingId(1, true);
```

#### **Authenticate A User Once**

You may use the once method to log a user into the application for a single request. No sessions or cookies will be utilized, which means this method may be helpful when building a stateless API:

```
if (Auth::once($credentials)) {
    //
}
```

### **HTTP Basic Authentication**

HTTP Basic Authentication provides a quick way to authenticate users of your application without setting up a dedicated "login" page. To get started, attach the auth.basic middleware to your route. The auth.basic middleware is included with the Laravel framework, so you do not need to define it:

```
Route::get('profile', function () {
    // Only authenticated users may enter...
})->middleware('auth.basic');
```

Once the middleware has been attached to the route, you will automatically be prompted for credentials when accessing the route in your browser. By default, the auth basic middleware will use the email column on the user record as the "username".

#### A Note On FastCGI

If you are using PHP FastCGI, HTTP Basic authentication may not work correctly out of the box. The following lines should be added to your .htaccess file:

```
RewriteCond %{HTTP:Authorization} ^(.+)$
RewriteRule .* - [E=HTTP_AUTHORIZATION:%{HTTP:Authorization}]
```

#### **Stateless HTTP Basic Authentication**

You may also use HTTP Basic Authentication without setting a user identifier cookie in the session, which is particularly useful for API authentication. To do so, <u>define a middleware</u> that calls the onceBasic method. If no response is returned by the onceBasic method, the request may be passed further into the application:

```
ramespace App\Http\Middleware;

use Illuminate\Support\Facades\Auth;

class AuthenticateOnceWithBasicAuth
{
    /**
    * Handle an incoming request.
    *
    @param \Illuminate\Http\Request $request
    * @param \Closure $next
    * @return mixed
    */
public function handle($request, $next)
    {
        return Auth::onceBasic() ?: $next($request);
    }
}
```

Next, register the route middleware and attach it to a route:

```
Route::get('api/user', function () {
    // Only authenticated users may enter...
})->middleware('auth.basic.once');
```

### **Logging Out**

To manually log users out of your application, you may use the logout method on the Auth facade. This will clear the authentication information in the user's session:

```
use Illuminate\Support\Facades\Auth;
Auth::logout();
```

### **Invalidating Sessions On Other Devices**

Laravel also provides a mechanism for invalidating and "logging out" a user's sessions that are active on other devices without invalidating the session on their current device. Before getting started, you should make sure that the Illuminate\Session\Middleware\AuthenticateSession middleware is present and un-commented in your app/Http/Kernel.php class' web middleware group:

```
'web' => [
    // ...
    \Illuminate\Session\Middleware\AuthenticateSession::class,
    // ...
],
```

Then, you may use the logoutOtherDevices method on the Auth facade. This method requires the user to provide their current password, which your application should accept through an input form:

```
use Illuminate\Support\Facades\Auth;
Auth::logoutOtherDevices($password);
```

NOTE When the logoutotherDevices method is invoked, the user's other sessions will be invalidated entirely, meaning they will be "logged out" of all guards they were previously authenticated by.

# **Adding Custom Guards**

You may define your own authentication guards using the extend method on the Auth facade. You should place this call to extend within a <u>service provider</u>. Since Laravel already ships with an AuthServiceProvider, we can place the code in that provider:

```
<?php
namespace App\Providers;
use App\Services\Auth\JwtGuard;
use Illuminate\Support\Facades\Auth;
use Illuminate\Foundation\Support\Providers\AuthServiceProvider as ServiceProvider;
class AuthServiceProvider extends ServiceProvider
    ^{\star} Register any application authentication / authorization services.
      @return void
    public function boot()
        $this->registerPolicies();
       Auth::extend('jwt', function ($app, $name, array $config) {
            // Return an instance of Illuminate\Contracts\Auth\Guard...
            return new JwtGuard(Auth::createUserProvider($config['provider']));
       });
    }
}
```

As you can see in the example above, the callback passed to the extend method should return an implementation of Illuminate\Contracts\Auth\Guard. This interface contains a few methods you will need to implement to define a custom guard. Once your custom guard has been defined, you may use this guard in the guards configuration of your auth.php configuration file:

```
'guards' => [
    'api' => [
        'driver' => 'jwt',
        'provider' => 'users',
],
],
```

### **Closure Request Guards**

The simplest way to implement a custom, HTTP request based authentication system is by using the Auth::viaRequest method. This method allows you to quickly define your authentication process using a single Closure.

To get started, call the Auth::viaRequest method within the boot method of your AuthServiceProvider. The viaRequest method accepts a guard name as its first argument. This name can be any string that describes your custom guard. The second argument passed to the method should be a Closure that receives the incoming HTTP request and returns a user instance or, if authentication fails, null:

```
use App\User;
use Illuminate\Http\Request;
use Illuminate\Support\Facades\Auth;
```

```
/**
   * Register any application authentication / authorization services.
   * @return void
   */
public function boot()
{
    $this->registerPolicies();
    Auth::viaRequest('custom-token', function ($request) {
        return User::where('token', $request->token)->first();
    });
}
```

Once your custom guard has been defined, you may use this guard in the guards configuration of your auth.php configuration file:

```
'guards' => [
    'api' => [
        'driver' => 'custom-token',
    ],
],
```

# **Adding Custom User Providers**

If you are not using a traditional relational database to store your users, you will need to extend Laravel with your own authentication user provider. We will use the provider method on the Auth facade to define a custom user provider:

After you have registered the provider using the provider method, you may switch to the new user provider in your auth.php configuration file. First, define a provider that uses your new driver:

```
'providers' => [
    'users' => [
    'driver' => 'riak',
    ],
],
```

Finally, you may use this provider in your guards configuration:

```
'guards' => [
    'web' => [
        'driver' => 'session',
        'provider' => 'users',
    ],
].
```

### **The User Provider Contract**

The Illuminate\Contracts\Auth\UserProvider implementations are only responsible for fetching a Illuminate\Contracts\Auth\Authenticatable implementation out of a persistent storage system, such as MySQL, Riak, etc. These two interfaces allow the Laravel authentication mechanisms to continue functioning regardless of how the user data is stored or what type of class is used to represent it.

Let's take a look at the Illuminate\Contracts\Auth\UserProvider contract:

```
<?php
namespace Illuminate\Contracts\Auth;
interface UserProvider {
    public function retrieveById($identifier);
    public function retrieveByToken($identifier, $token);
    public function updateRememberToken(Authenticatable $user, $token);
    public function retrieveByCredentials(array $credentials);
    public function validateCredentials(Authenticatable $user, array $credentials);
}</pre>
```

The retrieveById function typically receives a key representing the user, such as an auto-incrementing ID from a MySQL database. The Authenticatable implementation matching the ID should be retrieved and returned by the method.

The retrieveByToken function retrieves a user by their unique \$identifier and "remember me" \$token, stored in a field remember\_token. As with the previous method, the Authenticatable implementation should be returned.

The updateRememberToken method updates the \$user field remember\_token with the new \$token. A fresh token is assigned on a successful "remember me" login attempt or when the user is logging out.

The retrieveByCredentials method receives the array of credentials passed to the Auth::attempt method when attempting to sign into an application. The method should then "query" the underlying persistent storage for the user matching those credentials. Typically, this method will run a query with a "where" condition on \$credentials['username']. The method should then return an implementation of Authenticatable. This method should not attempt to do any password validation or authentication.

The validateCredentials method should compare the given <code>\$user</code> with the <code>\$credentials</code> to authenticate the user. For example, this method should probably use <code>Hash::check</code> to compare the value of <code>\$user->getAuthPassword()</code> to the value of <code>\$credentials['password']</code>. This method should return true or <code>false</code> indicating on whether the password is valid.

#### The Authenticatable Contract

Now that we have explored each of the methods on the UserProvider, let's take a look at the Authenticatable contract. Remember, the provider should return implementations of this interface from the retrieveById, retrieveByToken, and retrieveByCredentials methods:

```
namespace Illuminate\Contracts\Auth;
interface Authenticatable {
    public function getAuthIdentifierName();
    public function getAuthIdentifier();
    public function getAuthPassword();
    public function getRememberToken();
    public function setRememberToken($value);
    public function getRememberTokenName();
}
```

This interface is simple. The <code>getAuthIdentifierName</code> method should return the name of the "primary key" field of the user and the <code>getAuthIdentifier</code> method should return the "primary key" of the user. In a MySQL back-end, again, this would be the auto-incrementing primary key. The <code>getAuthPassword</code> should return the user's hashed password. This interface allows the authentication system to work with any User class, regardless of what ORM or storage abstraction layer you are using. By default, Laravel includes a <code>User</code> class in the app directory which implements this interface, so you may consult this class for an implementation example.

#### **Events**

Laravel raises a variety of <u>events</u> during the authentication process. You may attach listeners to these events in your <u>EventServiceProvider</u>:

```
/**
  * The event listener mappings for the application.
  * @var array
  */
protected $listen = [
    'Illuminate\Auth\Events\Registered' => [
        'App\Listeners\LogRegisteredUser',
    ],
    'Illuminate\Auth\Events\Attempting' => [
        'App\Listeners\LogAuthenticationAttempt',
    ],
```

#### Security

# **API Authentication (Passport)**

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### Introduction

Laravel already makes it easy to perform authentication via traditional login forms, but what about APIs? APIs typically use tokens to authenticate users and do not maintain session state between requests. Laravel makes API authentication a breeze using Laravel Passport, which provides a full OAuth2 server implementation for your Laravel application in a matter of minutes. Passport is built on top of the <u>League OAuth2 server</u> that is maintained by Andy Millington and Simon Hamp.

NOTE This documentation assumes you are already familiar with OAuth2. If you do not know anything about OAuth2, consider familiarizing yourself with the general <u>terminology</u> and features of OAuth2 before continuing.

### **Installation**

To get started, install Passport via the Composer package manager:

composer require laravel/passport

The Passport service provider registers its own database migration directory with the framework, so you should migrate your database after installing the package. The Passport migrations will create the tables your application needs to store clients and access tokens:

php artisan migrate

Next, you should run the passport:install command. This command will create the encryption keys needed to generate secure access tokens. In addition, the command will create "personal access" and "password grant" clients which will be used to generate access tokens:

php artisan passport:install

After running this command, add the Laravel\Passport\HasApiTokens trait to your App\User model. This trait will provide a few helper methods to your model which allow you to inspect the authenticated user's token and scopes:

<?php

```
namespace App;
use Laravel\Passport\HasApiTokens;
use Illuminate\Notifications\Notifiable;
use Illuminate\Foundation\Auth\User as Authenticatable;
class User extends Authenticatable
{
    use HasApiTokens, Notifiable;
}
```

Next, you should call the Passport::routes method within the boot method of your AuthServiceProvider. This method will register the routes necessary to issue access tokens and revoke access tokens, clients, and personal access tokens:

```
<?php
namespace App\Providers;
use Laravel\Passport\Passport;
use Illuminate\Support\Facades\Gate:
use Illuminate\Foundation\Support\Providers\AuthServiceProvider as ServiceProvider;
class AuthServiceProvider extends ServiceProvider
     * The policy mappings for the application.
       @var array
    protected $policies = [
   'App\Model' => 'App\Policies\ModelPolicy',
    1:
     ^{\star} Register any authentication / authorization services.
       @return void
    public function boot()
         $this->registerPolicies();
        Passport::routes();
    }
}
```

Finally, in your config/auth.php configuration file, you should set the driver option of the api authentication guard to passport. This will instruct your application to use Passport's TokenGuard when authenticating incoming API requests:

```
'guards' => [
    'web' => [
        'driver' => 'session',
        'provider' => 'users',
],

'api' => [
        'driver' => 'passport',
        'provider' => 'users',
],
],
```

### **Migration Customization**

If you are not going to use Passport's default migrations, you should call the Passport::ignoreMigrations method in the register method of your AppServiceProvider. You may export the default migrations using php artisan vendor:publish --tag=passport-migrations.

By default, Passport uses an integer column to store the user\_id. If your application uses a different column type to identify users (for example: UUIDs), you should modify the default Passport migrations after publishing them.

### **Frontend Quickstart**

NOTE In order to use the Passport Vue components, you must be using the <u>Vue</u> JavaScript framework. These components also use the Bootstrap CSS framework. However, even if you are not using these tools, the components serve as a valuable reference for your own frontend implementation.

Passport ships with a JSON API that you may use to allow your users to create clients and personal access tokens. However, it can be time consuming to code a frontend to interact with these APIs. So, Passport also includes pre-built <u>Vue</u> components you may use as an example implementation or starting point for your own implementation.

To publish the Passport Vue components, use the vendor:publish Artisan command:

```
php artisan vendor:publish --tag=passport-components
```

The published components will be placed in your resources/js/components directory. Once the components have been published, you should register them in your resources/js/app.js file:

```
Vue.component(
    'passport-clients',
    require('./components/passport/Clients.vue').default
);

Vue.component(
    'passport-authorized-clients',
    require('./components/passport/AuthorizedClients.vue').default
);

Vue.component(
    'passport-personal-access-tokens',
    require('./components/passport/PersonalAccessTokens.vue').default
);
```

NOTE Prior to Laravel v5.7.19, appending .default when registering components results in a console error. An explanation for this change can be found in the <u>Laravel Mix v4.0.0 release notes</u>.

After registering the components, make sure to run npm run dev to recompile your assets. Once you have recompiled your assets, you may drop the components into one of your application's templates to get started creating clients and personal access tokens:

```
<passport-clients></passport-authorized-clients>
<passport-authorized-clients></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens>
```

### **Deploying Passport**

When deploying Passport to your production servers for the first time, you will likely need to run the passport:keys command. This command generates the encryption keys Passport needs in order to generate access token. The generated keys are not typically kept in source control:

```
php artisan passport:keys
```

If necessary, you may define the path where Passport's keys should be loaded from. You may use the Passport::loadKeysFrom method to accomplish this:

```
/**
    * Register any authentication / authorization services.
    * @return void
    */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::loadKeysFrom('/secret-keys/oauth');
}
```

### Configuration

#### **Token Lifetimes**

By default, Passport issues long-lived access tokens that expire after one year. If you would like to configure a longer / shorter token lifetime, you may use the tokensExpireIn and refreshTokensExpireIn methods. These methods should be called from the boot method of your AuthServiceProvider:

```
/**
  * Register any authentication / authorization services.
  * @return void
  */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::tokensExpireIn(now()->addDays(15));
    Passport::refreshTokensExpireIn(now()->addDays(30));
}
```

### **Overriding Default Models**

You are free to extend the models used internally by Passport. Then, you may instruct Passport to use your custom models via the Passport class:

```
use App\Models\Passport\Client;
use App\Models\Passport\AuthCode;
use App\Models\Passport\TokenModel;
use App\Models\Passport\TokenModel;
use App\Models\Passport\TokenModel;
use App\Models\Passport\PersonalAccessClient;

/**
    * Register any authentication / authorization services.
    *
    * @return void
    */
public function boot()
{
        $this->registerPolicies();
        Passport::routes();
        Passport::useClientModel(Client::class);
        Passport::useTokenModel(TokenModel::class);
        Passport::useAuthCodeModel(AuthCode::class);
        Passport::usePersonalAccessClientModel(PersonalAccessClient::class);
}
```

### **Issuing Access Tokens**

Using OAuth2 with authorization codes is how most developers are familiar with OAuth2. When using authorization codes, a client application will redirect a user to your server where they will either approve or deny the request to issue an access token to the client.

#### **Managing Clients**

First, developers building applications that need to interact with your application's API will need to register their application with yours by creating a "client". Typically, this consists of providing the name of their application and a URL that your application can redirect to after users approve their request for authorization.

#### The passport:client Command

The simplest way to create a client is using the passport:client Artisan command. This command may be used to create your own clients for testing your OAuth2 functionality. When you run the client command, Passport will prompt you for more information about your client and will provide you with a client ID and secret:

```
php artisan passport:client
```

### Redirect URLs

If you would like to whitelist multiple redirect URLs for your client, you may specify them using a comma-delimited list when prompted for the URL by the passport:client command:

```
http://example.com/callback,http://examplefoo.com/callback
```

NOTE Any URLs which contains commas must be encoded.

### JSON API

Since your users will not be able to utilize the client command, Passport provides a JSON API that you may use to create clients. This saves you the trouble of having to manually code controllers for creating, updating, and deleting clients.

However, you will need to pair Passport's JSON API with your own frontend to provide a dashboard for your users to manage their clients. Below, we'll review all of the API endpoints for managing clients. For convenience, we'll use <a href="Axios"><u>Axios</u></a> to demonstrate making HTTP requests to the endpoints.

The JSON API is guarded by the web and auth middleware; therefore, it may only be called from your own application. It is not able to be called from an external source.

TIP If you don't want to implement the entire client management frontend yourself, you can use the <u>frontend quickstart</u> to have a fully functional frontend in a matter of minutes.

#### GET /oauth/clients

This route returns all of the clients for the authenticated user. This is primarily useful for listing all of the user's clients so that they

may edit or delete them:

```
axios.get('/oauth/clients')
   .then(response => {
      console.log(response.data);
   });
```

#### POST /oauth/clients

This route is used to create new clients. It requires two pieces of data: the client's name and a redirect URL. The redirect URL is where the user will be redirected after approving or denying a request for authorization.

When a client is created, it will be issued a client ID and client secret. These values will be used when requesting access tokens from your application. The client creation route will return the new client instance:

```
const data = {
   name: 'Client Name',
   redirect: 'http://example.com/callback'
};

axios.post('/oauth/clients', data)
   .then(response => {
      console.log(response.data);
   })
   .catch (response => {
      // List errors on response...
   });
```

#### PUT /oauth/clients/{client-id}

This route is used to update clients. It requires two pieces of data: the client's name and a redirect URL. The redirect URL is where the user will be redirected after approving or denying a request for authorization. The route will return the updated client instance:

```
const data = {
   name: 'New Client Name',
   redirect: 'http://example.com/callback'
};

axios.put('/oauth/clients/' + clientId, data)
   .then(response => {
      console.log(response.data);
   })
   .catch (response => {
      // List errors on response...
   });
```

## DELETE /oauth/clients/{client-id}

This route is used to delete clients:

#### **Requesting Tokens**

#### **Redirecting For Authorization**

Once a client has been created, developers may use their client ID and secret to request an authorization code and access token from your application. First, the consuming application should make a redirect request to your application's /oauth/authorize route like so:

TIP Remember, the /oauth/authorize route is already defined by the Passport::routes method. You do not need to manually define this route.

#### **Approving The Request**

When receiving authorization requests, Passport will automatically display a template to the user allowing them to approve or deny the authorization request. If they approve the request, they will be redirected back to the redirect\_uri that was specified by the consuming application. The redirect\_uri must match the redirect URL that was specified when the client was created.

If you would like to customize the authorization approval screen, you may publish Passport's views using the vendor:publish Artisan command. The published views will be placed in resources/views/vendor/passport:

```
php artisan vendor:publish --tag=passport-views
```

#### **Converting Authorization Codes To Access Tokens**

If the user approves the authorization request, they will be redirected back to the consuming application. The consumer should then issue a POST request to your application to request an access token. The request should include the authorization code that was issued by your application when the user approved the authorization request. In this example, we'll use the Guzzle HTTP library to make the POST request:

This /oauth/token route will return a JSON response containing access\_token, refresh\_token, and expires\_in attributes. The expires\_in attribute contains the number of seconds until the access token expires.

TIP Like the /oauth/authorize route, the /oauth/token route is defined for you by the Passport::routes method. There is no need to manually define this route. By default, this route is throttled using the settings of the ThrottleRequests middleware.

### **Refreshing Tokens**

If your application issues short-lived access tokens, users will need to refresh their access tokens via the refresh token that was provided to them when the access token was issued. In this example, we'll use the Guzzle HTTP library to refresh the token:

```
$http = new GuzzleHttp\Client;

$response = $http->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'refresh_token',
        'refresh_token' => 'the-refresh-token',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'scope' => '',
    ],
]);

return json_decode((string) $response->getBody(), true);
```

This /oauth/token route will return a JSON response containing access\_token, refresh\_token, and expires\_in attributes. The expires\_in attribute contains the number of seconds until the access token expires.

### **Password Grant Tokens**

The OAuth2 password grant allows your other first-party clients, such as a mobile application, to obtain an access token using an e-mail address / username and password. This allows you to issue access tokens securely to your first-party clients without requiring your users to go through the entire OAuth2 authorization code redirect flow.

### **Creating A Password Grant Client**

Before your application can issue tokens via the password grant, you will need to create a password grant client. You may do this using the passport:client command with the --password option. If you have already run the passport:install command, you do not need to run this command:

```
php artisan passport:client --password
```

### **Requesting Tokens**

Once you have created a password grant client, you may request an access token by issuing a POST request to the /oauth/token route with the user's email address and password. Remember, this route is already registered by the Passport::routes method so there is no need to define it manually. If the request is successful, you will receive an access\_token and refresh\_token in the JSON response from the server:

```
$http = new GuzzleHttp\Client;

$response = $http->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'password',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'username' => 'taylor@laravel.com',
        'password' => 'my-password',
        'scope' => '',
    ],
]);

return json_decode((string) $response->getBody(), true);
```

TIP Remember, access tokens are long-lived by default. However, you are free to <u>configure your maximum access token</u> <u>lifetime</u> if needed.

#### **Requesting All Scopes**

When using the password grant, you may wish to authorize the token for all of the scopes supported by your application. You can do this by requesting the \* scope. If you request the \* scope, the can method on the token instance will always return true. This scope may only be assigned to a token that is issued using the password grant:

```
$response = $http->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'password',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'username' => 'taylor@laravel.com',
        'password' => 'my-password',
        'scope' => '*',
],
]);
```

### **Implicit Grant Tokens**

The implicit grant is similar to the authorization code grant; however, the token is returned to the client without exchanging an authorization code. This grant is most commonly used for JavaScript or mobile applications where the client credentials can't be securely stored. To enable the grant, call the enableImplicitGrant method in your AuthServiceProvider:

```
/**
  * Register any authentication / authorization services.
  * @return void
  */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::enableImplicitGrant();
}
```

Once a grant has been enabled, developers may use their client ID to request an access token from your application. The consuming application should make a redirect request to your application's /oauth/authorize route like so:

TIP Remember, the /oauth/authorize route is already defined by the Passport::routes method. You do not need to manually define this route.

### **Client Credentials Grant Tokens**

The client credentials grant is suitable for machine-to-machine authentication. For example, you might use this grant in a scheduled job which is performing maintenance tasks over an API.

Before your application can issue tokens via the client credentials grant, you will need to create a client credentials grant client. You may do this using the --client option of the passport:client command:

```
php artisan passport:client --client
```

Next, to use this grant type, you need to add the CheckClientCredentials middleware to the \$routeMiddleware property of your app/Http/Kernel.php file:

```
use Laravel\Passport\Http\Middleware\CheckClientCredentials;
protected $routeMiddleware = [
    'client' => CheckClientCredentials::class,
];
Then, attach the middleware to a route:
Route::get('/orders', function (Request $request) {
    ...
})->middleware('client');
```

To restrict access to the route to specific scopes you may provide a comma-delimited list of the required scopes when attaching the client middleware to the route:

```
Route::get('/orders', function (Request $request) {
    ...
})->middleware('client:check-status,your-scope');
```

### **Retrieving Tokens**

To retrieve a token using this grant type, make a request to the oauth/token endpoint:

```
$guzzle = new GuzzleHttp\Client;

$response = $guzzle->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'client_credentials',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'scope' => 'your-scope',
    ],
]);

return json_decode((string) $response->getBody(), true)['access_token'];
```

### **Personal Access Tokens**

Sometimes, your users may want to issue access tokens to themselves without going through the typical authorization code redirect flow. Allowing users to issue tokens to themselves via your application's UI can be useful for allowing users to experiment with your API or may serve as a simpler approach to issuing access tokens in general.

NOTE Personal access tokens are always long-lived. Their lifetime is not modified when using the tokensExpireIn or refreshTokensExpireIn methods.

#### **Creating A Personal Access Client**

Before your application can issue personal access tokens, you will need to create a personal access client. You may do this using the passport:client command with the --personal option. If you have already run the passport:install command, you do not need to run this command:

```
php artisan passport:client --personal
```

If you have already defined a personal access client, you may instruct Passport to use it using the personalAccessClientId method. Typically, this method should be called from the boot method of your AuthServiceProvider:

```
/**

* Register any authentication / authorization services.

* @return void

*/
public function boot()
{

$this->registerPolicies();
```

```
Passport::routes();

Passport::personalAccessClientId('client-id');
}
```

### **Managing Personal Access Tokens**

Once you have created a personal access client, you may issue tokens for a given user using the createToken method on the User model instance. The createToken method accepts the name of the token as its first argument and an optional array of scopes as its second argument:

```
$user = App\User::find(1);

// Creating a token without scopes...
$token = $user->createToken('Token Name')->accessToken;

// Creating a token with scopes...
$token = $user->createToken('My Token', ['place-orders'])->accessToken;
```

#### JSON API

Passport also includes a JSON API for managing personal access tokens. You may pair this with your own frontend to offer your users a dashboard for managing personal access tokens. Below, we'll review all of the API endpoints for managing personal access tokens. For convenience, we'll use <u>Axios</u> to demonstrate making HTTP requests to the endpoints.

The JSON API is guarded by the web and auth middleware; therefore, it may only be called from your own application. It is not able to be called from an external source.

TIP If you don't want to implement the personal access token frontend yourself, you can use the <u>frontend quickstart</u> to have a fully functional frontend in a matter of minutes.

#### **GET** /oauth/scopes

This route returns all of the <u>scopes</u> defined for your application. You may use this route to list the scopes a user may assign to a personal access token:

```
axios.get('/oauth/scopes')
   .then(response => {
      console.log(response.data);
}):
```

#### GET /oauth/personal-access-tokens

This route returns all of the personal access tokens that the authenticated user has created. This is primarily useful for listing all of the user's tokens so that they may edit or delete them:

```
axios.get('/oauth/personal-access-tokens')
   .then(response => {
      console.log(response.data);
   });
```

### POST /oauth/personal-access-tokens

This route creates new personal access tokens. It requires two pieces of data: the token's name and the scopes that should be assigned to the token:

```
const data = {
   name: 'Token Name',
   scopes: []
};

axios.post('/oauth/personal-access-tokens', data)
   .then(response => {
      console.log(response.data.accessToken);
   })
   .catch (response => {
      // List errors on response...
   });
```

#### DELETE /oauth/personal-access-tokens/{token-id}

This route may be used to delete personal access tokens:

```
{\tt axios.delete('/oauth/personal-access-tokens'' + tokenId);}\\
```

### **Protecting Routes**

#### Via Middleware

Passport includes an <u>authentication guard</u> that will validate access tokens on incoming requests. Once you have configured the api guard to use the passport driver, you only need to specify the auth:api middleware on any routes that require a valid access token:

```
Route::get('/user', function () {
    //
})->middleware('auth:api');
```

#### **Passing The Access Token**

When calling routes that are protected by Passport, your application's API consumers should specify their access token as a Bearer token in the Authorization header of their request. For example, when using the Guzzle HTTP library:

```
$response = $client->request('GET', '/api/user', [
    'headers' => [
        'Accept' => 'application/json',
        'Authorization' => 'Bearer '.$accessToken,
    ],
]);
```

# **Token Scopes**

Scopes allow your API clients to request a specific set of permissions when requesting authorization to access an account. For example, if you are building an e-commerce application, not all API consumers will need the ability to place orders. Instead, you may allow the consumers to only request authorization to access order shipment statuses. In other words, scopes allow your application's users to limit the actions a third-party application can perform on their behalf.

### **Defining Scopes**

You may define your API's scopes using the Passport::tokensCan method in the boot method of your AuthServiceProvider. The tokensCan method accepts an array of scope names and scope descriptions. The scope description may be anything you wish and will be displayed to users on the authorization approval screen:

```
use Laravel\Passport\Passport;
Passport::tokensCan([
   'place-orders' => 'Place orders',
   'check-status' => 'Check order status',
]);
```

# **Default Scope**

If a client does not request any specific scopes, you may configure your Passport server to attach a default scope to the token using the setDefaultScope method. Typically, you should call this method from the boot method of your AuthServiceProvider:

```
use Laravel\Passport\Passport;
Passport::setDefaultScope([
   'check-status',
   'place-orders',
```

### **Assigning Scopes To Tokens**

#### When Requesting Authorization Codes

When requesting an access token using the authorization code grant, consumers should specify their desired scopes as the scope query string parameter. The scope parameter should be a space-delimited list of scopes:

#### When Issuing Personal Access Tokens

If you are issuing personal access tokens using the user model's createToken method, you may pass the array of desired scopes as the second argument to the method:

```
$token = $user->createToken('My Token', ['place-orders'])->accessToken;
```

#### **Checking Scopes**

Passport includes two middleware that may be used to verify that an incoming request is authenticated with a token that has been granted a given scope. To get started, add the following middleware to the \$routeMiddleware property of your app/Http/Kernel.php file:

```
'scopes' => \Laravel\Passport\Http\Middleware\CheckScopes::class,
'scope' => \Laravel\Passport\Http\Middleware\CheckForAnyScope::class,
```

#### **Check For All Scopes**

The scopes middleware may be assigned to a route to verify that the incoming request's access token has *all* of the listed scopes:

```
Route::get('/orders', function () {
    // Access token has both "check-status" and "place-orders" scopes...
})->middleware('scopes:check-status, place-orders');
```

#### **Check For Any Scopes**

The scope middleware may be assigned to a route to verify that the incoming request's access token has *at least one* of the listed scopes:

```
Route::get('/orders', function () {
    // Access token has either "check-status" or "place-orders" scope...
})->middleware('scope:check-status,place-orders');
```

#### **Checking Scopes On A Token Instance**

Once an access token authenticated request has entered your application, you may still check if the token has a given scope using the tokenCan method on the authenticated User instance:

```
use Illuminate\Http\Request;
Route::get('/orders', function (Request $request) {
    if ($request->user()->tokenCan('place-orders')) {
        //
    }
});
```

#### **Additional Scope Methods**

The scopeIds method will be return an array of all defined IDs / names:

```
Laravel\Passport\Passport::scopeIds();
```

The scopes method will return an array of all defined scopes as instances of Laravel\Passport\Scope:

```
Laravel\Passport\Passport::scopes();
```

The scopesFor method will return an array of Laravel\Passport\Scope instances matching the given IDs / names:

```
Laravel\Passport\Passport::scopesFor(['place-orders', 'check-status']);
```

You may determine if a given scope has been defined using the hasScope method:

```
Laravel\Passport\Passport::hasScope('place-orders');
```

## **Consuming Your API With JavaScript**

When building an API, it can be extremely useful to be able to consume your own API from your JavaScript application. This approach to API development allows your own application to consume the same API that you are sharing with the world. The same API may be consumed by your web application, mobile applications, third-party applications, and any SDKs that you may publish on various package managers.

Typically, if you want to consume your API from your JavaScript application, you would need to manually send an access token to the application and pass it with each request to your application. However, Passport includes a middleware that can handle this

for you. All you need to do is add the CreateFreshApiToken middleware to your web middleware group in your app/Http/Kernel.php file:

```
'web' => [
    // Other middleware...
    \Laravel\Passport\Http\Middleware\CreateFreshApiToken::class,
],
```

NOTE You should ensure that the EncryptCookies middleware is listed prior to the CreateFreshApiToken middleware in your middleware stack.

This Passport middleware will attach a laravel\_token cookie to your outgoing responses. This cookie contains an encrypted JWT that Passport will use to authenticate API requests from your JavaScript application. Now, you may make requests to your application's API without explicitly passing an access token:

```
axios.get('/api/user')
   .then(response => {
      console.log(response.data);
   }):
```

### **Customizing The Cookie Name**

If needed, you can customize the laravel\_token cookie's name using the Passport::cookie method. Typically, this method should be called from the boot method of your AuthServiceProvider:

```
/**
    * Register any authentication / authorization services.
    * @return void
    */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::cookie('custom_name');
}
```

#### **CSRF Protection**

#### **Events**

Passport raises events when issuing access tokens and refresh tokens. You may use these events to prune or revoke other access tokens in your database. You may attach listeners to these events in your application's EventServiceProvider:

```
/**
  * The event listener mappings for the application.
  * @var array
  */
protected $listen = [
    'Laravel\Passport\Events\AccessTokenCreated' => [
        'App\Listeners\RevokeOldTokens',
    ],
    'Laravel\Passport\Events\RefreshTokenCreated' => [
        'App\Listeners\PruneOldTokens',
    ],
];
```

### **Testing**

Passport's actingAs method may be used to specify the currently authenticated user as well as its scopes. The first argument given to the actingAs method is the user instance and the second is an array of scopes that should be granted to the user's token:

```
use App\User;
```

```
use Laravel\Passport\Passport;
public function testServerCreation()
{
    Passport::actingAs(
        factory(User::class)->create(),
        ['create-servers']
    );
    $response = $this->post('/api/create-server');
    $response->assertStatus(201);
}
```

#### Security

# **Authorization**

- Introduction
- Gates
  - Writing Gates
  - Authorizing Actions
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- Creating Policies
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### Introduction

In addition to providing <u>authentication</u> services out of the box, Laravel also provides a simple way to authorize user actions against a given resource. Like authentication, Laravel's approach to authorization is simple, and there are two primary ways of authorizing actions: gates and policies.

Think of gates and policies like routes and controllers. Gates provide a simple, Closure based approach to authorization while policies, like controllers, group their logic around a particular model or resource. We'll explore gates first and then examine policies.

You do not need to choose between exclusively using gates or exclusively using policies when building an application. Most applications will most likely contain a mixture of gates and policies, and that is perfectly fine! Gates are most applicable to actions which are not related to any model or resource, such as viewing an administrator dashboard. In contrast, policies should be used when you wish to authorize an action for a particular model or resource.

# **Gates**

### **Writing Gates**

Gates are Closures that determine if a user is authorized to perform a given action and are typically defined in the App\Providers\AuthServiceProvider class using the Gate facade. Gates always receive a user instance as their first argument, and may optionally receive additional arguments such as a relevant Eloquent model:

```
/**
  * Register any authentication / authorization services.
  *
  * @return void
  */
public function boot()
{
    $this->registerPolicies();
    Gate::define('update-post', function ($user, $post) {
        return $user->id == $post->user_id;
    });
}
```

Gates may also be defined using a class@method style callback string, like controllers:

```
/**
   * Register any authentication / authorization services.
   * @return void
   */
public function boot()
{
    $this->registerPolicies();
    Gate::define('update-post', 'App\Policies\PostPolicy@update');
```

}

#### **Resource Gates**

You may also define multiple Gate abilities at once using the resource method:

```
Gate::resource('posts', 'App\Policies\PostPolicy');
```

This is identical to manually defining the following Gate definitions:

```
Gate::define('posts.view', 'App\Policies\PostPolicy@view');
Gate::define('posts.create', 'App\Policies\PostPolicy@create');
Gate::define('posts.update', 'App\Policies\PostPolicy@update');
Gate::define('posts.delete', 'App\Policies\PostPolicy@delete');
```

By default, the view, create, update, and delete abilities will be defined. You may override the default abilities by passing an array as a third argument to the resource method. The keys of the array define the names of the abilities while the values define the method names. For example, the following code will only create two new Gate definitions - posts.image and posts.photo:

```
Gate::resource('posts', 'PostPolicy', [
   'image' => 'updateImage',
   'photo' => 'updatePhoto',
]);
```

### **Authorizing Actions**

To authorize an action using gates, you should use the allows or denies methods. Note that you are not required to pass the currently authenticated user to these methods. Laravel will automatically take care of passing the user into the gate Closure:

```
if (Gate::allows('update-post', $post)) {
    // The current user can update the post...
}
if (Gate::denies('update-post', $post)) {
    // The current user can't update the post...
}
```

If you would like to determine if a particular user is authorized to perform an action, you may use the foruser method on the Gate facade:

```
if (Gate::forUser($user)->allows('update-post', $post)) {
    // The user can update the post...
}

if (Gate::forUser($user)->denies('update-post', $post)) {
    // The user can't update the post...
}
```

### **Intercepting Gate Checks**

Sometimes, you may wish to grant all abilities to a specific user. You may use the before method to define a callback that is run before all other authorization checks:

```
Gate::before(function ($user, $ability) {
    if ($user->isSuperAdmin()) {
        return true;
    }
});
```

If the before callback returns a non-null result that result will be considered the result of the check.

You may use the after method to define a callback to be executed after all other authorization checks:

```
Gate::after(function ($user, $ability, $result, $arguments) {
   if ($user->isSuperAdmin()) {
      return true;
   }
});
```

Similar to the before check, if the after callback returns a non-null result that result will be considered the result of the check.

# **Creating Policies**

### **Generating Policies**

Policies are classes that organize authorization logic around a particular model or resource. For example, if your application is a blog, you may have a Post model and a corresponding PostPolicy to authorize user actions such as creating or updating posts.

You may generate a policy using the make:policy artisan command. The generated policy will be placed in the app/Policies directory. If this directory does not exist in your application, Laravel will create it for you:

```
php artisan make:policy PostPolicy
```

The make:policy command will generate an empty policy class. If you would like to generate a class with the basic "CRUD" policy methods already included in the class, you may specify a --model when executing the command:

```
php artisan make:policy PostPolicy --model=Post
```

TIP All policies are resolved via the Laravel <u>service container</u>, allowing you to type-hint any needed dependencies in the policy's constructor to have them automatically injected.

### **Registering Policies**

Once the policy exists, it needs to be registered. The AuthServiceProvider included with fresh Laravel applications contains a policies property which maps your Eloquent models to their corresponding policies. Registering a policy will instruct Laravel which policy to utilize when authorizing actions against a given model:

### **Writing Policies**

### **Policy Methods**

Once the policy has been registered, you may add methods for each action it authorizes. For example, let's define an update method on our PostPolicy which determines if a given User can update a given Post instance.

The update method will receive a User and a Post instance as its arguments, and should return true or false indicating whether the user is authorized to update the given Post. So, for this example, let's verify that the user's id matches the user\_id on the post:

```
<?php
namespace App\Policies;
use App\User;
use App\Post;

class PostPolicy
{
    /**
     * Determine if the given post can be updated by the user.
     *
     * @param \App\User $user
     * @param \App\Post $post
     * @return bool
     */
     public function update(User $user, Post $post)
     {
        return $user->id === $post->user_id;
     }
}
```

```
}
```

You may continue to define additional methods on the policy as needed for the various actions it authorizes. For example, you might define view or delete methods to authorize various Post actions, but remember you are free to give your policy methods any name you like.

TIP If you used the --model option when generating your policy via the Artisan console, it will already contain methods for the view, create, update, delete, restore, and forceDelete actions.

### **Methods Without Models**

Some policy methods only receive the currently authenticated user and not an instance of the model they authorize. This situation is most common when authorizing create actions. For example, if you are creating a blog, you may wish to check if a user is authorized to create any posts at all.

When defining policy methods that will not receive a model instance, such as a create method, it will not receive a model instance. Instead, you should define the method as only expecting the authenticated user:

```
/**
    * Determine if the given user can create posts.
    *
    * @param \App\User \$user
    * @return bool
    */
public function create(User \$user)
{
    ///
}
```

#### **Guest Users**

By default, all gates and policies automatically return false if the incoming HTTP request was not initiated by an authenticated user. However, you may allow these authorization checks to pass through to your gates and policies by declaring an "optional" type-hint or supplying a null default value for the user argument definition:

```
<?php
namespace App\Policies;
use App\User;
use App\Post;
class PostPolicy
{
    /**
    * Determine if the given post can be updated by the user.
    * @param \App\User $user
    * @param \App\Post $post
    * @return bool
    */
    public function update(?User $user, Post $post)
    {
        return $user->id === $post->user_id;
    }
}
```

### **Policy Filters**

For certain users, you may wish to authorize all actions within a given policy. To accomplish this, define a before method on the policy. The before method will be executed before any other methods on the policy, giving you an opportunity to authorize the action before the intended policy method is actually called. This feature is most commonly used for authorizing application administrators to perform any action:

```
public function before($user, $ability)
{
    if ($user->isSuperAdmin()) {
        return true;
    }
}
```

If you would like to deny all authorizations for a user you should return false from the before method. If null is returned, the authorization will fall through to the policy method.

NOTE The before method of a policy class will not be called if the class doesn't contain a method with a name matching the name of the ability being checked.

# **Authorizing Actions Using Policies**

#### Via The User Model

The user model that is included with your Laravel application includes two helpful methods for authorizing actions: can and cant. The can method receives the action you wish to authorize and the relevant model. For example, let's determine if a user is authorized to update a given Post model:

```
if ($user->can('update', $post)) {
    //
}
```

If a <u>policy is registered</u> for the given model, the can method will automatically call the appropriate policy and return the boolean result. If no policy is registered for the model, the can method will attempt to call the Closure based Gate matching the given action name.

### **Actions That Don't Require Models**

Remember, some actions like create may not require a model instance. In these situations, you may pass a class name to the can method. The class name will be used to determine which policy to use when authorizing the action:

```
use App\Post;
if ($user->can('create', Post::class)) {
    // Executes the "create" method on the relevant policy...
}
```

#### Via Middleware

Laravel includes a middleware that can authorize actions before the incoming request even reaches your routes or controllers. By default, the <code>illuminate\Auth\Middleware\Authorize</code> middleware is assigned the can key in your App\Http\Kernel class. Let's explore an example of using the can middleware to authorize that a user can update a blog post:

```
use App\Post;
Route::put('/post/{post}', function (Post $post) {
    // The current user may update the post...
})->middleware('can:update,post');
```

In this example, we're passing the can middleware two arguments. The first is the name of the action we wish to authorize and the second is the route parameter we wish to pass to the policy method. In this case, since we are using <u>implicit model binding</u>, a Post model will be passed to the policy method. If the user is not authorized to perform the given action, a HTTP response with a 403 status code will be generated by the middleware.

### **Actions That Don't Require Models**

Again, some actions like create may not require a model instance. In these situations, you may pass a class name to the middleware. The class name will be used to determine which policy to use when authorizing the action:

```
Route::post('/post', function () {
    // The current user may create posts...
})->middleware('can:create,App\Post');
```

### Via Controller Helpers

In addition to helpful methods provided to the user model, Laravel provides a helpful authorize method to any of your controllers which extend the App\Http\Controllers\Controller base class. Like the can method, this method accepts the name of the action you wish to authorize and the relevant model. If the action is not authorized, the authorize method will throw an Illuminate\Auth\Access\AuthorizationException, which the default Laravel exception handler will convert to an HTTP response with a 403 status code:

```
<?php
namespace App\Http\Controllers;
use App\Post;
use Illuminate\Http\Request;
use App\Http\Controllers\Controller;
class PostController extends Controller
{
    /**
    * Update the given blog post.
    *
    * @param Request $request</pre>
```

### **Actions That Don't Require Models**

As previously discussed, some actions like create may not require a model instance. In these situations, you may pass a class name to the authorize method. The class name will be used to determine which policy to use when authorizing the action:

```
/**
  * Create a new blog post.
  *
  * @param Request $request
  * @return Response
  * @throws \Illuminate\Auth\Access\AuthorizationException
  */
public function create(Request $request)
{
    $this->authorize('create', Post::class);
    // The current user can create blog posts...
}
```

#### **Authorizing Resource Controllers**

If you are utilizing resource controllers, you may make use of the authorizeResource method in the controller's constructor. This method will attach the appropriate can middleware definition to the resource controller's methods.

The authorizeResource method accepts the model's class name as its first argument, and the name of the route / request parameter that will contain the model's ID as its second argument:

TIP You may use the make:policy command with the --model option to quickly generate a policy class for a given model: php artisan make:policy PostPolicy --model=Post.

### Via Blade Templates

When writing Blade templates, you may wish to display a portion of the page only if the user is authorized to perform a given action. For example, you may wish to show an update form for a blog post only if the user can actually update the post. In this situation, you may use the @can and @cannot family of directives:

These directives are convenient shortcuts for writing <code>@if</code> and <code>@unless</code> statements. The <code>@can</code> and <code>@cannot</code> statements above respectively translate to the following statements:

```
@if (Auth::user()->can('update', $post))
```

```
<!-- The Current User Can Update The Post -->
@endif
@unless (Auth::user()->can('update', $post))
      <!-- The Current User Can't Update The Post -->
@endunless
```

### **Actions That Don't Require Models**

Like most of the other authorization methods, you may pass a class name to the @can and @cannot directives if the action does not require a model instance:

#### Security

# **Email Verification**

- Introduction
- Database Considerations
- Routing
  - Protecting Routes
- <u>Views</u>
- After Verifying Emails
- Events

### Introduction

Many web applications require users to verify their email addresses before using the application. Rather than forcing you to reimplement this on each application, Laravel provides convenient methods for sending and verifying email verification requests.

### **Model Preparation**

To get started, verify that your App\User model implements the Illuminate\Contracts\Auth\MustVerifyEmail contract:

```
<?php
namespace App;
use Illuminate\Notifications\Notifiable;
use Illuminate\Contracts\Auth\MustVerifyEmail;
use Illuminate\Foundation\Auth\User as Authenticatable;
class User extends Authenticatable implements MustVerifyEmail
{
    use Notifiable;
    // ...
}</pre>
```

# **Database Considerations**

#### The Email Verification Column

Next, your user table must contain an email\_verified\_at column to store the date and time that the email address was verified. By default, the users table migration included with the Laravel framework already includes this column. So, all you need to do is run your database migrations:

```
php artisan migrate
```

### Routing

Laravel includes the Auth\VerificationController class that contains the necessary logic to send verification links and verify emails. To register the necessary routes for this controller, pass the verify option to the Auth::routes method:

```
Auth::routes(['verify' => true]);
```

### **Protecting Routes**

Route middleware can be used to only allow verified users to access a given route. Laravel ships with a verified middleware, which is defined at Illuminate\Auth\Middleware\EnsureEmailIsVerified. Since this middleware is already registered in your application's HTTP kernel, all you need to do is attach the middleware to a route definition:

```
Route::get('profile', function () {
    // Only verified users may enter...
})->middleware('verified');
```

### **Views**

Laravel will generate all of the necessary email verification views when the make: auth command is executed. This view is placed in resources/views/auth/verify.blade.php. You are free to customize this view as needed for your application.

### **After Verifying Emails**

After an email address is verified, the user will automatically be redirected to /home. You can customize the post verification redirect location by defining a redirectTo method or property on the VerificationController:

```
protected $redirectTo = '/dashboard';
```

### **Events**

Laravel dispatches <u>events</u> during the email verification process. You may attach listeners to these events in your <u>EventServiceProvider</u>:

```
/**
  * The event listener mappings for the application.
  * @var array
  */
protected $listen = [
    'Illuminate\Auth\Events\Verified' => [
         'App\Listeners\LogVerifiedUser',
    ],
];
```

#### Security

# **Encryption**

- Introduction
- Configuration
- Using The Encrypter

### Introduction

Laravel's encrypter uses OpenSSL to provide AES-256 and AES-128 encryption. You are strongly encouraged to use Laravel's built-in encryption facilities and not attempt to roll your own "home grown" encryption algorithms. All of Laravel's encrypted values are signed using a message authentication code (MAC) so that their underlying value can not be modified once encrypted.

# Configuration

Before using Laravel's encrypter, you must set a key option in your configuration file. You should use the php artisan key:generate command to generate this key since this Artisan command will use PHP's secure random bytes generator to build your key. If this value is not properly set, all values encrypted by Laravel will be insecure.

# **Using The Encrypter**

### **Encrypting A Value**

You may encrypt a value using the encrypt helper. All encrypted values are encrypted using OpenSSL and the AES-256-CBC cipher. Furthermore, all encrypted values are signed with a message authentication code (MAC) to detect any modifications to the encrypted string:

```
<?php
namespace App\Http\Controllers;
use App\User:
use Illuminate\Http\Request;
use App\Http\Controllers\Controller;
class UserController extends Controller
     * Store a secret message for the user.
      @param Request $request
     * @param int $id
      @return Response
    public function storeSecret(Request $request, $id)
        $user = User::findOrFail($id);
        $user->fill([
            'secret'
                    => encrypt($request->secret)
        1)->save():
```

### **Encrypting Without Serialization**

Encrypted values are passed through serialize during encryption, which allows for encryption of objects and arrays. Thus, non-PHP clients receiving encrypted values will need to unserialize the data. If you would like to encrypt and decrypt values without serialization, you may use the encryptString and decryptString methods of the Crypt facade:

```
use Illuminate\Support\Facades\Crypt;
$encrypted = Crypt::encryptString('Hello world.');
$decrypted = Crypt::decryptString($encrypted);
```

### **Decrypting A Value**

You may decrypt values using the decrypt helper. If the value can not be properly decrypted, such as when the MAC is invalid, an Illuminate\Contracts\Encryption\DecryptException will be thrown:

```
use Illuminate\Contracts\Encryption\DecryptException;
```

```
try {
     $decrypted = decrypt($encryptedValue);
} catch (DecryptException $e) {
     //
}
```

#### Security

# Hashing

- Introduction
- Configuration
- Basic Usage

### Introduction

The Laravel Hash <u>facade</u> provides secure Bcrypt and Argon2 hashing for storing user passwords. If you are using the built-in LoginController and RegisterController classes that are included with your Laravel application, they will use Bcrypt for registration and authentication by default.

TIP Bcrypt is a great choice for hashing passwords because its "work factor" is adjustable, which means that the time it takes to generate a hash can be increased as hardware power increases.

# Configuration

The default hashing driver for your application is configured in the config/hashing.php configuration file. There are currently three supported drivers: Bcrypt and Argon2 (Argon2i and Argon2id variants).

NOTE The Argon2i driver requires PHP 7.2.0 or greater and the Argon2id driver requires PHP 7.3.0 or greater.

# **Basic Usage**

You may hash a password by calling the make method on the Hash facade:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
use Illuminate\Support\Facades\Hash;
use App\Http\Controllers\Controller;
class UpdatePasswordController extends Controller
     * Update the password for the user.
       @param Request $request
       @return Response
    public function update(Request $request)
        // Validate the new password length...
        $request->user()->fill([
            'password' => Hash::make($request->newPassword)
        ])->save();
    }
}
```

### **Adjusting The Bcrypt Work Factor**

If you are using the Bcrypt algorithm, the make method allows you to manage the work factor of the algorithm using the rounds option; however, the default is acceptable for most applications:

```
$hashed = Hash::make('password', [
    'rounds' => 12
]);
```

### **Adjusting The Argon2 Work Factor**

If you are using the Argon2 algorithm, the make method allows you to manage the work factor of the algorithm using the memory, time, and threads options; however, the defaults are acceptable for most applications:

```
$hashed = Hash::make('password', [
   'memory' => 1024,
   'time' => 2,
   'threads' => 2,
]);
```

TIP For more information on these options, check out the official PHP documentation.

### Verifying A Password Against A Hash

The check method allows you to verify that a given plain-text string corresponds to a given hash. However, if you are using the LoginController included with Laravel, you will probably not need to use this directly, as this controller automatically calls this method:

```
if (Hash::check('plain-text', $hashedPassword)) {
    // The passwords match...
}
```

### Checking If A Password Needs To Be Rehashed

The needsRehash function allows you to determine if the work factor used by the hasher has changed since the password was hashed:

```
if (Hash::needsRehash($hashed)) {
    $hashed = Hash::make('plain-text');
}
```

#### Security

# **Resetting Passwords**

- Introduction
- Database Considerations
- Routing
- Views
- After Resetting Passwords
- Customization

### Introduction

TIP **Want to get started fast?** Just run php artisan make:auth in a fresh Laravel application and navigate your browser to http://your-app.test/register or any other URL that is assigned to your application. This single command will take care of scaffolding your entire authentication system, including resetting passwords!

Most web applications provide a way for users to reset their forgotten passwords. Rather than forcing you to re-implement this on each application, Laravel provides convenient methods for sending password reminders and performing password resets.

NOTE Before using the password reset features of Laravel, your user must use the Illuminate\Notifications\Notifiable trait

### **Database Considerations**

To get started, verify that your App\User model implements the Illuminate\Contracts\Auth\CanResetPassword contract. Of course, the App\User model included with the framework already implements this interface, and uses the Illuminate\Auth\Passwords\CanResetPassword trait to include the methods needed to implement the interface.

#### **Generating The Reset Token Table Migration**

Next, a table must be created to store the password reset tokens. The migration for this table is included with Laravel out of the box, and resides in the database/migrations directory. So, all you need to do is run your database migrations:

php artisan migrate

### Routing

Laravel includes Auth\ForgotPasswordController and Auth\ResetPasswordController classes that contains the logic necessary to e-mail password reset links and reset user passwords. All of the routes needed to perform password resets may be generated using the make: auth Artisan command:

php artisan make:auth

### **Views**

Again, Laravel will generate all of the necessary views for password reset when the make: auth command is executed. These views are placed in resources/views/auth/passwords. You are free to customize them as needed for your application.

### **After Resetting Passwords**

Once you have defined the routes and views to reset your user's passwords, you may access the route in your browser at /password/reset. The ForgotPasswordController included with the framework already includes the logic to send the password reset link e-mails, while the ResetPasswordController includes the logic to reset user passwords.

After a password is reset, the user will automatically be logged into the application and redirected to /home. You can customize the post password reset redirect location by defining a redirectTo property on the ResetPasswordController:

```
protected $redirectTo = '/dashboard';
```

NOTE By default, password reset tokens expire after one hour. You may change this via the password reset expire option in your config/auth.php file.

### Customization

### **Authentication Guard Customization**

In your auth.php configuration file, you may configure multiple "guards", which may be used to define authentication behavior for multiple user tables. You can customize the included ResetPasswordController to use the guard of your choice by overriding the guard method on the controller. This method should return a guard instance:

```
use Illuminate\Support\Facades\Auth;
protected function guard()
{
    return Auth::guard('guard-name');
}
```

#### **Password Broker Customization**

In your auth.php configuration file, you may configure multiple password "brokers", which may be used to reset passwords on multiple user tables. You can customize the included ForgotPasswordController and ResetPasswordController to use the broker of your choice by overriding the broker method:

```
use Illuminate\Support\Facades\Password;

/**
  * Get the broker to be used during password reset.
  * @return PasswordBroker
  */
protected function broker()
{
    return Password::broker('name');
}
```

### **Reset Email Customization**

You may easily modify the notification class used to send the password reset link to the user. To get started, override the sendPasswordResetNotification method on your User model. Within this method, you may send the notification using any notification class you choose. The password reset \$token is the first argument received by the method:

#### **Digging Deeper**

# **Artisan Console**

- Introduction
  - o Tinker (REPL)
- Writing Commands
  - Generating Commands
  - Command Structure
- Closure Commands
   Defining Input Expectations
  - Arguments
  - o Options
  - Input Arrays
  - Input Descriptions
- Command I/O
  - Retrieving Input
  - o Prompting For Input
  - Writing Output
- Registering Commands
- Programmatically Executing Commands
  - o Calling Commands From Other Commands

### Introduction

Artisan is the command-line interface included with Laravel. It provides a number of helpful commands that can assist you while you build your application. To view a list of all available Artisan commands, you may use the list command:

```
php artisan list
```

Every command also includes a "help" screen which displays and describes the command's available arguments and options. To view a help screen, precede the name of the command with help:

php artisan help migrate

### Tinker (REPL)

All Laravel applications include Tinker, a REPL powered by the <u>PsySH</u> package. Tinker allows you to interact with your entire Laravel application on the command line, including the Eloquent ORM, jobs, events, and more. To enter the Tinker environment, run the tinker Artisan command:

```
php artisan tinker
```

You can publish Tinker's configuration file using the vendor:publish command:

```
php artisan vendor:publish --provider="Laravel\Tinker\TinkerServiceProvider"
```

### **Command Whitelist**

Tinker utilizes a white-list to determine which Artisan commands are allowed to be run within its shell. By default, you may run the clear-compiled, down, env, inspire, migrate, optimize, and up commands. If you would like to white-list more commands you may add them to the commands array in your tinker.php configuration file:

```
'commands' => [
    // App\Console\Commands\ExampleCommand::class,
],
```

#### Alias Blacklist

Typically, Tinker automatically aliases classes as you require them in Tinker. However, you may wish to never alias some classes. You may accomplish this by listing the classes in the dont\_alias array of your tinker.php configuration file:

```
'dont_alias' => [
    App\User::class,
1.
```

# **Writing Commands**

In addition to the commands provided with Artisan, you may also build your own custom commands. Commands are typically

stored in the app/console/commands directory; however, you are free to choose your own storage location as long as your commands can be loaded by Composer.

#### **Generating Commands**

To create a new command, use the make:command Artisan command. This command will create a new command class in the app/Console/Commands directory. Don't worry if this directory does not exist in your application, since it will be created the first time you run the make:command Artisan command. The generated command will include the default set of properties and methods that are present on all commands:

php artisan make:command SendEmails

#### **Command Structure**

After generating your command, you should fill in the signature and description properties of the class, which will be used when displaying your command on the list screen. The handle method will be called when your command is executed. You may place your command logic in this method.

TIP For greater code reuse, it is good practice to keep your console commands light and let them defer to application services to accomplish their tasks. In the example below, note that we inject a service class to do the "heavy lifting" of sending the emails.

Let's take a look at an example command. Note that we are able to inject any dependencies we need into the command's constructor or handle method. The Laravel <u>service container</u> will automatically inject all dependencies type-hinted in the constructor or handle method:

```
<?php
namespace App\Console\Commands;
use App\User;
use App\DripEmailer;
use Illuminate\Console\Command;
class SendEmails extends Command
     ^{\ast} The name and signature of the console command.
     * @var string
    protected $signature = 'email:send {user}';
     ^{\star}\, The console command description.
     * @var string
    protected $description = 'Send drip e-mails to a user';
     * The drip e-mail service.
     * @var DripEmailer
    protected $drip;
     * Create a new command instance.
       @param DripEmailer $drip
       @return void
    public function __construct(DripEmailer $drip)
        parent::__construct();
        $this->drip = $drip;
    }
     * Execute the console command.
       @return mixed
    public function handle()
        $this->drip->send(User::find($this->argument('user')));
    }
}
```

#### **Closure Commands**

Closure based commands provide an alternative to defining console commands as classes. In the same way that route Closures are an alternative to controllers, think of command Closures as an alternative to command classes. Within the commands method of your app/console/Kernel.php file, Laravel loads the routes/console.php file:

```
/**

* Register the Closure based commands for the application.

* @return void

*/
protected function commands()
{
    require base_path('routes/console.php');
}
```

Even though this file does not define HTTP routes, it defines console based entry points (routes) into your application. Within this file, you may define all of your Closure based routes using the Artisan::command method. The command method accepts two arguments: the command signature and a Closure which receives the commands arguments and options:

```
Artisan::command('build {project}', function ($project) {
    $this->info("Building {$project}!");
});
```

The Closure is bound to the underlying command instance, so you have full access to all of the helper methods you would typically be able to access on a full command class.

#### **Type-Hinting Dependencies**

In addition to receiving your command's arguments and options, command Closures may also type-hint additional dependencies that you would like resolved out of the <u>service container</u>:

```
use App\User;
use App\DripEmailer;

Artisan::command('email:send {user}', function (DripEmailer $drip, $user) {
    $drip->send(User::find($user));
});
```

## **Closure Command Descriptions**

When defining a Closure based command, you may use the describe method to add a description to the command. This description will be displayed when you run the php artisan list or php artisan help commands:

```
Artisan::command('build {project}', function ($project) {
    $this->info("Building {$project}!");
})->describe('Build the project');
```

## **Defining Input Expectations**

When writing console commands, it is common to gather input from the user through arguments or options. Laravel makes it very convenient to define the input you expect from the user using the signature property on your commands. The signature property allows you to define the name, arguments, and options for the command in a single, expressive, route-like syntax.

## Arguments

All user supplied arguments and options are wrapped in curly braces. In the following example, the command defines one **required** argument: user:

```
/**
  * The name and signature of the console command.
  *
  * @var string
  */
protected $signature = 'email:send {user}';
```

You may also make arguments optional and define default values for arguments:

```
// Optional argument...
email:send {user?}
// Optional argument with default value...
email:send {user=foo}
```

### **Options**

Options, like arguments, are another form of user input. Options are prefixed by two hyphens (--) when they are specified on the command line. There are two types of options: those that receive a value and those that don't. Options that don't receive a value serve as a boolean "switch". Let's take a look at an example of this type of option:

```
/**
  * The name and signature of the console command.
  *
  * @var string
  */
protected $signature = 'email:send {user} {--queue}';
```

In this example, the --queue switch may be specified when calling the Artisan command. If the --queue switch is passed, the value of the option will be true. Otherwise, the value will be false:

```
php artisan email:send 1 --queue
```

#### **Options With Values**

Next, let's take a look at an option that expects a value. If the user must specify a value for an option, suffix the option name with a = sign:

```
/**
  * The name and signature of the console command.
  *
  * @var string
  */
protected $signature = 'email:send {user} {--queue=}';
```

In this example, the user may pass a value for the option like so:

```
php artisan email:send 1 --queue=default
```

You may assign default values to options by specifying the default value after the option name. If no option value is passed by the user, the default value will be used:

```
email:send {user} {--queue=default}
```

#### **Option Shortcuts**

To assign a shortcut when defining an option, you may specify it before the option name and use a  $\mid$  delimiter to separate the shortcut from the full option name:

```
email:send {user} {--Q|queue}
```

#### **Input Arrays**

If you would like to define arguments or options to expect array inputs, you may use the \* character. First, let's take a look at an example that specifies an array argument:

```
email:send {user*}
```

When calling this method, the user arguments may be passed in order to the command line. For example, the following command will set the value of user to ['foo', 'bar']:

```
php artisan email:send foo bar
```

When defining an option that expects an array input, each option value passed to the command should be prefixed with the option

```
email:send {user} {--id=*}
php artisan email:send --id=1 --id=2
```

#### **Input Descriptions**

You may assign descriptions to input arguments and options by separating the parameter from the description using a colon. If you need a little extra room to define your command, feel free to spread the definition across multiple lines:

## Command I/O

### **Retrieving Input**

While your command is executing, you will obviously need to access the values for the arguments and options accepted by your command. To do so, you may use the argument and option methods:

If you need to retrieve all of the arguments as an array, call the arguments method:

```
$arguments = $this->arguments();
```

Options may be retrieved just as easily as arguments using the option method. To retrieve all of the options as an array, call the options method:

```
// Retrieve a specific option...
$queueName = $this->option('queue');
// Retrieve all options...
$options = $this->options();
```

If the argument or option does not exist, null will be returned.

#### **Prompting For Input**

In addition to displaying output, you may also ask the user to provide input during the execution of your command. The ask method will prompt the user with the given question, accept their input, and then return the user's input back to your command:

The secret method is similar to ask, but the user's input will not be visible to them as they type in the console. This method is useful when asking for sensitive information such as a password:

```
$password = $this->secret('What is the password?');
```

## **Asking For Confirmation**

If you need to ask the user for a simple confirmation, you may use the confirm method. By default, this method will return false. However, if the user enters y or yes in response to the prompt, the method will return true.

```
if ($this->confirm('Do you wish to continue?')) {
    //
}
```

#### **Auto-Completion**

The anticipate method can be used to provide auto-completion for possible choices. The user can still choose any answer, regardless of the auto-completion hints:

```
$name = $this->anticipate('What is your name?', ['Taylor', 'Dayle']);
```

## **Multiple Choice Questions**

If you need to give the user a predefined set of choices, you may use the choice method. You may set the array index of the default value to be returned if no option is chosen:

```
$name = $this->choice('What is your name?', ['Taylor', 'Dayle'], $defaultIndex);
```

## **Writing Output**

To send output to the console, use the line, info, comment, question and error methods. Each of these methods will use appropriate ANSI colors for their purpose. For example, let's display some general information to the user. Typically, the info method will display in the console as green text:

```
/**

* Execute the console command.

* @return mixed

*/
public function handle()
{

$this->info('Display this on the screen');
}
```

To display an error message, use the error method. Error message text is typically displayed in red:

```
$this->error('Something went wrong!');
```

If you would like to display plain, uncolored console output, use the line method:

```
$this->line('Display this on the screen');
```

#### **Table Layouts**

The table method makes it easy to correctly format multiple rows / columns of data. Just pass in the headers and rows to the method. The width and height will be dynamically calculated based on the given data:

```
$headers = ['Name', 'Email'];

$users = App\User::all(['name', 'email'])->toArray();

$this->table($headers, $users);
```

#### **Progress Bars**

For long running tasks, it could be helpful to show a progress indicator. Using the output object, we can start, advance and stop the Progress Bar. First, define the total number of steps the process will iterate through. Then, advance the Progress Bar after processing each item:

```
$users = App\User::all();
$bar = $this->output->createProgressBar(count($users));
$bar->start();
foreach ($users as $user) {
    $this->performTask($user);
    $bar->advance();
}
$bar->finish();
```

For more advanced options, check out the **Symfony Progress Bar component documentation**.

## **Registering Commands**

Because of the load method call in your console kernel's commands method, all commands within the app/console/commands directory will automatically be registered with Artisan. In fact, you are free to make additional calls to the load method to scan other directories for Artisan commands:

```
/**
    * Register the commands for the application.
    * @return void
    */
protected function commands()
{
    $this->load(__DIR__.'/Commands');
    $this->load(__DIR__.'/MoreCommands');
    // ...
```

You may also manually register commands by adding its class name to the \$commands property of your app/Console/Kernel.php file. When Artisan boots, all the commands listed in this property will be resolved by the <a href="service container">service container</a> and registered with

Artisan:

```
protected $commands = [
    Commands\SendEmails::class
1:
```

## **Programmatically Executing Commands**

Sometimes you may wish to execute an Artisan command outside of the CLI. For example, you may wish to fire an Artisan command from a route or controller. You may use the call method on the Artisan facade to accomplish this. The call method accepts either the command's name or class as the first argument, and an array of command parameters as the second argument. The exit code will be returned:

Using the queue method on the Artisan facade, you may even queue Artisan commands so they are processed in the background by your <u>queue workers</u>. Before using this method, make sure you have configured your queue and are running a queue listener:

```
Route::get('/foo', function () {
   Artisan::queue('email:send', [
          'user' => 1, '--queue' => 'default'
   ]);
   //
});
```

You may also specify the connection or queue the Artisan command should be dispatched to:

```
Artisan::queue('email:send', [
    'user' => 1, '--queue' => 'default'
])->onConnection('redis')->onQueue('commands');
```

## **Passing Array Values**

If your command defines an option that accepts an array, you may pass an array of values to that option:

## **Passing Boolean Values**

If you need to specify the value of an option that does not accept string values, such as the --force flag on the migrate:refresh command, you should pass true or false:

```
$exitCode = Artisan::call('migrate:refresh', [
    '--force' => true,
]);
```

#### **Calling Commands From Other Commands**

Sometimes you may wish to call other commands from an existing Artisan command. You may do so using the call method. This call method accepts the command name and an array of command parameters:

If you would like to call another console command and suppress all of its output, you may use the callSilent method. The callSilent method has the same signature as the call method:

```
$this->callSilent('email:send', [
    'user' => 1, '--queue' => 'default'
]);
```

#### **Digging Deeper**

# **Broadcasting**

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#### Introduction

In many modern web applications, WebSockets are used to implement realtime, live-updating user interfaces. When some data is updated on the server, a message is typically sent over a WebSocket connection to be handled by the client. This provides a more robust, efficient alternative to continually polling your application for changes.

To assist you in building these types of applications, Laravel makes it easy to "broadcast" your events over a WebSocket connection. Broadcasting your Laravel events allows you to share the same event names between your server-side code and your client-side JavaScript application.

TIP Before diving into event broadcasting, make sure you have read all of the documentation regarding Laravel <u>events and listeners</u>.

## Configuration

All of your application's event broadcasting configuration is stored in the config/broadcasting.php configuration file. Laravel supports several broadcast drivers out of the box: <a href="Pusher">Pusher</a>, <a href="Redis">Redis</a>, and a log driver for local development and debugging. Additionally, a null driver is included which allows you to totally disable broadcasting. A configuration example is included for each of these drivers in the config/broadcasting.php configuration file.

## **Broadcast Service Provider**

Before broadcasting any events, you will first need to register the App\Providers\BroadcastServiceProvider. In fresh Laravel applications, you only need to uncomment this provider in the providers array of your config/app.php configuration file. This provider will allow you to register the broadcast authorization routes and callbacks.

#### **CSRF** Token

<u>Laravel Echo</u> will need access to the current session's CSRF token. You should verify that your application's head HTML element defines a meta tag containing the CSRF token:

```
<meta name="csrf-token" content="{{ csrf_token() }}">
```

## **Driver Prerequisites**

#### **Pusher**

If you are broadcasting your events over **Pusher**, you should install the Pusher PHP SDK using the Composer package manager:

```
composer require pusher/pusher-php-server "~3.0"
```

Next, you should configure your Pusher credentials in the <code>config/broadcasting.php</code> configuration file. An example Pusher configuration is already included in this file, allowing you to quickly specify your Pusher key, secret, and application ID. The <code>config/broadcasting.php</code> file's <code>pusher</code> configuration also allows you to specify additional <code>options</code> that are supported by Pusher, such as the cluster:

```
'options' => [
   'cluster' => 'eu',
   'encrypted' => true
],
```

When using Pusher and <u>Laravel Echo</u>, you should specify pusher as your desired broadcaster when instantiating the Echo instance in your resources/js/bootstrap.js file:

```
import Echo from "laravel-echo";
window.Pusher = require('pusher-js');
window.Echo = new Echo({
    broadcaster: 'pusher',
    key: 'your-pusher-key'
});
```

#### Redis

If you are using the Redis broadcaster, you should install the Predis library:

```
composer require predis/predis
```

The Redis broadcaster will broadcast messages using Redis' pub / sub feature; however, you will need to pair this with a WebSocket server that can receive the messages from Redis and broadcast them to your WebSocket channels.

When the Redis broadcaster publishes an event, it will be published on the event's specified channel names and the payload will be a JSON encoded string containing the event name, a data payload, and the user that generated the event's socket ID (if applicable).

#### Socket.IO

If you are going to pair the Redis broadcaster with a Socket.IO server, you will need to include the Socket.IO JavaScript client library in your application. You may install it via the NPM package manager:

```
npm install --save socket.io-client
```

Next, you will need to instantiate Echo with the socket.io connector and a host.

```
import Echo from "laravel-echo"
window.io = require('socket.io-client');
window.Echo = new Echo({
    broadcaster: 'socket.io',
    host: window.location.hostname + ':6001'
});
```

Finally, you will need to run a compatible Socket.IO server. Laravel does not include a Socket.IO server implementation; however, a community driven Socket.IO server is currently maintained at the <a href="televerlde-laravel-echo-server">televerlde-laravel-echo-server</a> GitHub repository.

## **Queue Prerequisites**

Before broadcasting events, you will also need to configure and run a <u>queue listener</u>. All event broadcasting is done via queued jobs so that the response time of your application is not seriously affected.

## **Concept Overview**

Laravel's event broadcasting allows you to broadcast your server-side Laravel events to your client-side JavaScript application using a driver-based approach to WebSockets. Currently, Laravel ships with <a href="Pusher">Pusher</a> and Redis drivers. The events may be easily consumed on the client-side using the <a href="Laravel Echo">Laravel Echo</a> Javascript package.

Events are broadcast over "channels", which may be specified as public or private. Any visitor to your application may subscribe

to a public channel without any authentication or authorization; however, in order to subscribe to a private channel, a user must be authenticated and authorized to listen on that channel.

## **Using An Example Application**

Before diving into each component of event broadcasting, let's take a high level overview using an e-commerce store as an example. We won't discuss the details of configuring <u>Pusher</u> or <u>Laravel Echo</u> since that will be discussed in detail in other sections of this documentation.

In our application, let's assume we have a page that allows users to view the shipping status for their orders. Let's also assume that a ShippingStatusUpdated event is fired when a shipping status update is processed by the application:

```
event(new ShippingStatusUpdated($update));
```

#### The ShouldBroadcast Interface

When a user is viewing one of their orders, we don't want them to have to refresh the page to view status updates. Instead, we want to broadcast the updates to the application as they are created. So, we need to mark the ShippingStatusUpdated event with the ShouldBroadcast interface. This will instruct Laravel to broadcast the event when it is fired:

```
<?php
namespace App\Events;
use Illuminate\Broadcasting\Channel;
use Illuminate\Queue\SerializesModels;
use Illuminate\Broadcasting\PrivateChannel;
use Illuminate\Broadcasting\PresenceChannel;
use Illuminate\Broadcasting\InteractsWithSockets;
use Illuminate\Contracts\Broadcasting\ShouldBroadcast;
class ShippingStatusUpdated implements ShouldBroadcast {
    /**
    * Information about the shipping status update.
    *
    * @var string
    */
    public $update;
}</pre>
```

The ShouldBroadcast interface requires our event to define a broadcaston method. This method is responsible for returning the channels that the event should broadcast on. An empty stub of this method is already defined on generated event classes, so we only need to fill in its details. We only want the creator of the order to be able to view status updates, so we will broadcast the event on a private channel that is tied to the order:

```
* Get the channels the event should broadcast on.

* @return array
 */
public function broadcastOn()
{
    return new PrivateChannel('order.'.$this->update->order_id);
}
```

## **Authorizing Channels**

Remember, users must be authorized to listen on private channels. We may define our channel authorization rules in the routes/channels.php file. In this example, we need to verify that any user attempting to listen on the private order.1 channel is actually the creator of the order:

```
Broadcast::channel('order.{orderId}', function ($user, $orderId) {
    return $user->id === Order::findOrNew($orderId)->user_id;
});
```

The channel method accepts two arguments: the name of the channel and a callback which returns true or false indicating whether the user is authorized to listen on the channel.

All authorization callbacks receive the currently authenticated user as their first argument and any additional wildcard parameters as their subsequent arguments. In this example, we are using the {orderId} placeholder to indicate that the "ID" portion of the channel name is a wildcard.

### **Listening For Event Broadcasts**

Next, all that remains is to listen for the event in our JavaScript application. We can do this using Laravel Echo. First, we'll use the

private method to subscribe to the private channel. Then, we may use the listen method to listen for the ShippingStatusUpdated event. By default, all of the event's public properties will be included on the broadcast event:

```
Echo.private(`order.${orderId}`)
  .listen('ShippingStatusUpdated', (e) => {
      console.log(e.update);
  });
```

## **Defining Broadcast Events**

To inform Laravel that a given event should be broadcast, implement the Illuminate\Contracts\Broadcasting\ShouldBroadcast interface on the event class. This interface is already imported into all event classes generated by the framework so you may easily add it to any of your events.

The ShouldBroadcast interface requires you to implement a single method: broadcaston. The broadcaston method should return a channel or array of channels that the event should broadcast on. The channels should be instances of Channel, PrivateChannel, or PresenceChannel. Instances of Channel represent public channels that any user may subscribe to, while PrivateChannels and PresenceChannels represent private channels that require <a href="mailto:channels-newed-newe

```
<?php
namespace App\Events;
use Illuminate\Broadcasting\Channel;
use Illuminate\Queue\SerializesModels;
use Illuminate\Broadcasting\PrivateChannel;
use Illuminate\Broadcasting\PresenceChannel;
use \ Illuminate \verb|\Broadcasting \verb|\Interacts With Sockets|;
use Illuminate\Contracts\Broadcasting\ShouldBroadcast:
class ServerCreated implements ShouldBroadcast
    use SerializesModels:
    public $user;
     * Create a new event instance.
       @return void
    public function __construct(User $user)
        $this->user = $user;
    }
     * Get the channels the event should broadcast on.
      @return Channel|array
    public function broadcastOn()
        return new PrivateChannel('user.'.$this->user->id);
}
```

Then, you only need to <u>fire the event</u> as you normally would. Once the event has been fired, a <u>queued job</u> will automatically broadcast the event over your specified broadcast driver.

#### **Broadcast Name**

By default, Laravel will broadcast the event using the event's class name. However, you may customize the broadcast name by defining a broadcastAs method on the event:

```
/**

* The event's broadcast name.

* @return string

*/
public function broadcastAs()
{
    return 'server.created';
}
```

If you customize the broadcast name using the broadcastAs method, you should make sure to register your listener with a leading . character. This will instruct Echo to not prepend the application's namespace to the event:

```
.listen('.server.created', function (e) {
    ....
});
```

#### **Broadcast Data**

When an event is broadcast, all of its public properties are automatically serialized and broadcast as the event's payload, allowing you to access any of its public data from your JavaScript application. So, for example, if your event has a single public \$user property that contains an Eloquent model, the event's broadcast payload would be:

```
{
    "user": {
        "id": 1,
        "name": "Patrick Stewart"
        ...
}
```

However, if you wish to have more fine-grained control over your broadcast payload, you may add a broadcastwith method to your event. This method should return the array of data that you wish to broadcast as the event payload:

```
/**
  * Get the data to broadcast.
  *
  * @return array
  */
public function broadcastWith()
{
    return ['id' => $this->user->id];
}
```

#### **Broadcast Queue**

By default, each broadcast event is placed on the default queue for the default queue connection specified in your queue.php configuration file. You may customize the queue used by the broadcaster by defining a broadcastqueue property on your event class. This property should specify the name of the queue you wish to use when broadcasting:

```
/**
  * The name of the queue on which to place the event.
  *
  * @var string
  */
public $broadcastQueue = 'your-queue-name';
```

If you want to broadcast your event using the sync queue instead of the default queue driver, you can implement the ShouldBroadcastNow interface instead of ShouldBroadcast:

### **Broadcast Conditions**

Sometimes you want to broadcast your event only if a given condition is true. You may define these conditions by adding a broadcastWhen method to your event class:

```
/**
  * Determine if this event should broadcast.
  * @return bool
  */
public function broadcastWhen()
{
    return $this->value > 100;
}
```

## **Authorizing Channels**

Private channels require you to authorize that the currently authenticated user can actually listen on the channel. This is accomplished by making an HTTP request to your Laravel application with the channel name and allowing your application to determine if the user can listen on that channel. When using <u>Laravel Echo</u>, the HTTP request to authorize subscriptions to private channels will be made automatically; however, you do need to define the proper routes to respond to these requests.

## **Defining Authorization Routes**

Thankfully, Laravel makes it easy to define the routes to respond to channel authorization requests. In the

BroadcastServiceProvider included with your Laravel application, you will see a call to the Broadcast::routes method. This method will register the /broadcasting/auth route to handle authorization requests:

```
Broadcast::routes();
```

The Broadcast::routes method will automatically place its routes within the web middleware group; however, you may pass an array of route attributes to the method if you would like to customize the assigned attributes:

```
Broadcast::routes($attributes);
```

## **Customizing The Authorization Endpoint**

By default, Echo will use the /broadcasting/auth endpoint to authorize channel access. However, you may specify your own authorization endpoint by passing the authEndpoint configuration option to your Echo instance:

```
window.Echo = new Echo({
   broadcaster: 'pusher',
   key: 'your-pusher-key',
   authEndpoint: '/custom/endpoint/auth'
});
```

### **Defining Authorization Callbacks**

Next, we need to define the logic that will actually perform the channel authorization. This is done in the routes/channels.php file that is included with your application. In this file, you may use the Broadcast::channel method to register channel authorization callbacks:

```
Broadcast::channel('order.{orderId}', function ($user, $orderId) {
    return $user->id === Order::findOrNew($orderId)->user_id;
});
```

The channel method accepts two arguments: the name of the channel and a callback which returns true or false indicating whether the user is authorized to listen on the channel.

All authorization callbacks receive the currently authenticated user as their first argument and any additional wildcard parameters as their subsequent arguments. In this example, we are using the {orderId} placeholder to indicate that the "ID" portion of the channel name is a wildcard.

## **Authorization Callback Model Binding**

Just like HTTP routes, channel routes may also take advantage of implicit and explicit route model binding. For example, instead of receiving the string or numeric order ID, you may request an actual order model instance:

```
use App\Order;
Broadcast::channel('order.{order}', function ($user, Order $order) {
    return $user->id === $order->user_id;
}):
```

#### **Defining Channel Classes**

If your application is consuming many different channels, your routes/channels.php file could become bulky. So, instead of using Closures to authorize channels, you may use channel classes. To generate a channel class, use the make:channel Artisan command. This command will place a new channel class in the App/Broadcasting directory.

```
php artisan make:channel OrderChannel
```

Next, register your channel in your routes/channels.php file:

```
use App\Broadcasting\OrderChannel;
Broadcast::channel('order.{order}', OrderChannel::class);
```

Finally, you may place the authorization logic for your channel in the channel class' join method. This join method will house the same logic you would have typically placed in your channel authorization Closure. Of course, you may also take advantage of channel model binding:

```
<?php
namespace App\Broadcasting;
use App\User;
use App\Order;
class OrderChannel</pre>
```

TIP Like many other classes in Laravel, channel classes will automatically be resolved by the <u>service container</u>. So, you may type-hint any dependencies required by your channel in its constructor.

## **Broadcasting Events**

Once you have defined an event and marked it with the ShouldBroadcast interface, you only need to fire the event using the event function. The event dispatcher will notice that the event is marked with the ShouldBroadcast interface and will queue the event for broadcasting:

event(new ShippingStatusUpdated(\$update));

## **Only To Others**

When building an application that utilizes event broadcasting, you may substitute the event function with the broadcast function. Like the event function, the broadcast function dispatches the event to your server-side listeners:

```
broadcast(new ShippingStatusUpdated($update));
```

However, the broadcast function also exposes the toothers method which allows you to exclude the current user from the broadcast's recipients:

```
broadcast(new ShippingStatusUpdated($update))->toOthers();
```

To better understand when you may want to use the toothers method, let's imagine a task list application where a user may create a new task by entering a task name. To create a task, your application might make a request to a /task end-point which broadcasts the task's creation and returns a JSON representation of the new task. When your JavaScript application receives the response from the end-point, it might directly insert the new task into its task list like so:

```
axios.post('/task', task)
   .then((response) => {
      this.tasks.push(response.data);
   });
```

However, remember that we also broadcast the task's creation. If your JavaScript application is listening for this event in order to add tasks to the task list, you will have duplicate tasks in your list: one from the end-point and one from the broadcast. You may solve this by using the toothers method to instruct the broadcaster to not broadcast the event to the current user.

NOTE Your event must use the Illuminate\Broadcasting\InteractsWithSockets trait in order to call the toOthers method.

## Configuration

When you initialize a Laravel Echo instance, a socket ID is assigned to the connection. If you are using <u>Vue</u> and <u>Axios</u>, the socket ID will automatically be attached to every outgoing request as a x-socket-ID header. Then, when you call the toothers method, Laravel will extract the socket ID from the header and instruct the broadcaster to not broadcast to any connections with that socket ID

If you are not using Vue and Axios, you will need to manually configure your JavaScript application to send the x-Socket-ID header. You may retrieve the socket ID using the Echo.socketId method:

```
var socketId = Echo.socketId();
```

## **Receiving Broadcasts**

## **Installing Laravel Echo**

Laravel Echo is a JavaScript library that makes it painless to subscribe to channels and listen for events broadcast by Laravel. You may install Echo via the NPM package manager. In this example, we will also install the pusher-js package since we will be using the Pusher broadcaster:

```
npm install --save laravel-echo pusher-js
```

Once Echo is installed, you are ready to create a fresh Echo instance in your application's JavaScript. A great place to do this is at the bottom of the resources/js/bootstrap.js file that is included with the Laravel framework:

```
import Echo from "laravel-echo"
window.Echo = new Echo({
    broadcaster: 'pusher',
    key: 'your-pusher-key'
});
```

When creating an Echo instance that uses the pusher connector, you may also specify a cluster as well as whether the connection should be encrypted:

```
window.Echo = new Echo({
   broadcaster: 'pusher',
   key: 'your-pusher-key',
   cluster: 'eu',
   encrypted: true
});
```

#### **Using An Existing Client Instance**

If you already have a Pusher or Socket.io client instance that you would like Echo to utilize, you may pass it to Echo via the client configuration option:

```
const client = require('pusher-js');
window.Echo = new Echo({
   broadcaster: 'pusher',
   key: 'your-pusher-key',
   client: client
});
```

## **Listening For Events**

Once you have installed and instantiated Echo, you are ready to start listening for event broadcasts. First, use the channel method to retrieve an instance of a channel, then call the listen method to listen for a specified event:

```
Echo.channel('orders')
   .listen('OrderShipped', (e) => {
      console.log(e.order.name);
   }):
```

If you would like to listen for events on a private channel, use the private method instead. You may continue to chain calls to the listen method to listen for multiple events on a single channel:

```
Echo.private('orders')
   .listen(...)
   .listen(...)
   .listen(...);
```

### **Leaving A Channel**

To leave a channel, you may call the leaveChannel method on your Echo instance:

```
Echo.leaveChannel('orders');
```

If you would like to leave a channel and also its associated private and presence channels, you may call the Leave method:

```
Echo.leave('orders');
```

## Namespaces

You may have noticed in the examples above that we did not specify the full namespace for the event classes. This is because Echo will automatically assume the events are located in the App\Events namespace. However, you may configure the root namespace when you instantiate Echo by passing a namespace configuration option:

```
window.Echo = new Echo({
   broadcaster: 'pusher'
```

```
key: 'your-pusher-key',
namespace: 'App.Other.Namespace'
});
```

Alternatively, you may prefix event classes with a . when subscribing to them using Echo. This will allow you to always specify the fully-qualified class name:

### **Presence Channels**

Presence channels build on the security of private channels while exposing the additional feature of awareness of who is subscribed to the channel. This makes it easy to build powerful, collaborative application features such as notifying users when another user is viewing the same page.

## **Authorizing Presence Channels**

All presence channels are also private channels; therefore, users must be <u>authorized to access them</u>. However, when defining authorization callbacks for presence channels, you will not return true if the user is authorized to join the channel. Instead, you should return an array of data about the user.

The data returned by the authorization callback will be made available to the presence channel event listeners in your JavaScript application. If the user is not authorized to join the presence channel, you should return false or null:

```
Broadcast::channel('chat.{roomId}', function ($user, $roomId) {
   if ($user->canJoinRoom($roomId)) {
      return ['id' => $user->id, 'name' => $user->name];
   }
});
```

#### **Joining Presence Channels**

To join a presence channel, you may use Echo's join method. The join method will return a PresenceChannel implementation which, along with exposing the listen method, allows you to subscribe to the here, joining, and leaving events.

The here callback will be executed immediately once the channel is joined successfully, and will receive an array containing the user information for all of the other users currently subscribed to the channel. The joining method will be executed when a new user joins a channel, while the leaving method will be executed when a user leaves the channel.

## **Broadcasting To Presence Channels**

Presence channels may receive events just like public or private channels. Using the example of a chatroom, we may want to broadcast NewMessage events to the room's presence channel. To do so, we'll return an instance of PresenceChannel from the event's broadcaston method:

```
/**
 * Get the channels the event should broadcast on.
 *
 * @return Channel|array
 */
public function broadcastOn()
{
    return new PresenceChannel('room.'.$this->message->room_id);
}
```

Like public or private events, presence channel events may be broadcast using the broadcast function. As with other events, you may use the toothers method to exclude the current user from receiving the broadcast:

```
broadcast(new NewMessage($message));
broadcast(new NewMessage($message))->toOthers();
```

You may listen for the join event via Echo's  ${\tt listen}$  method:

## **Client Events**

TIP When using <u>Pusher</u>, you must enable the "Client Events" option in the "App Settings" section of your <u>application</u> <u>dashboard</u> in order to send client events.

Sometimes you may wish to broadcast an event to other connected clients without hitting your Laravel application at all. This can be particularly useful for things like "typing" notifications, where you want to alert users of your application that another user is typing a message on a given screen.

To broadcast client events, you may use Echo's whisper method:

```
Echo.private('chat')
   .whisper('typing', {
        name: this.user.name
   });
```

To listen for client events, you may use the listenForWhisper method:

```
Echo.private('chat')
   .listenForWhisper('typing', (e) => {
      console.log(e.name);
   }):
```

## **Notifications**

By pairing event broadcasting with <u>notifications</u>, your JavaScript application may receive new notifications as they occur without needing to refresh the page. First, be sure to read over the documentation on using <u>the broadcast notification channel</u>.

Once you have configured a notification to use the broadcast channel, you may listen for the broadcast events using Echo's notification method. Remember, the channel name should match the class name of the entity receiving the notifications:

```
Echo.private(`App.User.${userId}`)
    .notification((notification) => {
        console.log(notification.type);
    });
```

In this example, all notifications sent to App\User instances via the broadcast channel would be received by the callback. A channel authorization callback for the App.User.{id} channel is included in the default BroadcastServiceProvider that ships with the Laravel framework.

#### **Digging Deeper**

# Cache

- Configuration
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# Configuration

Laravel provides an expressive, unified API for various caching backends. The cache configuration is located at config/cache.php. In this file you may specify which cache driver you would like to be used by default throughout your application. Laravel supports popular caching backends like Memcached and Redis out of the box.

The cache configuration file also contains various other options, which are documented within the file, so make sure to read over these options. By default, Laravel is configured to use the file cache driver, which stores the serialized, cached objects in the filesystem. For larger applications, it is recommended that you use a more robust driver such as Memcached or Redis. You may even configure multiple cache configurations for the same driver.

## **Driver Prerequisites**

#### **Database**

When using the database cache driver, you will need to setup a table to contain the cache items. You'll find an example schema declaration for the table below:

```
Schema::create('cache', function ($table) {
     $table->string('key')->unique();
$table->text('value');
     $table->integer('expiration');
});
```

TIP You may also use the php artisan cache:table Artisan command to generate a migration with the proper schema.

#### Memcached

Using the Memcached driver requires the Memcached PECL package to be installed. You may list all of your Memcached servers in the config/cache.php configuration file:

```
'memcached' => [
        'host' => '127.0.0.1',
        'port' => 11211,
        'weight' => 100
   1,
```

You may also set the host option to a UNIX socket path. If you do this, the port option should be set to 0:

```
'memcached' => [
        'host' => '/var/run/memcached/memcached.sock',
         'port' => 0,
         'weight' => 100
    ],
1,
```

#### Redis

Before using a Redis cache with Laravel, you will need to either install the predis/predis package (~1.0) via Composer or install the PhpRedis PHP extension via PECL.

For more information on configuring Redis, consult its Laravel documentation page.

## Cache Usage

## **Obtaining A Cache Instance**

The Illuminate\Contracts\Cache\Factory and Illuminate\Contracts\Cache\Repository contracts provide access to Laravel's cache services. The Factory contract provides access to all cache drivers defined for your application. The Repository contract is typically an implementation of the default cache driver for your application as specified by your cache configuration file.

However, you may also use the cache facade, which is what we will use throughout this documentation. The cache facade provides convenient, terse access to the underlying implementations of the Laravel cache contracts:

#### **Accessing Multiple Cache Stores**

Using the cache facade, you may access various cache stores via the store method. The key passed to the store method should correspond to one of the stores listed in the stores configuration array in your cache configuration file:

```
$value = Cache::store('file')->get('foo');
Cache::store('redis')->put('bar', 'baz', 10);
```

## **Retrieving Items From The Cache**

The get method on the cache facade is used to retrieve items from the cache. If the item does not exist in the cache, null will be returned. If you wish, you may pass a second argument to the get method specifying the default value you wish to be returned if the item doesn't exist:

```
$value = Cache::get('key');
$value = Cache::get('key', 'default');
```

You may even pass a Closure as the default value. The result of the closure will be returned if the specified item does not exist in the cache. Passing a Closure allows you to defer the retrieval of default values from a database or other external service:

```
$value = Cache::get('key', function () {
    return DB::table(...)->get();
});
```

#### **Checking For Item Existence**

The has method may be used to determine if an item exists in the cache. This method will return false if the value is null or false:

```
if (Cache::has('key')) {
     //
}
```

#### **Incrementing / Decrementing Values**

The increment and decrement methods may be used to adjust the value of integer items in the cache. Both of these methods accept an optional second argument indicating the amount by which to increment or decrement the item's value:

```
Cache::increment('key');
Cache::increment('key', $amount);
Cache::decrement('key');
Cache::decrement('key', $amount);
```

#### Retrieve & Store

Sometimes you may wish to retrieve an item from the cache, but also store a default value if the requested item doesn't exist. For example, you may wish to retrieve all users from the cache or, if they don't exist, retrieve them from the database and add them to the cache. You may do this using the cache::remember method:

```
$value = Cache::remember('users', $minutes, function () {
    return DB::table('users')->get();
});
```

If the item does not exist in the cache, the Closure passed to the remember method will be executed and its result will be placed in the cache.

You may use the rememberForever method to retrieve an item from the cache or store it forever:

```
$value = Cache::rememberForever('users', function () {
    return DB::table('users')->get();
});
```

#### Retrieve & Delete

If you need to retrieve an item from the cache and then delete the item, you may use the pull method. Like the get method, null will be returned if the item does not exist in the cache:

```
$value = Cache::pull('key');
```

#### **Storing Items In The Cache**

You may use the put method on the Cache facade to store items in the cache. When you place an item in the cache, you need to specify the number of minutes for which the value should be cached:

```
Cache::put('key', 'value', $minutes);
```

Instead of passing the number of minutes as an integer, you may also pass a DateTime instance representing the expiration time of the cached item:

```
$expiresAt = now()->addMinutes(10);
Cache::put('key', 'value', $expiresAt);
```

#### **Store If Not Present**

The add method will only add the item to the cache if it does not already exist in the cache store. The method will return true if the item is actually added to the cache. Otherwise, the method will return false:

```
Cache::add('key', 'value', $minutes);
```

## **Storing Items Forever**

The forever method may be used to store an item in the cache permanently. Since these items will not expire, they must be manually removed from the cache using the forget method:

```
Cache::forever('key', 'value');
```

TIP If you are using the Memcached driver, items that are stored "forever" may be removed when the cache reaches its size limit.

### **Removing Items From The Cache**

You may remove items from the cache using the forget method:

```
Cache::forget('key');
```

You may clear the entire cache using the flush method:

```
Cache::flush();
```

NOTE Flushing the cache does not respect the cache prefix and will remove all entries from the cache. Consider this carefully when clearing a cache which is shared by other applications.

#### **Atomic Locks**

NOTE To utilize this feature, your application must be using the memcached or redis cache driver as your application's default cache driver. In addition, all servers must be communicating with the same central cache server.

Atomic locks allow for the manipulation of distributed locks without worrying about race conditions. For example, <u>Laravel Forge</u> uses atomic locks to ensure that only one remote task is being executed on a server at a time. You may create and manage locks using the <u>cache::lock method</u>:

```
if (Cache::lock('foo', 10)->get()) {
    // Lock acquired for 10 seconds...
    Cache::lock('foo')->release();
}
```

The get method also accepts a Closure. After the Closure is executed, Laravel will automatically release the lock:

```
Cache::lock('foo')->get(function () {
    // Lock acquired indefinitely and automatically released...
}):
```

If the lock is not available at the moment you request it, you may instruct Laravel to wait for a specified number of seconds. If the lock can not be acquired within the specified time limit, an Illuminate\Contracts\Cache\LockTimeoutException will be thrown:

```
if (Cache::lock('foo', 10)->block(5)) {
    // Lock acquired after waiting maximum of 5 seconds...
}
Cache::lock('foo', 10)->block(5, function () {
    // Lock acquired after waiting maximum of 5 seconds...
}):
```

## The Cache Helper

In addition to using the Cache facade or <u>cache contract</u>, you may also use the global cache function to retrieve and store data via the cache. When the cache function is called with a single, string argument, it will return the value of the given key:

```
$value = cache('key');
```

If you provide an array of key / value pairs and an expiration time to the function, it will store values in the cache for the specified duration:

```
cache(['key' => 'value'], $minutes);
cache(['key' => 'value'], now()->addSeconds(10));
```

When the cache function is called without any arguments, it returns an instance of the Illuminate\Contracts\Cache\Factory implementation, allowing you to call other caching methods:

```
cache()->remember('users', $minutes, function () {
    return DB::table('users')->get();
});
```

TIP When testing call to the global cache function, you may use the Cache::shouldReceive method just as if you were <u>testing</u> a facade.

# **Cache Tags**

NOTE Cache tags are not supported when using the file or database cache drivers. Furthermore, when using multiple tags with caches that are stored "forever", performance will be best with a driver such as memcached, which automatically purges stale records.

## **Storing Tagged Cache Items**

Cache tags allow you to tag related items in the cache and then flush all cached values that have been assigned a given tag. You may access a tagged cache by passing in an ordered array of tag names. For example, let's access a tagged cache and put value in the cache:

```
Cache::tags(['people', 'artists'])->put('John', $john, $minutes);
Cache::tags(['people', 'authors'])->put('Anne', $anne, $minutes);
```

## **Accessing Tagged Cache Items**

To retrieve a tagged cache item, pass the same ordered list of tags to the tags method and then call the get method with the key you wish to retrieve:

```
$john = Cache::tags(['people', 'artists'])->get('John');
$anne = Cache::tags(['people', 'authors'])->get('Anne');
```

### **Removing Tagged Cache Items**

You may flush all items that are assigned a tag or list of tags. For example, this statement would remove all caches tagged with either people, authors, or both. So, both Anne and John would be removed from the cache:

```
Cache::tags(['people', 'authors'])->flush();
```

In contrast, this statement would remove only caches tagged with authors, so Anne would be removed, but not John:

```
Cache::tags('authors')->flush();
```

## **Adding Custom Cache Drivers**

## **Writing The Driver**

To create our custom cache driver, we first need to implement the <code>illuminate\Contracts\Cache\Store contract</code>. So, a MongoDB cache implementation would look something like this:

```
ramespace App\Extensions;

use Illuminate\Contracts\Cache\Store;

class MongoStore implements Store
{
    public function get($key) {}
    public function many(array $keys);
    public function put($key, $value, $minutes) {}
    public function putMany(array $values, $minutes);
    public function increment($key, $value = 1) {}
    public function decrement($key, $value = 1) {}
    public function forever($key, $value) {}
    public function forget($key) {}
    public function flush() {}
    public function getPrefix() {}
}
```

We just need to implement each of these methods using a MongoDB connection. For an example of how to implement each of these methods, take a look at the <code>Illuminate\Cache\MemcachedStore</code> in the framework source code. Once our implementation is complete, we can finish our custom driver registration.

```
Cache::extend('mongo', function ($app) {
    return Cache::repository(new MongoStore);
});
```

TIP If you're wondering where to put your custom cache driver code, you could create an Extensions namespace within your app directory. However, keep in mind that Laravel does not have a rigid application structure and you are free to organize your application according to your preferences.

#### **Registering The Driver**

To register the custom cache driver with Laravel, we will use the extend method on the Cache facade. The call to Cache::extend could be done in the boot method of the default App\Providers\AppServiceProvider that ships with fresh Laravel applications, or you may create your own service provider to house the extension - just don't forget to register the provider in the config/app.php provider array:

```
<?php
namespace App\Providers;
use App\Extensions\MongoStore;
use Illuminate\Support\Facades\Cache;
use Illuminate\Support\ServiceProvider;
class CacheServiceProvider extends ServiceProvider
{
    /**
    * Perform post-registration booting of services.</pre>
```

```
*
 * @return void
 */
public function boot()
{
    Cache::extend('mongo', function ($app) {
        return Cache::repository(new MongoStore);
    });
}

/**
 * Register bindings in the container.
 *
 * @return void
 */
public function register()
 {
    //
}
```

The first argument passed to the extend method is the name of the driver. This will correspond to your driver option in the config/cache.php configuration file. The second argument is a Closure that should return an Illuminate\Cache\Repository instance. The Closure will be passed an \$app instance, which is an instance of the <a href="mailto:service container">service container</a>.

Once your extension is registered, update your config/cache.php configuration file's driver option to the name of your extension.

## **Events**

To execute code on every cache operation, you may listen for the <u>events</u> fired by the cache. Typically, you should place these event listeners within your EventServiceProvider:

```
/**
  * The event listener mappings for the application.
  * @var array
  */
protected $listen = [
    'Illuminate\Cache\Events\CacheHit' => [
         'App\Listeners\LogCacheHit',
],
    'Illuminate\Cache\Events\CacheMissed' => [
         'App\Listeners\LogCacheMissed',
],
    'Illuminate\Cache\Events\KeyForgotten' => [
         'App\Listeners\LogKeyForgotten',
],
    'Illuminate\Cache\Events\KeyWritten' => [
         'App\Listeners\LogKeyWritten',
],
    'Illuminate\Cache\Events\KeyWritten',
],
];
```

#### **Digging Deeper**

# **Collections**

- Introduction
  - Creating Collections
  - Extending Collections
- Available Methods
- Higher Order Messages

## Introduction

The Illuminate\Support\Collection class provides a fluent, convenient wrapper for working with arrays of data. For example, check out the following code. We'll use the collect helper to create a new collection instance from the array, run the strtoupper function on each element, and then remove all empty elements:

```
$collection = collect(['taylor', 'abigail', null])->map(function ($name) {
    return strtoupper($name);
})
->reject(function ($name) {
    return empty($name);
});
```

As you can see, the collection class allows you to chain its methods to perform fluent mapping and reducing of the underlying array. In general, collections are immutable, meaning every collection method returns an entirely new collection instance.

### **Creating Collections**

As mentioned above, the collect helper returns a new Illuminate\Support\Collection instance for the given array. So, creating a collection is as simple as:

```
$collection = collect([1, 2, 3]);
```

TIP The results of **Eloquent** queries are always returned as Collection instances.

## **Extending Collections**

Collections are "macroable", which allows you to add additional methods to the collection class at run time. For example, the following code adds a toUpper method to the Collection class:

```
use Illuminate\Support\Str;
Collection::macro('toUpper', function () {
    return $this->map(function ($value) {
        return Str::upper($value);
    });
});
$collection = collect(['first', 'second']);
$upper = $collection->toUpper();
// ['FIRST', 'SECOND']
```

Typically, you should declare collection macros in a service provider.

#### **Available Methods**

For the remainder of this documentation, we'll discuss each method available on the <code>collection</code> class. Remember, all of these methods may be chained to fluently manipulate the underlying array. Furthermore, almost every method returns a new <code>collection</code> instance, allowing you to preserve the original copy of the collection when necessary:

all average avg chunk collapse combine concat contains containsStrict count crossJoin dd diff diffAssoc diffKeys dump each eachSpread every except filter first firstWhere flatMap flatten flip forget forPage get groupBy has implode intersect intersectByKeys isEmpty isNotEmpty keyBy keys last macro make map mapInto mapSpread mapToGroups mapWithKeys max median merge min mode nth only pad partition pipe pluck pop prepend pull push put random reduce reject reverse search shift shuffle slice some sort sortByDesc sortKeys sortKeysDesc splice split sum take tap times toArray toJson transform union unique uniqueStrict unless unlessEmpty unlessNotEmpty unwrap values when whenEmpty whenNotEmpty where whereStrict whereBetween whereInStrict whereInstanceOf whereNotBetween whereNotIn whereNotInStrict wrap zip

## **Method Listing**

```
all()
```

The all method returns the underlying array represented by the collection:

```
collect([1, 2, 3])->all();
// [1, 2, 3]
```

#### average()

Alias for the avg method.

#### avg()

The avg method returns the average value of a given key:

```
$average = collect([['foo' => 10], ['foo' => 10], ['foo' => 20], ['foo' => 40]])->avg('foo');
// 20
$average = collect([1, 1, 2, 4])->avg();
// 2
```

#### chunk()

The chunk method breaks the collection into multiple, smaller collections of a given size:

```
$collection = collect([1, 2, 3, 4, 5, 6, 7]);
$chunks = $collection->chunk(4);
$chunks->toArray();
// [[1, 2, 3, 4], [5, 6, 7]]
```

This method is especially useful in <u>views</u> when working with a grid system such as <u>Bootstrap</u>. Imagine you have a collection of <u>Eloquent</u> models you want to display in a grid:

### collapse()

The collapse method collapses a collection of arrays into a single, flat collection:

```
$collection = collect([[1, 2, 3], [4, 5, 6], [7, 8, 9]]);
$collapsed = $collection->collapse();
$collapsed->all();
// [1, 2, 3, 4, 5, 6, 7, 8, 9]
```

## combine()

The combine method combines the values of the collection, as keys, with the values of another array or collection:

```
$collection = collect(['name', 'age']);
$combined = $collection->combine(['George', 29]);
```

```
$combined->all();
// ['name' => 'George', 'age' => 29]
concat()
The concat method appends the given array or collection values onto the end of the collection:
$collection = collect(['John Doe']);
$concatenated = $collection->concat(['Jane Doe'])->concat(['name' => 'Johnny Doe']);
$concatenated->all();
// ['John Doe', 'Jane Doe', 'Johnny Doe']
contains()
The contains method determines whether the collection contains a given item:
$collection = collect(['name' => 'Desk', 'price' => 100]);
$collection->contains('Desk');
$collection->contains('New York');
You may also pass a key / value pair to the contains method, which will determine if the given pair exists in the collection:
$collection = collect([
    ['product' => 'Desk', 'price' => 200],
    ['product' => 'Chair', 'price' => 100],
$collection->contains('product', 'Bookcase');
Finally, you may also pass a callback to the contains method to perform your own truth test:
$collection = collect([1, 2, 3, 4, 5]);
$collection->contains(function ($value, $key) {
    return $value > 5;
});
// false
The contains method uses "loose" comparisons when checking item values, meaning a string with an integer value will be
```

The contains method uses "loose" comparisons when checking item values, meaning a string with an integer value will be considered equal to an integer of the same value. Use the <u>containsStrict</u> method to filter using "strict" comparisons.

## containsStrict()

This method has the same signature as the contains method; however, all values are compared using "strict" comparisons.

#### count()

The count method returns the total number of items in the collection:

```
$collection = collect([1, 2, 3, 4]);
$collection->count();
// 4
```

#### crossJoin()

The crossjoin method cross joins the collection's values among the given arrays or collections, returning a Cartesian product with all possible permutations:

#### dd()

The  $\operatorname{\mathsf{ad}}$  method dumps the collection's items and ends execution of the script:

If you do not want to stop executing the script, use the  $\underline{\text{dump}}$  method instead.

## diff()

The diff method compares the collection against another collection or a plain PHP array based on its values. This method will return the values in the original collection that are not present in the given collection:

```
$collection = collect([1, 2, 3, 4, 5]);
$diff = $collection->diff([2, 4, 6, 8]);
$diff->all();
// [1, 3, 5]
```

#### diffAssoc()

The diffAssoc method compares the collection against another collection or a plain PHP array based on its keys and values. This

 $method\ will\ return\ the\ key\ /\ value\ pairs\ in\ the\ original\ collection\ that\ are\ not\ present\ in\ the\ given\ collection:$ 

```
$collection = collect([
   'color' => 'orange',
   'type' => 'fruit',
   'remain' => 6
]);
$diff = $collection->diffAssoc([
   'color' => 'yellow',
   'type' => 'fruit',
   'remain' => 3,
   'used' => 6
]);
$diff->all();
// ['color' => 'orange', 'remain' => 6]
```

#### diffKeys()

The diffkeys method compares the collection against another collection or a plain PHP array based on its keys. This method will return the key / value pairs in the original collection that are not present in the given collection:

```
$collection = collect([
    'one' => 10,
    'two' => 20,
    'three' => 30,
    'four' => 40,
    'five' => 50,
]);

$diff = $collection->diffKeys([
    'two' => 2,
    'four' => 4,
    'six' => 6,
    'eight' => 8,
]);

$diff->all();
// ['one' => 10, 'three' => 30, 'five' => 50]
```

#### dump()

The dump method dumps the collection's items:

If you want to stop executing the script after dumping the collection, use the  $\underline{\tt dd}$  method instead.

#### each(

The each method iterates over the items in the collection and passes each item to a callback:

```
$collection->each(function ($item, $key) {
    //
});
```

If you would like to stop iterating through the items, you may return false from your callback:

```
$collection->each(function ($item, $key) {
   if (/* some condition */) {
```

```
return false;
    }
});
eachSpread()
The eachspread method iterates over the collection's items, passing each nested item value into the given callback:
$collection = collect([['John Doe', 35], ['Jane Doe', 33]]);
$collection->eachSpread(function ($name, $age) {
});
You may stop iterating through the items by returning false from the callback:
$collection->eachSpread(function ($name, $age) {
every()
The every method may be used to verify that all elements of a collection pass a given truth test:
collect([1, 2, 3, 4])->every(function ($value, $key) {
   return $value > 2;
// false
If the collection is empty, every will return true:
$collection = collect([]);
$collection->every(function($value, $key) {
    return $value > 2;
// true
except()
The except method returns all items in the collection except for those with the specified keys:
$collection = collect(['product_id' => 1, 'price' => 100, 'discount' => false]);
$filtered = $collection->except(['price', 'discount']);
$filtered->all();
// ['product_id' => 1]
For the inverse of except, see the only method.
filter()
The filter method filters the collection using the given callback, keeping only those items that pass a given truth test:
$collection = collect([1, 2, 3, 4]);
$filtered = $collection->filter(function ($value, $key) {
    return $value > 2;
});
$filtered->all();
// [3, 4]
```

If no callback is supplied, all entries of the collection that are equivalent to false will be removed:

```
$collection = collect([1, 2, 3, null, false, '', 0, []]);
$collection->filter()->all();
// [1, 2, 3]
```

For the inverse of filter, see the **reject** method.

#### first()

The first method returns the first element in the collection that passes a given truth test:

```
collect([1, 2, 3, 4])->first(function ($value, $key) {
   return $value > 2;
});
// 3
```

You may also call the first method with no arguments to get the first element in the collection. If the collection is empty, null is returned:

```
collect([1, 2, 3, 4])->first();
// 1
```

#### firstWhere()

The firstwhere method returns the first element in the collection with the given key / value pair:

You may also call the firstwhere method with an operator:

```
$collection->firstWhere('age', '>=', 18);
// ['name' => 'Diego', 'age' => 23]
```

## flatMap()

The flatMap method iterates through the collection and passes each value to the given callback. The callback is free to modify the item and return it, thus forming a new collection of modified items. Then, the array is flattened by a level:

```
$collection = collect([
    ['name' => 'Sally'],
    ['school' => 'Arkansas'],
    ['age' => 28]
]);

$flattened = $collection->flatMap(function ($values) {
    return array_map('strtoupper', $values);
});

$flattened->all();

// ['name' => 'SALLY', 'school' => 'ARKANSAS', 'age' => '28'];
```

#### flatten()

The flatten method flattens a multi-dimensional collection into a single dimension:

\$collection = collect(['name' => 'taylor', 'languages' => ['php', 'javascript']]);

In this example, calling flatten without providing the depth would have also flattened the nested arrays, resulting in ['iPhone 6S', 'Apple', 'Galaxy S7', 'Samsung']. Providing a depth allows you to restrict the levels of nested arrays that will be flattened.

#### flip()

The flip method swaps the collection's keys with their corresponding values:

```
$collection = collect(['name' => 'taylor', 'framework' => 'laravel']);
$flipped = $collection->flip();
$flipped->all();
// ['taylor' => 'name', 'laravel' => 'framework']
```

#### forget()

The forget method removes an item from the collection by its key:

```
$collection = collect(['name' => 'taylor', 'framework' => 'laravel']);
$collection->forget('name');
$collection->all();
// ['framework' => 'laravel']
```

NOTE Unlike most other collection methods, forget does not return a new modified collection; it modifies the collection it is called on.

### forPage()

The forPage method returns a new collection containing the items that would be present on a given page number. The method accepts the page number as its first argument and the number of items to show per page as its second argument:

```
$collection = collect([1, 2, 3, 4, 5, 6, 7, 8, 9]);
$chunk = $collection->forPage(2, 3);
$chunk->all();
// [4, 5, 6]
```

```
get()
```

```
The get method returns the item at a given key. If the key does not exist, null is returned:
```

```
$collection = collect(['name' => 'taylor', 'framework' => 'laravel']);
$value = $collection->get('name');
// taylor
```

You may optionally pass a default value as the second argument:

```
$collection = collect(['name' => 'taylor', 'framework' => 'laravel']);
$value = $collection->get('foo', 'default-value');
// default-value
```

You may even pass a callback as the default value. The result of the callback will be returned if the specified key does not exist:

```
$collection->get('email', function () {
    return 'default-value';
});
// default-value
```

#### groupBy()

The groupBy method groups the collection's items by a given key:

Instead of passing a string key, you may pass a callback. The callback should return the value you wish to key the group by:

Multiple grouping criteria may be passed as an array. Each array element will be applied to the corresponding level within a multi-dimensional array:

```
$data = new Collection([
    10 => ['user' => 1, 'skill' => 1, 'roles' => ['Role_1', 'Role_3']],
    20 => ['user' => 2, 'skill' => 1, 'roles' => ['Role_1', 'Role_2']],
    30 => ['user' => 3, 'skill' => 2, 'roles' => ['Role_1']],
    40 => ['user' => 4, 'skill' => 2, 'roles' => ['Role_2']],
]);
```

#### has()

The has method determines if a given key exists in the collection:

```
$collection = collect(['account_id' => 1, 'product' => 'Desk', 'amount' => 5]);
$collection->has('product');
// true
$collection->has(['product', 'amount']);
// true
$collection->has(['amount', 'price']);
// false
```

#### implode()

The implode method joins the items in a collection. Its arguments depend on the type of items in the collection. If the collection contains arrays or objects, you should pass the key of the attributes you wish to join, and the "glue" string you wish to place between the values:

```
$collection = collect([
    ['account_id' => 1, 'product' => 'Desk'],
    ['account_id' => 2, 'product' => 'Chair'],
]);
$collection->implode('product', ', ');
// Desk, Chair
```

If the collection contains simple strings or numeric values, pass the "glue" as the only argument to the method:

```
collect([1, 2, 3, 4, 5])->implode('-');
// '1-2-3-4-5'
```

#### intersect()

The intersect method removes any values from the original collection that are not present in the given array or collection. The resulting collection will preserve the original collection's keys:

```
$collection = collect(['Desk', 'Sofa', 'Chair']);
$intersect = $collection->intersect(['Desk', 'Chair', 'Bookcase']);
$intersect->all();
// [0 => 'Desk', 2 => 'Chair']
```

#### intersectByKeys()

The intersectByKeys method removes any keys from the original collection that are not present in the given array or collection:

```
$collection = collect([
    'serial' => 'UX301', 'type' => 'screen', 'year' => 2009
]);
$intersect = $collection->intersectByKeys([
    'reference' => 'UX404', 'type' => 'tab', 'year' => 2011
]);
$intersect->all();
// ['type' => 'screen', 'year' => 2009]
```

#### isEmpty()

The isEmpty method returns true if the collection is empty; otherwise, false is returned:

```
collect([])->isEmpty();
// true
```

#### isNotEmpty()

The isNotEmpty method returns true if the collection is not empty; otherwise, false is returned:

```
collect([])->isNotEmpty();
// false
```

#### keyBy()

The keyBy method keys the collection by the given key. If multiple items have the same key, only the last one will appear in the new collection:

You may also pass a callback to the method. The callback should return the value to key the collection by:

```
$keyed = $collection->keyBy(function ($item) {
    return strtoupper($item['product_id']);
});
```

#### keys()

The keys method returns all of the collection's keys:

```
$collection = collect([
    'prod-100' => ['product_id' => 'prod-100', 'name' => 'Desk'],
    'prod-200' => ['product_id' => 'prod-200', 'name' => 'Chair'],
]);

$keys = $collection->keys();

$keys->all();
// ['prod-100', 'prod-200']
```

#### last()

The last method returns the last element in the collection that passes a given truth test:

```
collect([1, 2, 3, 4])->last(function ($value, $key) {
   return $value < 3;
});
// 2</pre>
```

You may also call the last method with no arguments to get the last element in the collection. If the collection is empty, null is returned:

```
collect([1, 2, 3, 4])->last();
// 4
```

## macro()

The static macro method allows you to add methods to the collection class at run time. Refer to the documentation on <u>extending collections</u> for more information.

#### make()

The static make method creates a new collection instance. See the **Creating Collections** section.

#### map()

The map method iterates through the collection and passes each value to the given callback. The callback is free to modify the item and return it, thus forming a new collection of modified items:

```
$collection = collect([1, 2, 3, 4, 5]);
$multiplied = $collection->map(function ($item, $key) {
    return $item * 2;
});
$multiplied->all();
// [2, 4, 6, 8, 10]
```

NOTE Like most other collection methods, map returns a new collection instance; it does not modify the collection it is called on. If you want to transform the original collection, use the <a href="mailto:transform">transform</a> method.

#### mapInto()

The mapInto() method iterates over the collection, creating a new instance of the given class by passing the value into the constructor:

```
class Currency
{
    /**
    * Create a new currency instance.
    * @param string $code
    * @return void
    */
    function __construct(string $code)
    {
        $this->code = $code;
    }
}
$collection = collect(['USD', 'EUR', 'GBP']);
$currencies = $collection->mapInto(Currency::class);
$currencies->all();
// [Currency('USD'), Currency('EUR'), Currency('GBP')]
```

#### mapSpread()

The mapspread method iterates over the collection's items, passing each nested item value into the given callback. The callback is free to modify the item and return it, thus forming a new collection of modified items:

```
$collection = collect([0, 1, 2, 3, 4, 5, 6, 7, 8, 9]);
$chunks = $collection->chunk(2);
$sequence = $chunks->mapSpread(function ($even, $odd) {
    return $even + $odd;
});
$sequence->all();
// [1, 5, 9, 13, 17]
```

#### mapToGroups()

The mapToGroups method groups the collection's items by the given callback. The callback should return an associative array containing a single key / value pair, thus forming a new collection of grouped values:

#### mapWithKeys()

The mapwithkeys method iterates through the collection and passes each value to the given callback. The callback should return an associative array containing a single key / value pair:

## max()

The max method returns the maximum value of a given key:

```
$max = collect([['foo' => 10], ['foo' => 20]])->max('foo');
// 20
$max = collect([1, 2, 3, 4, 5])->max();
// 5
```

### median()

The median method returns the median value of a given key:

```
$median = collect([['foo' => 10], ['foo' => 10], ['foo' => 20], ['foo' => 40]])->median('foo');
// 15
$median = collect([1, 1, 2, 4])->median();
// 1.5
```

# merge()

The merge method merges the given array or collection with the original collection. If a string key in the given items matches a string key in the original collection, the given items's value will overwrite the value in the original collection:

```
$collection = collect(['product_id' => 1, 'price' => 100]);
```

```
$merged = $collection->merge(['price' => 200, 'discount' => false]);
$merged->all();
// ['product_id' => 1, 'price' => 200, 'discount' => false]
If the given items's keys are numeric, the values will be appended to the end of the collection:
$collection = collect(['Desk', 'Chair']);
$merged = $collection->merge(['Bookcase', 'Door']);
$merged->all();
// ['Desk', 'Chair', 'Bookcase', 'Door']
min()
The min method returns the minimum value of a given key:
$min = collect([['foo' => 10], ['foo' => 20]])->min('foo');
// 10
min = collect([1, 2, 3, 4, 5])-min();
mode()
The mode method returns the mode value of a given key:
$mode = collect([['foo' => 10], ['foo' => 10], ['foo' => 20], ['foo' => 40]])->mode('foo');
// [10]
mode = collect([1, 1, 2, 4])->mode();
// [1]
nth()
The nth method creates a new collection consisting of every n-th element:
$collection = collect(['a', 'b', 'c', 'd', 'e', 'f']);
$collection->nth(4);
// ['a', 'e']
You may optionally pass an offset as the second argument:
$collection->nth(4, 1);
// ['b', 'f']
only()
The only method returns the items in the collection with the specified keys:
$collection = collect(['product_id' => 1, 'name' => 'Desk', 'price' => 100, 'discount' => false]);
$filtered = $collection->only(['product_id', 'name']);
$filtered->all();
// ['product_id' => 1, 'name' => 'Desk']
For the inverse of only, see the except method.
```

```
pad()
```

The pad method will fill the array with the given value until the array reaches the specified size. This method behaves like the array pad PHP function.

To pad to the left, you should specify a negative size. No padding will take place if the absolute value of the given size is less than or equal to the length of the array:

```
$collection = collect(['A', 'B', 'C']);
$filtered = $collection->pad(5, 0);
$filtered->all();
// ['A', 'B', 'C', 0, 0]
$filtered = $collection->pad(-5, 0);
$filtered->all();
// [0, 0, 'A', 'B', 'C']
```

### partition()

The partition method may be combined with the list PHP function to separate elements that pass a given truth test from those that do not:

```
$collection = collect([1, 2, 3, 4, 5, 6]);
list($underThree, $equalOrAboveThree) = $collection->partition(function ($i) {
    return $i < 3;
});
$underThree->all();
// [1, 2]
$equalOrAboveThree->all();
// [3, 4, 5, 6]
```

### pipe()

The  ${\tt pipe}$  method passes the collection to the given callback and returns the result:

```
$collection = collect([1, 2, 3]);
$piped = $collection->pipe(function ($collection) {
    return $collection->sum();
});
// 6
```

### pluck()

The pluck method retrieves all of the values for a given key:

You may also specify how you wish the resulting collection to be keyed:

```
$plucked = $collection->pluck('name', 'product_id');
$plucked->all();
```

```
// ['prod-100' => 'Desk', 'prod-200' => 'Chair']
If duplicate keys exist, the last matching element will be inserted into the plucked collection:
$collection = collect([
    ['brand' => 'Tesla', 'color' => 'red'],
['brand' => 'Pagani', 'color' => 'white'],
['brand' => 'Tesla', 'color' => 'black'],
['brand' => 'Pagani', 'color' => 'orange'],
1);
$plucked = $collection->pluck('color', 'brand');
$plucked->all();
// ['Tesla' => 'black', 'Pagani' => 'orange']
pop()
The pop method removes and returns the last item from the collection:
$collection = collect([1, 2, 3, 4, 5]);
$collection->pop();
// 5
$collection->all();
// [1, 2, 3, 4]
prepend()
The prepend method adds an item to the beginning of the collection:
$collection = collect([1, 2, 3, 4, 5]);
$collection->prepend(0);
$collection->all();
// [0, 1, 2, 3, 4, 5]
You may also pass a second argument to set the key of the prepended item:
$collection = collect(['one' => 1, 'two' => 2]);
$collection->prepend(0, 'zero');
$collection->all();
// ['zero' => 0, 'one' => 1, 'two' => 2]
pull()
The pull method removes and returns an item from the collection by its key:
$collection = collect(['product_id' => 'prod-100', 'name' => 'Desk']);
$collection->pull('name');
// 'Desk'
$collection->all();
// ['product_id' => 'prod-100']
push()
```

The push method appends an item to the end of the collection:

```
$collection = collect([1, 2, 3, 4]);
$collection->push(5);
$collection->all();
// [1, 2, 3, 4, 5]
```

#### put()

The put method sets the given key and value in the collection:

```
$collection = collect(['product_id' => 1, 'name' => 'Desk']);
$collection->put('price', 100);
$collection->all();
// ['product_id' => 1, 'name' => 'Desk', 'price' => 100]
```

#### random()

The random method returns a random item from the collection:

```
$collection = collect([1, 2, 3, 4, 5]);
$collection->random();
// 4 - (retrieved randomly)
```

You may optionally pass an integer to random to specify how many items you would like to randomly retrieve. A collection of items is always returned when explicitly passing the number of items you wish to receive:

```
$random = $collection->random(3);
$random->all();
// [2, 4, 5] - (retrieved randomly)
```

If the Collection has fewer items than requested, the method will throw an InvalidArgumentException.

### reduce()

The reduce method reduces the collection to a single value, passing the result of each iteration into the subsequent iteration:

```
$collection = collect([1, 2, 3]);
$total = $collection->reduce(function ($carry, $item) {
    return $carry + $item;
});
// 6
```

The value for \$carry on the first iteration is null; however, you may specify its initial value by passing a second argument to reduce:

```
$collection->reduce(function ($carry, $item) {
    return $carry + $item;
}, 4);
// 10
```

### reject()

The reject method filters the collection using the given callback. The callback should return true if the item should be removed from the resulting collection:

```
$collection = collect([1, 2, 3, 4]);
$filtered = $collection->reject(function ($value, $key) {
    return $value > 2;
});
$filtered->all();
// [1, 2]
```

For the inverse of the reject method, see the **filter** method.

```
reverse()
```

The reverse method reverses the order of the collection's items, preserving the original keys:

```
$collection = collect(['a', 'b', 'c', 'd', 'e']);
$reversed = $collection->reverse();
$reversed->all();

/*
    [
         4 => 'e',
         3 => 'd',
         2 => 'c',
         1 => 'b',
         0 => 'a',
    ]
*/
```

#### search()

The search method searches the collection for the given value and returns its key if found. If the item is not found, false is returned.

```
$collection = collect([2, 4, 6, 8]);
$collection->search(4);
// 1
```

The search is done using a "loose" comparison, meaning a string with an integer value will be considered equal to an integer of the same value. To use "strict" comparison, pass true as the second argument to the method:

```
$collection->search('4', true);
// false
```

Alternatively, you may pass in your own callback to search for the first item that passes your truth test:

```
$collection->search(function ($item, $key) {
    return $item > 5;
});
// 2
```

### shift(

The shift method removes and returns the first item from the collection:

```
$collection = collect([1, 2, 3, 4, 5]);
$collection->shift();
// 1
$collection->all();
// [2, 3, 4, 5]
```

### shuffle()

The shuffle method randomly shuffles the items in the collection:

```
$collection = collect([1, 2, 3, 4, 5]);
$shuffled = $collection->shuffle();
$shuffled->all();
// [3, 2, 5, 1, 4] - (generated randomly)
```

### slice()

The slice method returns a slice of the collection starting at the given index:

```
$collection = collect([1, 2, 3, 4, 5, 6, 7, 8, 9, 10]);
$slice = $collection->slice(4);
$slice->all();
// [5, 6, 7, 8, 9, 10]
```

If you would like to limit the size of the returned slice, pass the desired size as the second argument to the method:

```
$slice = $collection->slice(4, 2);
$slice->all();
// [5, 6]
```

The returned slice will preserve keys by default. If you do not wish to preserve the original keys, you can use the <u>values</u> method to reindex them.

# some()

Alias for the **contains** method.

### sort()

The sort method sorts the collection. The sorted collection keeps the original array keys, so in this example we'll use the <u>values</u> method to reset the keys to consecutively numbered indexes:

```
$collection = collect([5, 3, 1, 2, 4]);
$sorted = $collection->sort();
$sorted->values()->all();
// [1, 2, 3, 4, 5]
```

If your sorting needs are more advanced, you may pass a callback to sort with your own algorithm. Refer to the PHP documentation on <a href="mailto:uasort">uasort</a>, which is what the collection's sort method calls under the hood.

TIP If you need to sort a collection of nested arrays or objects, see the **sortBy** and **sortByDesc** methods.

## sortBy()

The sortBy method sorts the collection by the given key. The sorted collection keeps the original array keys, so in this example we'll use the yalues method to reset the keys to consecutively numbered indexes:

```
$collection = collect([
    ['name' => 'Desk', 'price' => 200],
    ['name' => 'Chair', 'price' => 100],
    ['name' => 'Bookcase', 'price' => 150],
]);
```

### sortByDesc()

This method has the same signature as the sortBy method, but will sort the collection in the opposite order.

### sortKeys()

The sortKeys method sorts the collection by the keys of the underlying associative array:

```
$collection = collect([
    'id' => 22345,
    'first' => 'John',
    'last' => 'Doe',
]);
$sorted = $collection->sortKeys();
$sorted->all();
/*
    [
        'first' => 'John',
        'id' => 22345,
        'last' => 'Doe',
    ]
*/
```

### sortKeysDesc()

This method has the same signature as the sortKeys method, but will sort the collection in the opposite order.

### splice()

The splice method removes and returns a slice of items starting at the specified index:

```
$collection = collect([1, 2, 3, 4, 5]);
$chunk = $collection->splice(2);
```

```
$chunk->all();
// [3, 4, 5]
$collection->all();
// [1, 2]
You may pass a second argument to limit the size of the resulting chunk:
$collection = collect([1, 2, 3, 4, 5]);
$chunk = $collection->splice(2, 1);
$chunk->all();
// [3]
$collection->all();
// [1, 2, 4, 5]
In addition, you can pass a third argument containing the new items to replace the items removed from the collection:
$collection = collect([1, 2, 3, 4, 5]);
$chunk = $collection->splice(2, 1, [10, 11]);
$chunk->all();
// [3]
$collection->all():
// [1, 2, 10, 11, 4, 5]
split()
The split method breaks a collection into the given number of groups:
collection = collect([1, 2, 3, 4, 5]);
$groups = $collection->split(3);
$groups->toArray();
// [[1, 2], [3, 4], [5]]
sum()
The sum method returns the sum of all items in the collection:
collect([1, 2, 3, 4, 5])->sum();
// 15
If the collection contains nested arrays or objects, you should pass a key to use for determining which values to sum:
$collection = collect([
     ['name' => 'JavaScript: The Good Parts', 'pages' => 176],
['name' => 'JavaScript: The Definitive Guide', 'pages' => 1096],
$collection->sum('pages');
// 1272
In addition, you may pass your own callback to determine which values of the collection to sum:
     ['name' => 'Chair', 'colors' => ['Black']],
['name' => 'Desk', 'colors' => ['Black', 'Mahogany']],
['name' => 'Bookcase', 'colors' => ['Red', 'Beige', 'Brown']],
]);
$collection->sum(function ($product) {
     return count($product['colors']);
```

```
});
// 6
take()
The take method returns a new collection with the specified number of items:
$collection = collect([0, 1, 2, 3, 4, 5]);
$chunk = $collection->take(3);
$chunk->all();
// [0, 1, 2]
You may also pass a negative integer to take the specified amount of items from the end of the collection:
collection = collect([0, 1, 2, 3, 4, 5]);
$chunk = $collection->take(-2);
$chunk->all();
// [4, 5]
tap()
The tap method passes the collection to the given callback, allowing you to "tap" into the collection at a specific point and do
something with the items while not affecting the collection itself:
collect([2, 4, 3, 1, 5])
     ->tap(function ($collection) {
         Log::debug('Values after sorting', $collection->values()->toArray());
    })
     ->shift();
// 1
times()
The static times method creates a new collection by invoking the callback a given amount of times:
$collection = Collection::times(10, function ($number) {
     return $number * 9;
$collection->all();
// [9, 18, 27, 36, 45, 54, 63, 72, 81, 90]
This method can be useful when combined with factories to create Eloquent models:
$categories = Collection::times(3, function ($number) {
    return factory(Category::class)->create(['name' => "Category No. $number"]);
$categories->all();
         ['id' => 1, 'name' => 'Category #1'],
['id' => 2, 'name' => 'Category #2'],
['id' => 3, 'name' => 'Category #3'],
```

The toArray method converts the collection into a plain PHP array. If the collection's values are Eloquent models, the models will also be converted to arrays:

NOTE toArray also converts all of the collection's nested objects to an array. If you want to get the raw underlying array, use the <u>all</u> method instead.

#### toJson()

The toJson method converts the collection into a JSON serialized string:

```
$collection = collect(['name' => 'Desk', 'price' => 200]);
$collection->toJson();
// '{"name":"Desk", "price":200}'
```

#### transform()

The transform method iterates over the collection and calls the given callback with each item in the collection. The items in the collection will be replaced by the values returned by the callback:

```
$collection = collect([1, 2, 3, 4, 5]);
$collection->transform(function ($item, $key) {
    return $item * 2;
});
$collection->all();
// [2, 4, 6, 8, 10]
```

NOTE Unlike most other collection methods, transform modifies the collection itself. If you wish to create a new collection instead, use the  $\underline{\text{map}}$  method.

### union()

The union method adds the given array to the collection. If the given array contains keys that are already in the original collection, the original collection's values will be preferred:

```
$collection = collect([1 => ['a'], 2 => ['b']]);
$union = $collection->union([3 => ['c'], 1 => ['b']]);
$union->all();
// [1 => ['a'], 2 => ['b'], 3 => ['c']]
```

# unique()

The unique method returns all of the unique items in the collection. The returned collection keeps the original array keys, so in this example we'll use the <a href="values">values</a> method to reset the keys to consecutively numbered indexes:

```
$collection = collect([1, 1, 2, 2, 3, 4, 2]);
$unique = $collection->unique();
$unique->values()->all();
```

```
// [1, 2, 3, 4]
```

When dealing with nested arrays or objects, you may specify the key used to determine uniqueness:

You may also pass your own callback to determine item uniqueness:

The unique method uses "loose" comparisons when checking item values, meaning a string with an integer value will be considered equal to an integer of the same value. Use the <u>uniqueStrict</u> method to filter using "strict" comparisons.

### uniqueStrict()

This method has the same signature as the unique method; however, all values are compared using "strict" comparisons.

### unless()

The unless method will execute the given callback unless the first argument given to the method evaluates to true:

```
$collection = collect([1, 2, 3]);
$collection->unless(true, function ($collection) {
    return $collection->push(4);
});
$collection->unless(false, function ($collection) {
    return $collection->push(5);
});
$collection->all();
// [1, 2, 3, 5]
```

For the inverse of unless, see the when method.

### unlessEmpty()

Alias for the whenNotEmpty method.

#### unlessNotEmptv()

Alias for the whenEmpty method.

#### unwrap()

The static unwrap method returns the collection's underlying items from the given value when applicable:

```
Collection::unwrap(collect('John Doe'));
// ['John Doe']
Collection::unwrap(['John Doe']);
// ['John Doe']
Collection::unwrap('John Doe');
// 'John Doe'
```

#### values()

The values method returns a new collection with the keys reset to consecutive integers:

### when()

The when method will execute the given callback when the first argument given to the method evaluates to true:

```
$collection = collect([1, 2, 3]);
$collection->when(true, function ($collection) {
    return $collection->push(4);
});
$collection->when(false, function ($collection) {
    return $collection->push(5);
});
$collection->all();
// [1, 2, 3, 4]
```

For the inverse of when, see the <u>unless</u> method.

### whenEmpty()

The whenEmpty method will execute the given callback when the collection is empty:

```
$collection = collect(['michael', 'tom']);
$collection->whenEmpty(function ($collection) {
    return $collection->push('adam');
});
```

```
$collection->all();
// ['michael', 'tom']
$collection = collect();
$collection->whenEmpty(function ($collection) {
    return $collection->push('adam');
});
$collection->all();
// ['adam']
$collection = collect(['michael', 'tom']);
$collection->whenEmpty(function($collection) {
    return $collection->push('adam');
}, function($collection) {
    return $collection->push('taylor');
});
$collection->all();
// ['michael', 'tom', 'taylor']
```

For the inverse of when Empty, see the <a href="https://whenNotEmpty">whenNotEmpty</a> method.

#### whenNotEmpty()

The whenNotEmpty method will execute the given callback when the collection is not empty:

```
$collection = collect(['michael', 'tom']);
$collection->whenNotEmpty(function ($collection) {
    return $collection->push('adam');
$collection->all();
// ['michael', 'tom', 'adam']
$collection = collect();
$collection->whenNotEmpty(function ($collection) {
    return $collection->push('adam');
$collection->all();
// []
$collection = collect();
$collection->whenNotEmpty(function($collection) {
    return $collection->push('adam');
}, function($collection) {
    return $collection->push('taylor');
$collection->all();
// ['taylor']
```

For the inverse of whenNotEmpty, see the whenEmpty method.

### where()

The where method filters the collection by a given key / value pair:

The where method uses "loose" comparisons when checking item values, meaning a string with an integer value will be considered equal to an integer of the same value. Use the <a href="https://wherestrict">wherestrict</a> method to filter using "strict" comparisons.

### whereStrict()

This method has the same signature as the where method; however, all values are compared using "strict" comparisons.

### whereBetween()

The whereBetween method filters the collection within a given range:

### whereIn()

The whereIn method filters the collection by a given key / value contained within the given array:

The whereIn method uses "loose" comparisons when checking item values, meaning a string with an integer value will be considered equal to an integer of the same value. Use the <a href="https://whereInStrict">whereInStrict</a> method to filter using "strict" comparisons.

### whereInStrict()

This method has the same signature as the whereIn method; however, all values are compared using "strict" comparisons.

#### whereInstanceOf()

The whereInstanceOf method filters the collection by a given class type:

```
$collection = collect([
    new User,
    new User,
    new Post,
]);
return $collection->whereInstanceOf(User::class);
```

### whereNotBetween()

The whereNotBetween method filters the collection within a given range:

### whereNotIn()

The whereNotIn method filters the collection by a given key / value not contained within the given array:

The whereNotIn method uses "loose" comparisons when checking item values, meaning a string with an integer value will be considered equal to an integer of the same value. Use the <a href="https://whereNotInStrict">whereNotInStrict</a> method to filter using "strict" comparisons.

# whereNotInStrict()

This method has the same signature as the <a href="whereNotIn">whereNotIn</a> method; however, all values are compared using "strict" comparisons.

### wrap()

The static wrap method wraps the given value in a collection when applicable:

```
$collection = Collection::wrap('John Doe');
```

```
$collection->all();
// ['John Doe']
$collection = Collection::wrap(['John Doe']);
$collection->all();
// ['John Doe']
$collection = Collection::wrap(collect('John Doe'));
$collection->all();
// ['John Doe']
```

zip()

The zip method merges together the values of the given array with the values of the original collection at the corresponding index:

```
$collection = collect(['Chair', 'Desk']);
$zipped = $collection->zip([100, 200]);
$zipped->all();
// [['Chair', 100], ['Desk', 200]]
```

# **Higher Order Messages**

Collections also provide support for "higher order messages", which are short-cuts for performing common actions on collections. The collection methods that provide higher order messages are: <a href="average">average</a>, <a href="average">avg</a>, <a href="contains">contains</a>, <a href="each">each</a>, <a href="every">every</a>, <a href="filter">filter</a>, <a href="filter">first</a>, <a href="filter">flatMap</a>, <a href="groupBy">groupBy</a>, <a href="keyBy">keyBy</a>, <a href="main">map</a>, <a href="main">max</a>, <a href="main">min</a>, <a href="partition">partition</a>, <a href="main">reject</a>, <a href="main">some</a>, <a href="main">sortByDesc</a>, <a href="main">sum</a>, <a href="main">main</a>, <a href="main">main</a>, <a href="main">partition</a>, <a href="main">reject</a>, <a href="main">some</a>, <a href="main">sortByDesc</a>, <a href="main">sum</a>, <a href="main">main</a>, <a href="main">

Each higher order message can be accessed as a dynamic property on a collection instance. For instance, let's use the each higher order message to call a method on each object within a collection:

```
$users = User::where('votes', '>', 500)->get();
$users->each->markAsVip();
```

Likewise, we can use the sum higher order message to gather the total number of "votes" for a collection of users:

```
$users = User::where('group', 'Development')->get();
return $users->sum->votes;
```

### **Digging Deeper**

# **Events**

- Introduction
- Registering Events & Listeners
  - Generating Events & Listeners
  - o Manually Registering Events
- Defining Events
- Defining Listeners
- Queued Event Listeners
  - Manually Accessing The Queue
  - Handling Failed Jobs
- <u>Dispatching Events</u>
- Event Subscribers
  - Writing Event Subscribers
  - Registering Event Subscribers

### Introduction

Laravel's events provide a simple observer implementation, allowing you to subscribe and listen for various events that occur in your application. Event classes are typically stored in the app/Events directory, while their listeners are stored in app/Listeners. Don't worry if you don't see these directories in your application, since they will be created for you as you generate events and listeners using Artisan console commands.

Events serve as a great way to decouple various aspects of your application, since a single event can have multiple listeners that do not depend on each other. For example, you may wish to send a Slack notification to your user each time an order has shipped. Instead of coupling your order processing code to your Slack notification code, you can raise an OrderShipped event, which a listener can receive and transform into a Slack notification.

# **Registering Events & Listeners**

The EventServiceProvider included with your Laravel application provides a convenient place to register all of your application's event listeners. The listen property contains an array of all events (keys) and their listeners (values). Of course, you may add as many events to this array as your application requires. For example, let's add a orderShipped event:

```
* The event listener mappings for the application.

* @var array

*/
protected $listen = [
    'App\Events\OrderShipped' => [
        'App\Listeners\SendShipmentNotification',
    ],
];
```

# **Generating Events & Listeners**

Of course, manually creating the files for each event and listener is cumbersome. Instead, add listeners and events to your EventServiceProvider and use the event:generate command. This command will generate any events or listeners that are listed in your EventServiceProvider. Of course, events and listeners that already exist will be left untouched:

php artisan event:generate

### **Manually Registering Events**

Typically, events should be registered via the EventServiceProvider \$listen array; however, you may also register Closure based events manually in the boot method of your EventServiceProvider:

}

### Wildcard Event Listeners

You may even register listeners using the \* as a wildcard parameter, allowing you to catch multiple events on the same listener. Wildcard listeners receive the event name as their first argument, and the entire event data array as their second argument:

# **Defining Events**

An event class is a data container which holds the information related to the event. For example, let's assume our generated OrderShipped event receives an <u>Eloquent ORM</u> object:

```
<?php
namespace App\Events;
use App\Order;
use Illuminate\Queue\SerializesModels;
class OrderShipped
{
    use SerializesModels;
    public $order;

    /**
     * Create a new event instance.
     *
     * @param \App\Order $order
     * @return void
     */
     public function __construct(Order $order)
     {
          $this->order = $order;
     }
}
```

As you can see, this event class contains no logic. It is a container for the order instance that was purchased. The SerializesModels trait used by the event will gracefully serialize any Eloquent models if the event object is serialized using PHP's serialize function.

# **Defining Listeners**

Next, let's take a look at the listener for our example event. Event listeners receive the event instance in their handle method. The event:generate command will automatically import the proper event class and type-hint the event on the handle method. Within the handle method, you may perform any actions necessary to respond to the event:

TIP Your event listeners may also type-hint any dependencies they need on their constructors. All event listeners are resolved via the Laravel <u>service container</u>, so dependencies will be injected automatically.

### **Stopping The Propagation Of An Event**

Sometimes, you may wish to stop the propagation of an event to other listeners. You may do so by returning false from your listener's handle method.

# **Queued Event Listeners**

Queueing listeners can be beneficial if your listener is going to perform a slow task such as sending an e-mail or making an HTTP request. Before getting started with queued listeners, make sure to <u>configure your queue</u> and start a queue listener on your server or local development environment.

To specify that a listener should be queued, add the ShouldQueue interface to the listener class. Listeners generated by the event:generate Artisan command already have this interface imported into the current namespace, so you can use it immediately:

That's it! Now, when this listener is called for an event, it will be automatically queued by the event dispatcher using Laravel's queue system. If no exceptions are thrown when the listener is executed by the queue, the queued job will automatically be deleted after it has finished processing.

### **Customizing The Queue Connection & Queue Name**

If you would like to customize the queue connection and queue name used by an event listener, you may define \$connection and \$queue properties on your listener class:

# **Manually Accessing The Queue**

If you need to manually access the listener's underlying queue job's delete and release methods, you may do so using the <code>Illuminate\Queue\InteractsWithQueue</code> trait. This trait is imported by default on generated listeners and provides access to these methods:

```
<?php
namespace App\Listeners;
use App\Events\OrderShipped;
use Illuminate\Queue\InteractsWithQueue;
use Illuminate\Contracts\Queue\ShouldQueue;
class SendShipmentNotification implements ShouldQueue
{</pre>
```

```
use InteractsWithQueue;

/**
   * Handle the event.
   * @param \App\Events\OrderShipped $event
   * @return void
   */
public function handle(OrderShipped $event)
{
    if (true) {
        $this->release(30);
    }
}
```

# **Handling Failed Jobs**

Sometimes your queued event listeners may fail. If queued listener exceeds the maximum number of attempts as defined by your queue worker, the failed method will be called on your listener. The failed method receives the event instance and the exception that caused the failure:

```
namespace App\Listeners;
use App\Events\OrderShipped;
use Illuminate\Queue\InteractsWithQueue;
use Illuminate\Contracts\Queue\ShouldQueue;
{\tt class} \ {\tt SendShipmentNotification} \ {\tt implements} \ {\tt ShouldQueue}
    use InteractsWithQueue;
     * Handle the event.
       @param \App\Events\OrderShipped $event
      @return void
    public function handle(OrderShipped $event)
    }
     * Handle a job failure.
       @param \App\Events\OrderShipped $event
       @param \Exception $exception
      @return void
    public function failed(OrderShipped $event, $exception)
    }
```

# **Dispatching Events**

To dispatch an event, you may pass an instance of the event to the event helper. The helper will dispatch the event to all of its registered listeners. Since the event helper is globally available, you may call it from anywhere in your application:

```
<?php
namespace App\Http\Controllers;
use App\Order;
use App\Events\OrderShipped;
use App\Http\Controllers\Controller;
class OrderController extends Controller
{
    /**
     * Ship the given order.
     *
     * @param int $orderId
     * @return Response
     */
    public function ship($orderId)
     {
          $order = Order::findOrFail($orderId);
          // Order shipment logic...</pre>
```

```
event(new OrderShipped($order));
}
```

TIP When testing, it can be helpful to assert that certain events were dispatched without actually triggering their listeners. Laravel's <u>built-in testing helpers</u> makes it a cinch.

### **Event Subscribers**

### **Writing Event Subscribers**

Event subscribers are classes that may subscribe to multiple events from within the class itself, allowing you to define several event handlers within a single class. Subscribers should define a subscribe method, which will be passed an event dispatcher instance. You may call the listen method on the given dispatcher to register event listeners:

```
<?php
namespace App\Listeners;
class UserEventSubscriber
     * Handle user login events.
    public function onUserLogin($event) {}
    /^^
* Handle user logout events.
*/
    public function onUserLogout($event) {}
     * Register the listeners for the subscriber.
       @param \Illuminate\Events\Dispatcher $events
    public function subscribe($events)
        $events->listen(
             'Illuminate\Auth\Events\Login'
             'App\Listeners\UserEventSubscriber@onUserLogin'
        );
        $events->listen(
             'Illuminate\Auth\Events\Logout',
             'App\Listeners\UserEventSubscriber@onUserLogout'
        );
    }
}
```

# **Registering Event Subscribers**

After writing the subscriber, you are ready to register it with the event dispatcher. You may register subscribers using the \$subscribe property on the EventServiceProvider. For example, let's add the UserEventSubscriber to the list:

### **Digging Deeper**

# File Storage

- Introduction
- Configuration
  - o The Public Disk
  - The Local Driver
  - o <u>Driver Prerequisites</u>
  - Caching
- Obtaining Disk Instances
- Retrieving Files
  - o Downloading Files
  - File URLs
    - File Metadata
- Storing Files
  - File Uploads
  - File Visibility
- Deleting Files
- <u>Directories</u>
- Custom Filesystems

### Introduction

Laravel provides a powerful filesystem abstraction thanks to the wonderful Flysystem PHP package by Frank de Jonge. The Laravel Flysystem integration provides simple to use drivers for working with local filesystems, Amazon S3, and Rackspace Cloud Storage. Even better, it's amazingly simple to switch between these storage options as the API remains the same for each system.

# Configuration

The filesystem configuration file is located at <code>config/filesystems.php</code>. Within this file you may configure all of your "disks". Each disk represents a particular storage driver and storage location. Example configurations for each supported driver are included in the configuration file. So, modify the configuration to reflect your storage preferences and credentials.

Of course, you may configure as many disks as you like, and may even have multiple disks that use the same driver.

# The Public Disk

The public disk is intended for files that are going to be publicly accessible. By default, the public disk uses the local driver and stores these files in storage/app/public. To make them accessible from the web, you should create a symbolic link from public/storage to storage/app/public. This convention will keep your publicly accessible files in one directory that can be easily shared across deployments when using zero down-time deployment systems like <a href="Envoyer">Envoyer</a>.

To create the symbolic link, you may use the storage:link Artisan command:

```
php artisan storage:link
```

Of course, once a file has been stored and the symbolic link has been created, you can create a URL to the files using the asset helper:

```
echo asset('storage/file.txt');
```

### The Local Driver

When using the local driver, all file operations are relative to the root directory defined in your configuration file. By default, this value is set to the storage/app directory. Therefore, the following method would store a file in storage/app/file.txt:

```
Storage::disk('local')->put('file.txt', 'Contents');
```

### **Driver Prerequisites**

## **Composer Packages**

Before using the SFTP, S3, or Rackspace drivers, you will need to install the appropriate package via Composer:

- SFTP: league/flysystem-sftp ~1.0
- Amazon S3: league/flysystem-aws-s3-v3 ~1.0

• Rackspace: league/flysystem-rackspace ~1.0

An absolute must for performance is to use a cached adapter. You will need an additional package for this:

• CachedAdapter: league/flysystem-cached-adapter ~1.0

### **S3 Driver Configuration**

The S3 driver configuration information is located in your config/filesystems.php configuration file. This file contains an example configuration array for an S3 driver. You are free to modify this array with your own S3 configuration and credentials. For convenience, these environment variables match the naming convention used by the AWS CLI.

### **FTP Driver Configuration**

Laravel's Flysystem integrations works great with FTP; however, a sample configuration is not included with the framework's default filesystems.php configuration file. If you need to configure a FTP filesystem, you may use the example configuration below:

```
'ftp' => [
   'driver' => 'ftp',
   'host' => 'ftp.example.com',
   'username' => 'your-username',
   'password' => 'your-password',

   // Optional FTP Settings...
   // 'port' => 21,
   // 'root' => '',
   // 'passive' => true,
   // 'ssl' => true,
   // 'timeout' => 30,
],
```

### **SFTP Driver Configuration**

Laravel's Flysystem integrations works great with SFTP; however, a sample configuration is not included with the framework's default filesystems.php configuration file. If you need to configure a SFTP filesystem, you may use the example configuration below:

```
'sftp' => [
  'driver' => 'sftp',
  'host' => 'example.com',
  'username' => 'your-username',
  'password' => 'your-password',

// Settings for SSH key based authentication...
// 'privateKey' => '/path/to/privateKey',
  // 'password' => 'encryption-password',

// Optional SFTP Settings...
// 'port' => 22,
// 'root' => '',
// 'timeout' => 30,
],
```

# **Rackspace Driver Configuration**

Laravel's Flysystem integrations works great with Rackspace; however, a sample configuration is not included with the framework's default filesystems.php configuration file. If you need to configure a Rackspace filesystem, you may use the example configuration below:

```
'rackspace' => [
   'driver' => 'rackspace',
   'username' => 'your-username',
   'key' => 'your-key',
   'container' => 'your-container',
   'endpoint' => 'https://identity.api.rackspacecloud.com/v2.0/',
   'region' => 'IAD',
   'url_type' => 'publicURL',
1.
```

# **Caching**

To enable caching for a given disk, you may add a cache directive to the disk's configuration options. The cache option should be an array of caching options containing the disk name, the expire time in seconds, and the cache prefix:

```
's3' => [
  'driver' => 's3',
```

```
// Other Disk Options...
'cache' => [
    'store' => 'memcached',
    'expire' => 600,
    'prefix' => 'cache-prefix',
],
],
```

# **Obtaining Disk Instances**

The Storage facade may be used to interact with any of your configured disks. For example, you may use the put method on the facade to store an avatar on the default disk. If you call methods on the Storage facade without first calling the disk method, the method call will automatically be passed to the default disk:

```
use Illuminate\Support\Facades\Storage;
Storage::put('avatars/1', $fileContents);
```

If your applications interacts with multiple disks, you may use the disk method on the Storage facade to work with files on a particular disk:

```
Storage::disk('s3')->put('avatars/1', $fileContents);
```

# **Retrieving Files**

The get method may be used to retrieve the contents of a file. The raw string contents of the file will be returned by the method. Remember, all file paths should be specified relative to the "root" location configured for the disk:

```
$contents = Storage::get('file.jpg');
```

The exists method may be used to determine if a file exists on the disk:

```
$exists = Storage::disk('s3')->exists('file.jpg');
```

### **Downloading Files**

The download method may be used to generate a response that forces the user's browser to download the file at the given path. The download method accepts a file name as the second argument to the method, which will determine the file name that is seen by the user downloading the file. Finally, you may pass an array of HTTP headers as the third argument to the method:

```
return Storage::download('file.jpg');
return Storage::download('file.jpg', $name, $headers);
```

### File URLs

You may use the url method to get the URL for the given file. If you are using the local driver, this will typically just prepend /storage to the given path and return a relative URL to the file. If you are using the s3 or rackspace driver, the fully qualified remote URL will be returned:

```
use Illuminate\Support\Facades\Storage;
$url = Storage::url('file.jpg');
```

NOTE Remember, if you are using the local driver, all files that should be publicly accessible should be placed in the storage/app/public directory. Furthermore, you should <a href="mailto:create a symbolic link">create a symbolic link</a> at public/storage which points to the storage/app/public directory.

## **Temporary URLs**

For files stored using the s3 or rackspace driver, you may create a temporary URL to a given file using the temporaryUrl method. This methods accepts a path and a DateTime instance specifying when the URL should expire:

```
$url = Storage::temporaryUrl(
    'file.jpg', now()->addMinutes(5)
);
```

### **Local URL Host Customization**

If you would like to pre-define the host for files stored on a disk using the local driver, you may add a url option to the disk's configuration array:

```
'public' => [
  'driver' => 'local',
  'root' => storage_path('app/public'),
  'url' => env('APP_URL').'/storage',
  'visibility' => 'public',
],
```

### File Metadata

In addition to reading and writing files, Laravel can also provide information about the files themselves. For example, the size method may be used to get the size of the file in bytes:

```
use Illuminate\Support\Facades\Storage;
$size = Storage::size('file.jpg');
```

The lastModified method returns the UNIX timestamp of the last time the file was modified:

```
$time = Storage::lastModified('file.jpg');
```

# **Storing Files**

The put method may be used to store raw file contents on a disk. You may also pass a PHP resource to the put method, which will use Flysystem's underlying stream support. Using streams is greatly recommended when dealing with large files:

```
use Illuminate\Support\Facades\Storage;
Storage::put('file.jpg', $contents);
Storage::put('file.jpg', $resource);
```

#### **Automatic Streaming**

If you would like Laravel to automatically manage streaming a given file to your storage location, you may use the putFile or putFileAs method. This method accepts either a Illuminate\Http\File or Illuminate\Http\UploadedFile instance and will automatically stream the file to your desired location:

```
use Illuminate\Http\File;
use Illuminate\Support\Facades\Storage;

// Automatically generate a unique ID for file name...
Storage::putFile('photos', new File('/path/to/photo'));

// Manually specify a file name...
Storage::putFileAs('photos', new File('/path/to/photo'), 'photo.jpg');
```

There are a few important things to note about the putfile method. Note that we only specified a directory name, not a file name. By default, the putfile method will generate a unique ID to serve as the file name. The file's extension will be determined by examining the file's MIME type. The path to the file will be returned by the putfile method so you can store the path, including the generated file name, in your database.

The putfile and putfileAs methods also accept an argument to specify the "visibility" of the stored file. This is particularly useful if you are storing the file on a cloud disk such as S3 and would like the file to be publicly accessible:

```
Storage::putFile('photos', new File('/path/to/photo'), 'public');
```

# **Prepending & Appending To Files**

The prepend and append methods allow you to write to the beginning or end of a file:

```
Storage::prepend('file.log', 'Prepended Text');
Storage::append('file.log', 'Appended Text');
```

# **Copying & Moving Files**

The copy method may be used to copy an existing file to a new location on the disk, while the move method may be used to rename or move an existing file to a new location:

```
Storage::copy('old/file.jpg', 'new/file.jpg');
Storage::move('old/file.jpg', 'new/file.jpg');
```

### **File Uploads**

In web applications, one of the most common use-cases for storing files is storing user uploaded files such as profile pictures, photos, and documents. Laravel makes it very easy to store uploaded files using the store method on an uploaded file instance. Call the store method with the path at which you wish to store the uploaded file:

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
use App\Http\Controllers\Controller;
class UserAvatarController extends Controller
{
    /**
    * Update the avatar for the user.
    *
    * @param Request $request
    * @return Response
    */
    public function update(Request $request)
    {
        spath = $request->file('avatar')->store('avatars');
        return $path;
    }
}
```

There are a few important things to note about this example. Note that we only specified a directory name, not a file name. By default, the store method will generate a unique ID to serve as the file name. The file's extension will be determined by examining the file's MIME type. The path to the file will be returned by the store method so you can store the path, including the generated file name, in your database.

You may also call the putFile method on the Storage facade to perform the same file manipulation as the example above:

```
$path = Storage::putFile('avatars', $request->file('avatar'));
```

### Specifying A File Name

If you would not like a file name to be automatically assigned to your stored file, you may use the storeAs method, which receives the path, the file name, and the (optional) disk as its arguments:

```
$path = $request->file('avatar')->storeAs(
    'avatars', $request->user()->id
);
```

Of course, you may also use the putFileAs method on the Storage facade, which will perform the same file manipulation as the example above:

```
$path = Storage::putFileAs(
    'avatars', $request->file('avatar'), $request->user()->id
);
```

### Specifying A Disk

By default, this method will use your default disk. If you would like to specify another disk, pass the disk name as the second argument to the store method:

```
$path = $request->file('avatar')->store(
    'avatars/'.$request->user()->id, 's3
);
```

# File Visibility

In Laravel's Flysystem integration, "visibility" is an abstraction of file permissions across multiple platforms. Files may either be declared public or private. When a file is declared public, you are indicating that the file should generally be accessible to others. For example, when using the S3 driver, you may retrieve URLs for public files.

You can set the visibility when setting the file via the put method:

```
use Illuminate\Support\Facades\Storage;
Storage::put('file.jpg', $contents, 'public');
```

If the file has already been stored, its visibility can be retrieved and set via the getVisibility and setVisibility methods:

```
$visibility = Storage::getVisibility('file.jpg');
Storage::setVisibility('file.jpg', 'public')
```

# **Deleting Files**

The delete method accepts a single filename or an array of files to remove from the disk:

```
use Illuminate\Support\Facades\Storage;
Storage::delete('file.jpg');
Storage::delete(['file.jpg', 'file2.jpg']);
If necessary, you may specify the disk that the file should be deleted from:
use Illuminate\Support\Facades\Storage;
Storage::disk('s3')->delete('folder_path/file_name.jpg');
```

### **Directories**

### Get All Files Within A Directory

The files method returns an array of all of the files in a given directory. If you would like to retrieve a list of all files within a given directory including all sub-directories, you may use the allfiles method:

```
use Illuminate\Support\Facades\Storage;

$files = Storage::files($directory);

$files = Storage::allFiles($directory);
```

### Get All Directories Within A Directory

The directories method returns an array of all the directories within a given directory. Additionally, you may use the allDirectories method to get a list of all directories within a given directory and all of its sub-directories:

```
$directories = Storage::directories($directory);
// Recursive...
$directories = Storage::allDirectories($directory);
```

### **Create A Directory**

The makeDirectory method will create the given directory, including any needed sub-directories:

```
Storage::makeDirectory($directory);
```

### **Delete A Directory**

Finally, the deleteDirectory may be used to remove a directory and all of its files:

```
Storage::deleteDirectory($directory);
```

# **Custom Filesystems**

Laravel's Flysystem integration provides drivers for several "drivers" out of the box; however, Flysystem is not limited to these and has adapters for many other storage systems. You can create a custom driver if you want to use one of these additional adapters in your Laravel application.

In order to set up the custom filesystem you will need a Flysystem adapter. Let's add a community maintained Dropbox adapter to our project:

```
composer require spatie/flysystem-dropbox
```

Next, you should create a <u>service provider</u> such as <u>DropboxServiceProvider</u>. In the provider's boot method, you may use the Storage facade's extend method to define the custom driver:

```
<?php
namespace App\Providers;
use Storage;
use League\Flysystem\Filesystem;
use Illuminate\Support\ServiceProvider;
use Spatie\Dropbox\Client as DropboxClient;
use Spatie\FlysystemDropbox\DropboxAdapter;</pre>
```

The first argument of the extend method is the name of the driver and the second is a Closure that receives the <code>\$app</code> and <code>\$config</code> variables. The resolver Closure must return an instance of <code>League\Flysystem\Filesystem</code>. The <code>\$config</code> variable contains the values defined in <code>config/filesystems.php</code> for the specified disk.

Once you have created the service provider to register the extension, you may use the dropbox driver in your config/filesystems.php configuration file.

### **Digging Deeper**

# **Helpers**

- <u>Introduction</u> <u>Available Methods</u>

### Introduction

Laravel includes a variety of global "helper" PHP functions. Many of these functions are used by the framework itself; however, you are free to use them in your own applications if you find them convenient.

### **Available Methods**

## **Arrays & Objects**

array add array collapse array divide array dot array except array first array flatten array forget array get array has array last array only array pluck array prepend array pull array random array set array sort array sort recursive array where array wrap data fill data get data set head last

### **Paths**

app path base path config path database path mix public path resource path storage path

### **Strings**

camel case class basename e ends with kebab case preg replace array snake case starts with str after str before str contains str finish str is str limit Str::orderedUuid str plural str random str replace array str replace first str replace last str singular str slug str start studly case title case trans trans choice Str::uuid

## **URLs**

action asset secure\_asset route secure\_url url

### Miscellaneous

abort abort if abort unless app auth back brypt blank broadcast cache class uses recursive collect config cookie csrf\_field csrf\_token dd decrypt dispatch\_now dump encrypt env event factory filled info logger method\_field now old optional policy redirect report request rescue resolve response retry session tap today throw if throw unless trait uses recursive transform validator value view with

# **Method Listing**

# **Arrays & Objects**

```
array_add()
```

The array\_add function adds a given key / value pair to an array if the given key doesn't already exist in the array:

```
$array = array_add(['name' => 'Desk'], 'price', 100);
// ['name' => 'Desk', 'price' => 100]
```

### array\_collapse()

The array\_collapse function collapses an array of arrays into a single array:

```
$array = array_collapse([[1, 2, 3], [4, 5, 6], [7, 8, 9]]);
// [1, 2, 3, 4, 5, 6, 7, 8, 9]
```

```
array_divide()
```

// ['products' => []]

```
The array_divide function returns two arrays, one containing the keys, and the other containing the values of the given array:
[$keys, $values] = array_divide(['name' => 'Desk']);
// $keys: ['name']
// $values: ['Desk']
array_dot()
The array_dot function flattens a multi-dimensional array into a single level array that uses "dot" notation to indicate depth:
$array = ['products' => ['desk' => ['price' => 100]]];
$flattened = array_dot($array);
// ['products.desk.price' => 100]
array_except()
The array_except function removes the given key / value pairs from an array:
$array = ['name' => 'Desk', 'price' => 100];
$filtered = array_except($array, ['price']);
// ['name' => 'Desk']
array_first()
The array_first function returns the first element of an array passing a given truth test:
$array = [100, 200, 300];
$first = array_first($array, function ($value, $key) {
    return $value >= 150;
// 200
A default value may also be passed as the third parameter to the method. This value will be returned if no value passes the truth
$first = array_first($array, $callback, $default);
array_flatten()
The array_flatten function flattens a multi-dimensional array into a single level array:
$array = ['name' => 'Joe', 'languages' => ['PHP', 'Ruby']];
$flattened = array_flatten($array);
// ['Joe', 'PHP', 'Ruby']
array_forget()
The array_forget function removes a given key / value pair from a deeply nested array using "dot" notation:
$array = ['products' => ['desk' => ['price' => 100]]];
array_forget($array, 'products.desk');
```

// ['Taylor', 'Abigail']

```
array_get()
The array_get function retrieves a value from a deeply nested array using "dot" notation:
$array = ['products' => ['desk' => ['price' => 100]]];
$price = array_get($array, 'products.desk.price');
// 100
The array_get function also accepts a default value, which will be returned if the specific key is not found:
$discount = array_get($array, 'products.desk.discount', 0);
// 0
array_has()
The array_has function checks whether a given item or items exists in an array using "dot" notation:
$array = ['product' => ['name' => 'Desk', 'price' => 100]];
$contains = array_has($array, 'product.name');
// true
$contains = array_has($array, ['product.price', 'product.discount']);
// false
array_last()
The array_last function returns the last element of an array passing a given truth test:
$array = [100, 200, 300, 110];
$last = array_last($array, function ($value, $key) {
    return $value >= 150;
});
// 300
A default value may be passed as the third argument to the method. This value will be returned if no value passes the truth test:
$last = array_last($array, $callback, $default);
array only()
The array_only function returns only the specified key / value pairs from the given array:
$array = ['name' => 'Desk', 'price' => 100, 'orders' => 10];
$slice = array_only($array, ['name', 'price']);
// ['name' => 'Desk', 'price' => 100]
array_pluck()
The array_pluck function retrieves all of the values for a given key from an array:
array = [
    ['developer' => ['id' => 1, 'name' => 'Taylor']],
['developer' => ['id' => 2, 'name' => 'Abigail']],
$names = array_pluck($array, 'developer.name');
```

```
You may also specify how you wish the resulting list to be keyed:
```

```
$names = array_pluck($array, 'developer.name', 'developer.id');
// [1 => 'Taylor', 2 => 'Abigail']
```

#### array\_prepend()

The array\_prepend function will push an item onto the beginning of an array:

```
$array = ['one', 'two', 'three', 'four'];
$array = array_prepend($array, 'zero');
// ['zero', 'one', 'two', 'three', 'four']
```

If needed, you may specify the key that should be used for the value:

```
$array = ['price' => 100];
$array = array_prepend($array, 'Desk', 'name');
// ['name' => 'Desk', 'price' => 100]
```

### array\_pull()

The array\_pull function returns and removes a key / value pair from an array:

```
$array = ['name' => 'Desk', 'price' => 100];
$name = array_pull($array, 'name');
// $name: Desk
// $array: ['price' => 100]
```

A default value may be passed as the third argument to the method. This value will be returned if the key doesn't exist:

```
$value = array_pull($array, $key, $default);
```

### array\_random()

The array\_random function returns a random value from an array:

```
$array = [1, 2, 3, 4, 5];
$random = array_random($array);
// 4 - (retrieved randomly)
```

You may also specify the number of items to return as an optional second argument. Note that providing this argument will return an array, even if only one item is desired:

```
$items = array_random($array, 2);
// [2, 5] - (retrieved randomly)
```

### array\_set()

The array\_set function sets a value within a deeply nested array using "dot" notation:

```
$array = ['products' => ['desk' => ['price' => 100]]];
array_set($array, 'products.desk.price', 200);
// ['products' => ['desk' => ['price' => 200]]]
```

```
array_sort()
```

The array\_sort function sorts an array by its values:

```
$array = ['Desk', 'Table', 'Chair'];
$sorted = array_sort($array);
// ['Chair', 'Desk', 'Table']
```

You may also sort the array by the results of the given Closure:

### array\_sort\_recursive()

The array\_sort\_recursive function recursively sorts an array using the sort function for numeric sub=arrays and ksort for associative sub-arrays:

### array\_where()

The array\_where function filters an array using the given Closure:

```
$array = [100, '200', 300, '400', 500];
$filtered = array_where($array, function ($value, $key) {
    return is_string($value);
});
// [1 => '200', 3 => '400']
```

### array\_wrap()

The array\_wrap function wraps the given value in an array. If the given value is already an array it will not be changed:

```
$string = 'Laravel';
$array = array_wrap($string);
// ['Laravel']
```

If the given value is null, an empty array will be returned:

```
$nothing = null;
$array = array_wrap($nothing);
// []
data_fill()
The data_fill function sets a missing value within a nested array or object using "dot" notation:
$data = ['products' => ['desk' => ['price' => 100]]];
data_fill($data, 'products.desk.price', 200);
// ['products' => ['desk' => ['price' => 100]]]
data_fill($data, 'products.desk.discount', 10);
// ['products' => ['desk' => ['price' => 100, 'discount' => 10]]]
This function also accepts asterisks as wildcards and will fill the target accordingly:
     ['name' => 'Desk 2'],
    ],
data_fill($data, 'products.*.price', 200);
    Γ
        1
data_get()
The data_get function retrieves a value from a nested array or object using "dot" notation:
$data = ['products' => ['desk' => ['price' => 100]]];
$price = data_get($data, 'products.desk.price');
// 100
The data_get function also accepts a default value, which will be returned if the specified key is not found:
$discount = data_get($data, 'products.desk.discount', 0);
The function also accepts wildcards using asterisks, which may target any key of the array or object:
    'product-one' => ['name' => 'Desk 1', 'price' => 100],
'product-two' => ['name' => 'Desk 2', 'price' => 150],
data_get($data, '*.name');
// ['Desk 1', 'Desk 2'];
data_set()
The data_set function sets a value within a nested array or object using "dot" notation:
$data = ['products' => ['desk' => ['price' => 100]]];
data_set($data, 'products.desk.price', 200);
```

```
// ['products' => ['desk' => ['price' => 200]]]
```

This function also accepts wildcards and will set values on the target accordingly:

By default, any existing values are overwritten. If you wish to only set a value if it doesn't exist, you may pass false as the fourth argument:

```
$data = ['products' => ['desk' => ['price' => 100]]];
data_set($data, 'products.desk.price', 200, false);
// ['products' => ['desk' => ['price' => 100]]]
```

### head()

The head function returns the first element in the given array:

```
$array = [100, 200, 300];
$first = head($array);
// 100
```

### last()

The last function returns the last element in the given array:

```
$array = [100, 200, 300];
$last = last($array);
// 300
```

# **Paths**

### app\_path()

The app\_path function returns the fully qualified path to the app directory. You may also use the app\_path function to generate a fully qualified path to a file relative to the application directory:

```
$path = app_path();
$path = app_path('Http/Controllers/Controller.php');
```

### base\_path()

The base\_path function returns the fully qualified path to the project root. You may also use the base\_path function to generate a fully qualified path to a given file relative to the project root directory:

```
$path = base_path();
$path = base_path('vendor/bin');
```

#### config\_path()

The config\_path function returns the fully qualified path to the config directory. You may also use the config\_path function to generate a fully qualified path to a given file within the application's configuration directory:

```
$path = config_path();
$path = config_path('app.php');
```

#### database\_path()

The database\_path function returns the fully qualified path to the database directory. You may also use the database\_path function to generate a fully qualified path to a given file within the database directory:

```
$path = database_path();
$path = database_path('factories/UserFactory.php');
```

The mix function returns the path to a versioned Mix file:

```
$path = mix('css/app.css');
```

### public\_path()

mix()

The public\_path function returns the fully qualified path to the public directory. You may also use the public\_path function to generate a fully qualified path to a given file within the public directory:

```
$path = public_path();
$path = public_path('css/app.css');
```

## resource\_path()

The resource\_path function returns the fully qualified path to the resources directory. You may also use the resource\_path function to generate a fully qualified path to a given file within the resources directory:

```
$path = resource_path();
$path = resource_path('sass/app.scss');
```

### storage\_path()

The storage\_path function returns the fully qualified path to the storage directory. You may also use the storage\_path function to generate a fully qualified path to a given file within the storage directory:

```
$path = storage_path();
$path = storage_path('app/file.txt');
```

## Strings

```
_()
The __ function translates the given translation string or translation key using your <u>localization files</u>:
echo __('Welcome to our application');
echo __('messages.welcome');
If the specified translation string or key does not exist, the __ function will return the given value. So, using the example above,
the \underline{\phantom{a}} function would return messages.welcome if that translation key does not exist.
camel_case()
The camel\_case function converts the given string to camelCase:
$converted = camel_case('foo_bar');
// fooBar
class basename()
The class_basename returns the class name of the given class with the class' namespace removed:
$class = class_basename('Foo\Bar\Baz');
// Baz
e()
The e function runs PHP's htmlspecialchars function with the double_encode option set to true by default:
echo e('<html>foo</html>');
// <html&gt;foo&lt;/html&gt;
ends_with()
The ends_with function determines if the given string ends with the given value:
$result = ends_with('This is my name', 'name');
// true
kebab_case()
The kebab_case function converts the given string to kebab-case:
$converted = kebab_case('fooBar');
// foo-bar
preg_replace_array()
The preg_replace_array function replaces a given pattern in the string sequentially using an array:
$string = 'The event will take place between :start and :end';
$replaced = preg_replace_array('/:[a-z_]+/', ['8:30', '9:00'], $string);
// The event will take place between 8:30 and 9:00
```

```
snake_case()
The snake_case function converts the given string to snake_case:
$converted = snake_case('fooBar');
// foo_bar
starts_with()
The starts_with function determines if the given string begins with the given value:
$result = starts_with('This is my name', 'This');
// true
str_after()
The str_after function returns everything after the given value in a string:
$slice = str_after('This is my name', 'This is');
// ' my name'
str_before()
The str_before function returns everything before the given value in a string:
$slice = str_before('This is my name', 'my name');
// 'This is '
str_contains()
The str_contains function determines if the given string contains the given value (case sensitive):
$contains = str_contains('This is my name', 'my');
You may also pass an array of values to determine if the given string contains any of the values:
$contains = str_contains('This is my name', ['my', 'foo']);
// true
str_finish()
The str_finish function adds a single instance of the given value to a string if it does not already end with the value:
$adjusted = str_finish('this/string', '/');
// this/string/
$adjusted = str_finish('this/string/', '/');
// this/string/
str_is()
```

 $The \ \mathsf{str\_is} \ function \ determines \ if \ a \ given \ string \ matches \ a \ given \ pattern. \ Asterisks \ may \ be \ used \ to \ indicate \ wildcards:$ 

```
$matches = str_is('foo*', 'foobar');
// true
$matches = str_is('baz*', 'foobar');
// false
str_limit()
The str_limit function truncates the given string at the specified length:
$truncated = str_limit('The quick brown fox jumps over the lazy dog', 20);
// The quick brown fox...
You may also pass a third argument to change the string that will be appended to the end:
// The quick brown fox (...)
Str::orderedUuid()
The Str::ordereduuid method generates a "timestamp first" UUID that may be efficiently stored in an indexed database column:
use Illuminate\Support\Str;
return (string) Str::orderedUuid();
str_plural()
The str_plural function converts a string to its plural form. This function currently only supports the English language:
$plural = str_plural('car');
// cars
$plural = str_plural('child');
// children
You may provide an integer as a second argument to the function to retrieve the singular or plural form of the string:
$plural = str_plural('child', 2);
// children
$plural = str_plural('child', 1);
// child
str random()
The str_random function generates a random string of the specified length. This function uses PHP's random_bytes function:
$random = str_random(40);
str_replace_array()
The str_replace_array function replaces a given value in the string sequentially using an array:
$string = 'The event will take place between ? and ?';
$replaced = str_replace_array('?', ['8:30', '9:00'], $string);
```

```
// The event will take place between 8:30 and 9:00
str_replace_first()
The str_replace_first function replaces the first occurrence of a given value in a string:
$replaced = str_replace_first('the', 'a', 'the quick brown fox jumps over the lazy dog');
// a quick brown fox jumps over the lazy dog
str_replace_last()
The str_replace_last function replaces the last occurrence of a given value in a string:
$replaced = str_replace_last('the', 'a', 'the quick brown fox jumps over the lazy dog');
// the quick brown fox jumps over a lazy dog
str_singular()
The str_singular function converts a string to its singular form. This function currently only supports the English language:
$singular = str_singular('cars');
// car
$singular = str_singular('children');
// child
str_slug()
The str_slug function generates a URL friendly "slug" from the given string:
$slug = str_slug('Laravel 5 Framework', '-');
// laravel-5-framework
str_start()
The str_start function adds a single instance of the given value to a string if it does not already start with the value:
$adjusted = str_start('this/string', '/');
// /this/string
$adjusted = str_start('/this/string', '/');
// /this/string
studly_case()
The studly_case function converts the given string to StudlyCase:
$converted = studly_case('foo_bar');
// FooBar
title_case()
```

The title\_case function converts the given string to Title Case:

```
$converted = title_case('a nice title uses the correct case');
// A Nice Title Uses The Correct Case
```

#### trans()

The trans function translates the given translation key using your <u>localization files</u>:

```
echo trans('messages.welcome');
```

If the specified translation key does not exist, the trans function will return the given key. So, using the example above, the transfunction would return messages.welcome if the translation key does not exist.

#### trans\_choice()

The trans\_choice function translates the given translation key with inflection:

```
echo trans_choice('messages.notifications', $unreadCount);
```

If the specified translation key does not exist, the trans\_choice function will return the given key. So, using the example above, the trans\_choice function would return messages.notifications if the translation key does not exist.

#### Str::uuid()

```
The Str::uuid method generates a UUID (version 4): use Illuminate\Support\Str;
```

return (string) Str::uuid();

### **URLs**

#### action()

The action function generates a URL for the given controller action. You do not need to pass the full namespace of the controller. Instead, pass the controller class name relative to the App\Http\Controllers namespace:

```
$url = action('HomeController@index');
$url = action([HomeController::class, 'index']);
```

If the method accepts route parameters, you may pass them as the second argument to the method:

```
$url = action('UserController@profile', ['id' => 1]);
```

### asset()

The asset function generates a URL for an asset using the current scheme of the request (HTTP or HTTPS):

```
$url = asset('img/photo.jpg');
```

# secure\_asset()

The  $secure\_asset$  function generates a URL for an asset using HTTPS:

```
$url = secure_asset('img/photo.jpg');
```

```
route()
The route function generates a URL for the given named route:
$url = route('routeName');
If the route accepts parameters, you may pass them as the second argument to the method:
$url = route('routeName', ['id' => 1]);
By default, the route function generates an absolute URL. If you wish to generate a relative URL, you may pass false as the third
argument:
$url = route('routeName', ['id' => 1], false);
secure_url()
The secure_url function generates a fully qualified HTTPS URL to the given path:
$url = secure_url('user/profile');
$url = secure_url('user/profile', [1]);
url()
The url function generates a fully qualified URL to the given path:
$url = url('user/profile');
$url = url('user/profile', [1]);
If no path is provided, a Illuminate\Routing\UrlGenerator instance is returned:
$current = url()->current();
$full = url()->full();
$previous = url()->previous();
Miscellaneous
abort()
The abort function throws an HTTP exception which will be rendered by the exception handler:
abort(403);
You may also provide the exception's response text and custom response headers:
abort(403, 'Unauthorized.', $headers);
```

#### abort\_if()

The  ${\tt abort\_if}$  function throws an HTTP exception if a given boolean expression evaluates to  ${\tt true}$ :

```
abort_if(! Auth::user()->isAdmin(), 403);
```

Like the abort method, you may also provide the exception's response text as the third argument and an array of custom response headers as the fourth argument.

```
abort_unless()
```

The abort\_unless function throws an HTTP exception if a given boolean expression evaluates to false:

blank(true);
blank(false);
// false

```
abort_unless(Auth::user()->isAdmin(), 403);
```

Like the abort method, you may also provide the exception's response text as the third argument and an array of custom response headers as the fourth argument.

```
app()
The app function returns the service container instance:
$container = app();
You may pass a class or interface name to resolve it from the container:
$api = app('HelpSpot\API');
auth()
The auth function returns an authenticator instance. You may use it instead of the Auth facade for convenience:
$user = auth()->user();
If needed, you may specify which guard instance you would like to access:
$user = auth('admin')->user();
back()
The back function generates a <u>redirect HTTP response</u> to the user's previous location:
return back($status = 302, $headers = [], $fallback = false);
return back();
bcrypt()
The bcrypt function hashes the given value using Bcrypt. You may use it as an alternative to the Hash facade:
$password = bcrypt('my-secret-password');
broadcast()
The broadcast function broadcasts the given event to its listeners:
broadcast(new UserRegistered($user));
blank()
The blank function returns whether the given value is "blank":
blank('');
blank(' ');
blank(null);
blank(collect());
// true
blank(0);
```

For the inverse of blank, see the **filled** method.

```
cache()
```

The cache function may be used to get values from the <u>cache</u>. If the given key does not exist in the cache, an optional default value will be returned:

```
$value = cache('key');
$value = cache('key', 'default');
```

You may add items to the cache by passing an array of key / value pairs to the function. You should also pass the number of minutes or duration the cached value should be considered valid:

```
cache(['key' => 'value'], 5);
cache(['key' => 'value'], now()->addSeconds(10));
```

#### class\_uses\_recursive()

The class\_uses\_recursive function returns all traits used by a class, including traits used by all of its parent classes:

```
$traits = class_uses_recursive(App\User::class);
```

#### collect()

The collect function creates a <u>collection</u> instance from the given value:

```
$collection = collect(['taylor', 'abigail']);
```

### config()

The config function gets the value of a configuration variable. The configuration values may be accessed using "dot" syntax, which includes the name of the file and the option you wish to access. A default value may be specified and is returned if the configuration option does not exist:

```
$value = config('app.timezone');
$value = config('app.timezone', $default);
```

You may set configuration variables at runtime by passing an array of key / value pairs:

```
config(['app.debug' => true]);
```

### cookie()

The cookie function creates a new cookie instance:

```
$cookie = cookie('name', 'value', $minutes);
```

### csrf\_field()

The csrf\_field function generates an HTML hidden input field containing the value of the CSRF token. For example, using Blade syntax:

```
{{ csrf_field() }}
```

```
csrf_token()
The csrf_token function retrieves the value of the current CSRF token:
$token = csrf_token();
dd()
The dd function dumps the given variables and ends execution of the script:
dd($value);
dd($value1, $value2, $value3, ...);
If you do not want to halt the execution of your script, use the dump function instead.
decrypt()
The decrypt function decrypts the given value using Laravel's encrypter:
$decrypted = decrypt($encrypted_value);
dispatch()
The dispatch function pushes the given job onto the Laravel job queue:
dispatch(new App\Jobs\SendEmails);
dispatch_now()
The dispatch_now function runs the given job immediately and returns the value from its handle method:
$result = dispatch_now(new App\Jobs\SendEmails);
dump()
The dump function dumps the given variables:
dump($value);
dump($value1, $value2, $value3, ...);
If you want to stop executing the script after dumping the variables, use the \frac{dd}{dt} function instead.
  TIP You may use Artisan's dump-server command to intercept all dump calls and display them in your console window instead
  of your browser.
encrypt()
The encrypt function encrypts the given value using Laravel's encrypter:
$encrypted = encrypt($unencrypted_value);
env()
The env function retrieves the value of an environment variable or returns a default value:
```

```
$env = env('APP_ENV');
// Returns 'production' if APP_ENV is not set...
$env = env('APP_ENV', 'production');
```

NOTE If you execute the config:cache command during your deployment process, you should be sure that you are only calling the env function from within your configuration files. Once the configuration has been cached, the .env file will not be loaded and all calls to the env function will return null.

```
event()
```

The event function dispatches the given event to its listeners:

```
event(new UserRegistered($user));
```

#### factory()

The factory function creates a model factory builder for a given class, name, and amount. It can be used while testing or seeding:

```
$user = factory(App\User::class)->make();
```

#### filled()

The filled function returns whether the given value is not "blank":

```
filled(0);
filled(true);
filled(false);

// true
filled('');
filled('');
filled(null);
filled(collect());

// false
```

For the inverse of filled, see the blank method.

### info()

The info function will write information to the log:

```
info('Some helpful information!');
```

An array of contextual data may also be passed to the function:

```
info('User login attempt failed.', ['id' => $user->id]);
```

#### logger()

The logger function can be used to write a debug level message to the log:

```
logger('Debug message');
```

An array of contextual data may also be passed to the function:

```
logger('User has logged in.', ['id' => $user->id]);
```

 $A\,\underline{logger}$  instance will be returned if no value is passed to the function:

```
logger()->error('You are not allowed here.');
```

```
method_field()
```

The method\_field function generates an HTML hidden input field containing the spoofed value of the form's HTTP verb. For example, using <u>Blade syntax</u>:

#### now()

The now function creates a new Illuminate\Support\Carbon instance for the current time:

```
now = now();
```

#### old()

The old function retrieves an old input value flashed into the session:

```
$value = old('value');
$value = old('value', 'default');
```

#### optional()

The optional function accepts any argument and allows you to access properties or call methods on that object. If the given object is null, properties and methods will return null instead of causing an error:

```
return optional($user->address)->street;
{!! old('name', optional($user)->name) !!}
```

The optional function also accepts a Closure as its second argument. The Closure will be invoked if the value provided as the first argument is not null:

```
return optional(User::find($id), function ($user) {
    return new DummyUser;
}):
```

### policy()

The policy method retrieves a policy instance for a given class:

```
$policy = policy(App\User::class);
```

### redirect()

The redirect function returns a  $\underline{\text{redirect HTTP response}}$ , or returns the redirector instance if called with no arguments:

```
return redirect($to = null, $status = 302, $headers = [], $secure = null);
return redirect('/home');
return redirect()->route('route.name');
```

### report()

The report function will report an exception using your <u>exception handler</u>'s report method:

```
report($e);
```

#### request()

The request function returns the current request instance or obtains an input item:

```
$request = request();
$value = request('key', $default);
```

#### rescue()

The rescue function executes the given Closure and catches any exceptions that occur during its execution. All exceptions that are caught will be sent to your exception handler's report method; however, the request will continue processing:

```
return rescue(function () {
    return $this->method();
});
```

You may also pass a second argument to the rescue function. This argument will be the "default" value that should be returned if an exception occurs while executing the Closure:

```
return rescue(function () {
    return $this->method();
}, false);

return rescue(function () {
    return $this->method();
}, function () {
    return $this->failure();
});
```

#### resolve()

The resolve function resolves a given class or interface name to its instance using the service container:

```
$api = resolve('HelpSpot\API');
```

### response()

The response function creates a <u>response</u> instance or obtains an instance of the response factory:

```
return response('Hello World', 200, $headers);
return response()->json(['foo' => 'bar'], 200, $headers);
```

### retry()

The retry function attempts to execute the given callback until the given maximum attempt threshold is met. If the callback does not throw an exception, its return value will be returned. If the callback throws an exception, it will automatically be retried. If the maximum attempt count is exceeded, the exception will be thrown:

```
return retry(5, function () { $//$ Attempt 5 times while resting 100ms in between attempts...}, 100);
```

### session()

The session function may be used to get or set session values:

```
$value = session('key');
```

You may set values by passing an array of key / value pairs to the function:

```
session(['chairs' => 7, 'instruments' => 3]);
```

The session store will be returned if no value is passed to the function:

```
$value = session()->get('key');
session()->put('key', $value);
```

#### tap()

The tap function accepts two arguments: an arbitrary \$value and a Closure. The \$value will be passed to the Closure and then be returned by the tap function. The return value of the Closure is irrelevant:

```
$user = tap(User::first(), function ($user) {
    $user->name = 'taylor';

    $user->save();
});
```

If no Closure is passed to the tap function, you may call any method on the given \$value. The return value of the method you call will always be \$value, regardless of what the method actually returns in its definition. For example, the Eloquent update method typically returns an integer. However, we can force the method to return the model itself by chaining the update method call through the tap function:

```
$user = tap($user)->update([
   'name' => $name,
   'email' => $email,
]);
```

#### today()

The today function creates a new Illuminate\Support\Carbon instance for the current date:

```
$today = today();
```

#### throw\_if()

The  ${\tt throw\_if}$  function throws the given exception if a given boolean expression evaluates to  ${\tt true}$ :

```
throw_if(! Auth::user()->isAdmin(), AuthorizationException::class);
throw_if(
    ! Auth::user()->isAdmin(),
    AuthorizationException::class,
    'You are not allowed to access this page'
);
```

#### throw\_unless()

The throw\_unless function throws the given exception if a given boolean expression evaluates to false:

```
throw_unless(Auth::user()->isAdmin(), AuthorizationException::class);
throw_unless(
   Auth::user()->isAdmin(),
   AuthorizationException::class,
   'You are not allowed to access this page'
);
```

### trait\_uses\_recursive()

The trait\_uses\_recursive function returns all traits used by a trait:

```
$traits = trait_uses_recursive(\Illuminate\Notifications\Notifiable::class);
```

#### transform()

The transform function executes a closure on a given value if the value is not blank and returns the result of the closure:

```
$callback = function ($value) {
    return $value * 2;
};

$result = transform(5, $callback);
// 10
```

A default value or Closure may also be passed as the third parameter to the method. This value will be returned if the given value is blank:

```
$result = transform(null, $callback, 'The value is blank');
// The value is blank
```

#### validator()

The validator function creates a new <u>validator</u> instance with the given arguments. You may use it instead of the validator facade for convenience:

```
$validator = validator($data, $rules, $messages);
```

### value()

The value function returns the value it is given. However, if you pass a closure to the function, the closure will be executed then its result will be returned:

```
$result = value(true);
// true

$result = value(function () {
    return false;
});
// false
```

# view()

The view function retrieves a <u>view</u> instance:

```
return view('auth.login');
```

#### with()

The with function returns the value it is given. If a closure is passed as the second argument to the function, the closure will be executed and its result will be returned:

```
$callback = function ($value) {
    return (is_numeric($value)) ? $value * 2 : 0;
};

$result = with(5, $callback);

// 10

$result = with(null, $callback);

// 0

$result = with(5, null);

// 5
```

### **Digging Deeper**

# Mail

- Introduction
  - o <u>Driver Prerequisites</u>
- Generating Mailables
- Writing Mailables
  - o Configuring The Sender
  - Configuring The View
  - <u>View Data</u>
  - Attachments
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  - Customizing The SwiftMailer Message
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## Introduction

Laravel provides a clean, simple API over the popular <u>SwiftMailer</u> library with drivers for SMTP, Mailgun, SparkPost, Amazon SES, and sendmail, allowing you to quickly get started sending mail through a local or cloud based service of your choice.

#### **Driver Prerequisites**

The API based drivers such as Mailgun and SparkPost are often simpler and faster than SMTP servers. If possible, you should use one of these drivers. All of the API drivers require the Guzzle HTTP library, which may be installed via the Composer package manager:

```
composer require guzzlehttp/guzzle
```

## Mailgun Driver

To use the Mailgun driver, first install Guzzle, then set the driver option in your config/mail.php configuration file to mailgun. Next, verify that your config/services.php configuration file contains the following options:

```
'mailgun' => [
   'domain' => 'your-mailgun-domain',
   'secret' => 'your-mailgun-key',
],
```

If you are not using the "US" Mailgun region, you may define your region's endpoint in the services configuration file:

```
'mailgun' => [
  'domain' => 'your-mailgun-domain',
  'secret' => 'your-mailgun-key',
  'endpoint' => 'api.eu.mailgun.net',
],
```

# SparkPost Driver

To use the SparkPost driver, first install Guzzle, then set the driver option in your config/mail.php configuration file to sparkpost. Next, verify that your config/services.php configuration file contains the following options:

```
'sparkpost' => [
   'secret' => 'your-sparkpost-key',
],
```

If necessary, you may also configure which API endpoint should be used:

```
'sparkpost' => [
   'secret' => 'your-sparkpost-key',
   'options' => [
```

```
'endpoint' => 'https://api.eu.sparkpost.com/api/v1/transmissions',
],
],
```

#### **SES Driver**

To use the Amazon SES driver you must first install the Amazon AWS SDK for PHP. You may install this library by adding the following line to your composer.json file's require section and running the composer update command:

```
"aws/aws-sdk-php": "~3.0"
```

Next, set the driver option in your config/mail.php configuration file to ses and verify that your config/services.php configuration file contains the following options:

```
'ses' => [
  'key' => 'your-ses-key',
  'secret' => 'your-ses-secret',
  'region' => 'ses-region', // e.g. us-east-1
],
```

If you need to include <u>additional options</u> when executing the SES SendRawEmail request, you may define an options array within your ses configuration:

# **Generating Mailables**

In Laravel, each type of email sent by your application is represented as a "mailable" class. These classes are stored in the app/Mail directory. Don't worry if you don't see this directory in your application, since it will be generated for you when you create your first mailable class using the make:mail command:

php artisan make:mail OrderShipped

# **Writing Mailables**

All of a mailable class' configuration is done in the build method. Within this method, you may call various methods such as from, subject, view, and attach to configure the email's presentation and delivery.

### **Configuring The Sender**

## Using The from Method

First, let's explore configuring the sender of the email. Or, in other words, who the email is going to be "from". There are two ways to configure the sender. First, you may use the from method within your mailable class' build method:

```
/**

* Build the message.

*

* @return $this

*/
public function build()
{

return $this->from('example@example.com')

->view('emails.orders.shipped');
}
```

## Using A Global from Address

However, if your application uses the same "from" address for all of its emails, it can become cumbersome to call the from method in each mailable class you generate. Instead, you may specify a global "from" address in your config/mail.php configuration file. This address will be used if no other "from" address is specified within the mailable class:

```
'from' => ['address' => 'example@example.com', 'name' => 'App Name'],
```

In addition, you may define a global "reply\_to" address within your config/mail.php configuration file:

```
'reply_to' => ['address' => 'example@example.com', 'name' => 'App Name'],
```

## **Configuring The View**

Within a mailable class' build method, you may use the view method to specify which template should be used when rendering the emails contents. Since each email typically uses a <u>Blade template</u> to render its contents, you have the full power and convenience of the Blade templating engine when building your emails HTML:

```
/**
  * Build the message.
  *
  * @return $this
  */
public function build()
{
    return $this->view('emails.orders.shipped');
}
```

TIP You may wish to create a resources/views/emails directory to house all of your email templates; however, you are free to place them wherever you wish within your resources/views directory.

#### **Plain Text Emails**

If you would like to define a plain-text version of your email, you may use the text method. Like the view method, the text method accepts a template name which will be used to render the contents of the email. You are free to define both a HTML and plain-text version of your message:

### View Data

### Via Public Properties

Typically, you will want to pass some data to your view that you can utilize when rendering the email's HTML. There are two ways you may make data available to your view. First, any public property defined on your mailable class will automatically be made available to the view. So, for example, you may pass data into your mailable class' constructor and set that data to public properties defined on the class:

```
<?php
namespace App\Mail;
use App\Order;
use Illuminate\Bus\Oueueable:
use Illuminate\Mail\Mailable;
use Illuminate\Queue\SerializesModels;
class OrderShipped extends Mailable
    use Queueable, SerializesModels;
    * The order instance.
      @var Order
    public $order;
     * Create a new message instance.
      @return void
    public function __construct(Order $order)
        $this->order = $order;
    }
```

```
* Build the message.

*
    * @return $this
    */
public function build()
{
       return $this->view('emails.orders.shipped');
}
```

Once the data has been set to a public property, it will automatically be available in your view, so you may access it like you would access any other data in your Blade templates:

```
<div>
    Price: {{ $order->price }}
</div>
```

### Via The with Method:

If you would like to customize the format of your email's data before it is sent to the template, you may manually pass your data to the view via the with method. Typically, you will still pass data via the mailable class' constructor; however, you should set this data to protected or private properties so the data is not automatically made available to the template. Then, when calling the with method, pass an array of data that you wish to make available to the template:

```
namespace App\Mail;
use App\Order;
use Illuminate\Bus\Queueable;
use Illuminate\Mail\Mailable;
use Illuminate\Queue\SerializesModels;
class OrderShipped extends Mailable
    use Queueable, SerializesModels;
     * The order instance.
     * @var Order
    protected $order;
     * Create a new message instance.
     * @return void
    public function __construct(Order $order)
        $this->order = $order;
     * Build the message.
       @return $this
    public function build()
        return $this->view('emails.orders.shipped')
                     ->with([
                         'orderName' => $this->order->name,
                         'orderPrice' => $this->order->price,
}
```

Once the data has been passed to the with method, it will automatically be available in your view, so you may access it like you would access any other data in your Blade templates:

```
<div>
    Price: {{ $orderPrice }}
</div>
```

### Attachments

To add attachments to an email, use the attach method within the mailable class' build method. The attach method accepts the full path to the file as its first argument:

```
/**
```

When attaching files to a message, you may also specify the display name and / or MIME type by passing an array as the second argument to the attach method:

## **Attaching Files from Disk**

If you have stored a file on one of your filesystem disks, you may attach it to the email using the attachFromStorage method:

If necessary, you may specify the file's attachment name and additional options using the second and third arguments to the attachFromStorage method:

The attachFromStorageDisk method may be used if you need to specify a storage disk other than your default disk:

## **Raw Data Attachments**

The attachData method may be used to attach a raw string of bytes as an attachment. For example, you might use this method if you have generated a PDF in memory and want to attach it to the email without writing it to disk. The attachData method accepts the raw data bytes as its first argument, the name of the file as its second argument, and an array of options as its third argument:

```
/**

* Build the message.

*

* @return $this

*/
```

#### **Inline Attachments**

Embedding inline images into your emails is typically cumbersome; however, Laravel provides a convenient way to attach images to your emails and retrieving the appropriate CID. To embed an inline image, use the <code>embed</code> method on the <code>\$message</code> variable within your email template. Laravel automatically makes the <code>\$message</code> variable available to all of your email templates, so you don't need to worry about passing it in manually:

```
<body>
    Here is an image:
        <img src="{{ $message->embed($pathToImage) }}">
</body>
```

NOTE \$message variable is not available in markdown messages.

#### **Embedding Raw Data Attachments**

If you already have a raw data string you wish to embed into an email template, you may use the embeddata method on the \$message variable:

```
<body>
    Here is an image from raw data:
        <img src="{{ $message->embedData($data, $name) }}">
</body>
```

### **Customizing The SwiftMailer Message**

The withSwiftMessage method of the Mailable base class allows you to register a callback which will be invoked with the raw SwiftMailer message instance before sending the message. This gives you an opportunity to customize the message before it is delivered:

# **Markdown Mailables**

Markdown mailable messages allow you to take advantage of the pre-built templates and components of mail notifications in your mailables. Since the messages are written in Markdown, Laravel is able to render beautiful, responsive HTML templates for the messages while also automatically generating a plain-text counterpart.

### **Generating Markdown Mailables**

To generate a mailable with a corresponding Markdown template, you may use the --markdown option of the make:mail Artisan command:

```
php artisan make:mail OrderShipped --markdown=emails.orders.shipped
```

Then, when configuring the mailable within its build method, call the markdown method instead of the view method. The markdown methods accepts the name of the Markdown template and an optional array of data to make available to the template:

```
/**

* Build the message.

* @return $this

*/
public function build()
```

## **Writing Markdown Messages**

Markdown mailables use a combination of Blade components and Markdown syntax which allow you to easily construct mail messages while leveraging Laravel's pre-crafted components:

```
@component('mail::message')
# Order Shipped

Your order has been shipped!
@component('mail::button', ['url' => $url])
View Order
@endcomponent
Thanks,<br>
{{ config('app.name') }}
@endcomponent
```

TIP Do not use excess indentation when writing Markdown emails. Markdown parsers will render indented content as code blocks.

#### **Button Component**

The button component renders a centered button link. The component accepts two arguments, a url and an optional color. Supported colors are primary, success, and error. You may add as many button components to a message as you wish:

```
@component('mail::button', ['url' => $url, 'color' => 'success'])
View Order
@endcomponent
```

### **Panel Component**

The panel component renders the given block of text in a panel that has a slightly different background color than the rest of the message. This allows you to draw attention to a given block of text:

```
@component('mail::panel')
This is the panel content.
@endcomponent
```

### **Table Component**

The table component allows you to transform a Markdown table into an HTML table. The component accepts the Markdown table as its content. Table column alignment is supported using the default Markdown table alignment syntax:

### **Customizing The Components**

You may export all of the Markdown mail components to your own application for customization. To export the components, use the vendor:publish Artisan command to publish the laravel-mail asset tag:

```
php artisan vendor:publish --tag=laravel-mail
```

This command will publish the Markdown mail components to the resources/views/vendor/mail directory. The mail directory will contain a html and a markdown directory, each containing their respective representations of every available component. The components in the html directory are used to generate the HTML version of your email, and their counterparts in the markdown directory are used to generate the plain-text version. You are free to customize these components however you like.

### **Customizing The CSS**

After exporting the components, the resources/views/vendor/mail/html/themes directory will contain a default.css file. You may customize the CSS in this file and your styles will automatically be in-lined within the HTML representations of your Markdown mail messages.

TIP If you would like to build an entirely new theme for the Markdown components, write a new CSS file within the

html/themes directory and change the theme option of your mail configuration file.

# **Sending Mail**

To send a message, use the to method on the Mail <u>facade</u>. The to method accepts an email address, a user instance, or a collection of users. If you pass an object or collection of objects, the mailer will automatically use their email and name properties when setting the email recipients, so make sure these attributes are available on your objects. Once you have specified your recipients, you may pass an instance of your mailable class to the send method:

```
namespace App\Http\Controllers;
use App\Order:
use App\Mail\OrderShipped;
use Illuminate\Http\Request;
use Illuminate\Support\Facades\Mail;
use App\Http\Controllers\Controller;
class OrderController extends Controller
     * Ship the given order.
       @param Request $request
       @param int $orderId
      @return Response
    public function ship(Request $request, $orderId)
        $order = Order::findOrFail($orderId);
        // Ship order...
       Mail::to($request->user())->send(new OrderShipped($order));
    }
}
```

Of course, you are not limited to just specifying the "to" recipients when sending a message. You are free to set "to", "cc", and "bcc" recipients all within a single, chained method call:

```
Mail::to($request->user())
    ->cc($moreUsers)
    ->bcc($evenMoreUsers)
    ->send(new OrderShipped($order));
```

## **Rendering Mailables**

Sometimes you may wish to capture the HTML content of a mailable without sending it. To accomplish this, you may call the render method of the mailable. This method will return the evaluated contents of the mailable as a string:

```
$invoice = App\Invoice::find(1);
return (new App\Mail\InvoicePaid($invoice))->render();
```

### **Previewing Mailables In The Browser**

When designing a mailable's template, it is convenient to quickly preview the rendered mailable in your browser like a typical Blade template. For this reason, Laravel allows you to return any mailable directly from a route Closure or controller. When a mailable is returned, it will be rendered and displayed in the browser, allowing you to quickly preview its design without needing to send it to an actual email address:

```
Route::get('mailable', function () {
    $invoice = App\Invoice::find(1);
    return new App\Mail\InvoicePaid($invoice);
});
```

### **Queueing Mail**

### **Queueing A Mail Message**

Since sending email messages can drastically lengthen the response time of your application, many developers choose to queue email messages for background sending. Laravel makes this easy using its built-in <u>unified queue API</u>. To queue a mail message, use the queue method on the Mail facade after specifying the message's recipients:

```
Mail::to($request->user())
```

```
->cc($moreUsers)
->bcc($evenMoreUsers)
->queue(new OrderShipped($order));
```

This method will automatically take care of pushing a job onto the queue so the message is sent in the background. Of course, you will need to <u>configure your queues</u> before using this feature.

### **Delayed Message Queueing**

If you wish to delay the delivery of a queued email message, you may use the later method. As its first argument, the later method accepts a DateTime instance indicating when the message should be sent:

```
$when = now()->addMinutes(10);

Mail::to($request->user())
    ->cc($moreUsers)
    ->bcc($evenMoreUsers)
    ->later($when, new OrderShipped($order));
```

#### **Pushing To Specific Queues**

Since all mailable classes generated using the make:mail command make use of the Illuminate\Bus\Queueable trait, you may call the onQueue and onConnection methods on any mailable class instance, allowing you to specify the connection and queue name for the message:

#### **Queueing By Default**

If you have mailable classes that you want to always be queued, you may implement the ShouldQueue contract on the class. Now, even if you call the send method when mailing, the mailable will still be queued since it implements the contract:

# **Localizing Mailables**

Laravel allows you to send mailables in a locale other than the current language, and will even remember this locale if the mail is queued.

To accomplish this, the Mail facade offers a locale method to set the desired language. The application will change into this locale when the mailable is being formatted and then revert back to the previous locale when formatting is complete:

```
Mail::to($request->user())->locale('es')->send(
   new OrderShipped($order)
).
```

### **User Preferred Locales**

Sometimes, applications store each user's preferred locale. By implementing the HasLocalePreference contract on one or more of your models, you may instruct Laravel to use this stored locale when sending mail:

 $use \ \, \textbf{Illuminate} \\ \textbf{Contracts} \\ \textbf{Translation} \\ \textbf{HasLocalePreference}; \\$ 

```
class User extends Model implements HasLocalePreference
{
    /**
    * Get the user's preferred locale.
    *
    * @return string
    */
    public function preferredLocale()
    {
        return $this->locale;
    }
}
```

Once you have implemented the interface, Laravel will automatically use the preferred locale when sending mailables and notifications to the model. Therefore, there is no need to call the locale method when using this interface:

```
Mail::to($request->user())->send(new OrderShipped($order));
```

# **Mail & Local Development**

When developing an application that sends email, you probably don't want to actually send emails to live email addresses. Laravel provides several ways to "disable" the actual sending of emails during local development.

### Log Driver

Instead of sending your emails, the log mail driver will write all email messages to your log files for inspection. For more information on configuring your application per environment, check out the <u>configuration documentation</u>.

#### **Universal To**

Another solution provided by Laravel is to set a universal recipient of all emails sent by the framework. This way, all the emails generated by your application will be sent to a specific address, instead of the address actually specified when sending the message. This can be done via the to option in your config/mail.php configuration file:

```
'to' => [
   'address' => 'example@example.com',
   'name' => 'Example'
],
```

#### Mailtrap

Finally, you may use a service like Mailtrap and the smtp driver to send your email messages to a "dummy" mailbox where you may view them in a true email client. This approach has the benefit of allowing you to actually inspect the final emails in Mailtrap's message viewer.

### **Events**

Laravel fires two events during the process of sending mail messages. The MessageSending event is fired prior to a message being sent, while the MessageSent event is fired after a message has been sent. Remember, these events are fired when the mail is being sent, not when it is queued. You may register an event listener for this event in your EventServiceProvider:

### **Digging Deeper**

# **Notifications**

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## Introduction

In addition to support for <u>sending email</u>, Laravel provides support for sending notifications across a variety of delivery channels, including mail, SMS (via <u>Nexmo</u>), and <u>Slack</u>. Notifications may also be stored in a database so they may be displayed in your web interface.

Typically, notifications should be short, informational messages that notify users of something that occurred in your application. For example, if you are writing a billing application, you might send an "Invoice Paid" notification to your users via the email and SMS channels.

# **Creating Notifications**

In Laravel, each notification is represented by a single class (typically stored in the app/Notifications directory). Don't worry if you don't see this directory in your application, it will be created for you when you run the make:notification Artisan command:

php artisan make:notification InvoicePaid

This command will place a fresh notification class in your app/Notifications directory. Each notification class contains a via method and a variable number of message building methods (such as toMail or toDatabase) that convert the notification to a message optimized for that particular channel.

## **Sending Notifications**

## **Using The Notifiable Trait**

Notifications may be sent in two ways: using the notify method of the Notifiable trait or using the Notification <u>facade</u>. First, let's explore using the trait:

```
<?php
namespace App;
use Illuminate\Notifications\Notifiable;
use Illuminate\Foundation\Auth\User as Authenticatable;
class User extends Authenticatable
{
    use Notifiable;
}</pre>
```

This trait is utilized by the default App\User model and contains one method that may be used to send notifications: notify. The notify method expects to receive a notification instance:

```
use App\Notifications\InvoicePaid;
$user->notify(new InvoicePaid($invoice));
```

TIP Remember, you may use the Illuminate\Notifications\Notifiable trait on any of your models. You are not limited to only including it on your user model.

### **Using The Notification Facade**

Alternatively, you may send notifications via the Notification facade. This is useful primarily when you need to send a notification to multiple notifiable entities such as a collection of users. To send notifications using the facade, pass all of the notifiable entities and the notification instance to the send method:

```
Notification::send($users, new InvoicePaid($invoice));
```

### **Specifying Delivery Channels**

Every notification class has a via method that determines on which channels the notification will be delivered. Out of the box, notifications may be sent on the mail, database, broadcast, nexmo, and slack channels.

TIP If you would like to use other delivery channels such as Telegram or Pusher, check out the community driven <u>Laravel Notification Channels website</u>.

The via method receives a \$notifiable instance, which will be an instance of the class to which the notification is being sent. You may use \$notifiable to determine which channels the notification should be delivered on:

```
/**
    * Get the notification's delivery channels.
    * @param mixed $notifiable
    * @return array
    */
public function via($notifiable)
{
    return $notifiable->prefers_sms ? ['nexmo'] : ['mail', 'database'];
}
```

## **Queueing Notifications**

NOTE Before queueing notifications you should configure your queue and <u>start a worker</u>.

Sending notifications can take time, especially if the channel needs an external API call to deliver the notification. To speed up your application's response time, let your notification be queued by adding the Shouldqueue interface and Queueable trait to your class. The interface and trait are already imported for all notifications generated using make:notification, so you may immediately add them to your notification class:

```
<?php
namespace App\Notifications;
use Illuminate\Bus\Queueable;
use Illuminate\Notifications\Notification;
use Illuminate\Contracts\Queue\ShouldQueue;
class InvoicePaid extends Notification implements ShouldQueue
{
    use Queueable;</pre>
```

```
// ...
```

Once the ShouldQueue interface has been added to your notification, you may send the notification like normal. Laravel will detect the ShouldQueue interface on the class and automatically queue the delivery of the notification:

```
$user->notify(new InvoicePaid($invoice));
```

If you would like to delay the delivery of the notification, you may chain the delay method onto your notification instantiation:

```
$when = now()->addMinutes(10);
$user->notify((new InvoicePaid($invoice))->delay($when));
```

#### **On-Demand Notifications**

Sometimes you may need to send a notification to someone who is not stored as a "user" of your application. Using the Notification::route method, you may specify ad-hoc notification routing information before sending the notification:

```
Notification::route('mail', 'taylor@example.com')
->route('nexmo', '5555555555')
->notify(new InvoicePaid($invoice));
```

## **Mail Notifications**

### **Formatting Mail Messages**

If a notification supports being sent as an email, you should define a toMail method on the notification class. This method will receive a <code>snotifiable</code> entity and should return a <code>Illuminate\Notifications\Messages\MailMessage</code> instance. Mail messages may contain lines of text as well as a "call to action". Let's take a look at an example toMail method:

TIP Note we are using \$this->invoice->id in our toMail method. You may pass any data your notification needs to generate its message into the notification's constructor.

In this example, we register a greeting, a line of text, a call to action, and then another line of text. These methods provided by the MailMessage object make it simple and fast to format small transactional emails. The mail channel will then translate the message components into a nice, responsive HTML email template with a plain-text counterpart. Here is an example of an email generated by the mail channel:

# Laravel

# Hello!

One of your invoices has been paid!

View Invoice

Thank you for using our application!

Regards,

Laravel

If you're having trouble clicking the "View Invoice" button, copy and paste the URL below into your web browser:

https://example.com/invoice/1

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TIP When sending mail notifications, be sure to set the name value in your config/app.php configuration file. This value will be used in the header and footer of your mail notification messages.

## **Other Notification Formatting Options**

Instead of defining the "lines" of text in the notification class, you may use the view method to specify a custom template that should be used to render the notification email:

In addition, you may return a mailable object from the toMail method:

use App\Mail\InvoicePaid as Mailable;

```
/**

* Get the mail representation of the notification.

*

* @param mixed $notifiable

* @return Mailable
```

```
*/
public function toMail($notifiable)
{
    return (new Mailable($this->invoice))->to($this->user->email);
}
```

#### **Error Messages**

Some notifications inform users of errors, such as a failed invoice payment. You may indicate that a mail message is regarding an error by calling the error method when building your message. When using the error method on a mail message, the call to action button will be red instead of blue:

# **Customizing The Recipient**

When sending notifications via the mail channel, the notification system will automatically look for an email property on your notifiable entity. You may customize which email address is used to deliver the notification by defining a routeNotificationForMail method on the entity:

# **Customizing The Subject**

By default, the email's subject is the class name of the notification formatted to "title case". So, if your notification class is named InvoicePaid, the email's subject will be Invoice Paid. If you would like to specify an explicit subject for the message, you may call the subject method when building your message:

### **Customizing The Templates**

You can modify the HTML and plain-text template used by mail notifications by publishing the notification package's resources. After running this command, the mail notification templates will be located in the resources/views/vendor/notifications directory:

php artisan vendor:publish --tag=laravel-notifications

### **Markdown Mail Notifications**

Markdown mail notifications allow you to take advantage of the pre-built templates of mail notifications, while giving you more freedom to write longer, customized messages. Since the messages are written in Markdown, Laravel is able to render beautiful, responsive HTML templates for the messages while also automatically generating a plain-text counterpart.

### **Generating The Message**

To generate a notification with a corresponding Markdown template, you may use the --markdown option of the make:notification Artisan command:

```
php artisan make:notification InvoicePaid --markdown=mail.invoice.paid
```

Like all other mail notifications, notifications that use Markdown templates should define a toMail method on their notification class. However, instead of using the line and action methods to construct the notification, use the markdown method to specify the name of the Markdown template that should be used:

### **Writing The Message**

Markdown mail notifications use a combination of Blade components and Markdown syntax which allow you to easily construct notifications while leveraging Laravel's pre-crafted notification components:

```
@component('mail::message')
# Invoice Paid

Your invoice has been paid!
@component('mail::button', ['url' => $url])
View Invoice
@endcomponent

Thanks, < br>
{{ config('app.name') }}
@endcomponent
```

### **Button Component**

The button component renders a centered button link. The component accepts two arguments, a url and an optional color. Supported colors are blue, green, and red. You may add as many button components to a notification as you wish:

```
@component('mail::button', ['url' => $url, 'color' => 'green'])
View Invoice
@endcomponent
```

## **Panel Component**

The panel component renders the given block of text in a panel that has a slightly different background color than the rest of the notification. This allows you to draw attention to a given block of text:

```
@component('mail::panel')
This is the panel content.
@endcomponent
```

### **Table Component**

The table component allows you to transform a Markdown table into an HTML table. The component accepts the Markdown table as its content. Table column alignment is supported using the default Markdown table alignment syntax:

```
@component('mail::table')
```

| Laravel       | Table         | Example |
|---------------|---------------|---------|
|               | ::            | :       |
| Col 2 is      | Centered      | \$10    |
| Col 3 is      | Right-Aligned | \$20    |
| @endcomponent |               |         |

### **Customizing The Components**

You may export all of the Markdown notification components to your own application for customization. To export the components, use the vendor:publish Artisan command to publish the laravel-mail asset tag:

```
php artisan vendor:publish --tag=laravel-mail
```

This command will publish the Markdown mail components to the resources/views/vendor/mail directory. The mail directory will contain a html and a markdown directory, each containing their respective representations of every available component. You are free to customize these components however you like.

### **Customizing The CSS**

After exporting the components, the resources/views/vendor/mail/html/themes directory will contain a default.css file. You may customize the CSS in this file and your styles will automatically be in-lined within the HTML representations of your Markdown notifications.

TIP If you would like to build an entirely new theme for the Markdown components, write a new CSS file within the html/themes directory and change the theme option of your mail configuration file.

## **Database Notifications**

## **Prerequisites**

The database notification channel stores the notification information in a database table. This table will contain information such as the notification type as well as custom JSON data that describes the notification.

You can query the table to display the notifications in your application's user interface. But, before you can do that, you will need to create a database table to hold your notifications. You may use the notifications:table command to generate a migration with the proper table schema:

```
php artisan notifications:table
php artisan migrate
```

## **Formatting Database Notifications**

If a notification supports being stored in a database table, you should define a toDatabase or toArray method on the notification class. This method will receive a \$notifiable entity and should return a plain PHP array. The returned array will be encoded as JSON and stored in the data column of your notifications table. Let's take a look at an example toArray method:

```
/**
  * Get the array representation of the notification.
  * @param mixed $notifiable
  * @return array
  */
public function toArray($notifiable)
{
    return [
          'invoice_id' => $this->invoice->id,
          'amount' => $this->invoice->amount,
    ];
}
```

### toDatabase Vs. toArray

The toArray method is also used by the broadcast channel to determine which data to broadcast to your JavaScript client. If you would like to have two different array representations for the database and broadcast channels, you should define a toDatabase method instead of a toArray method.

# **Accessing The Notifications**

Once notifications are stored in the database, you need a convenient way to access them from your notifiable entities. The <code>Illuminate\Notifications\Notifiable</code> trait, which is included on Laravel's default App\User model, includes a notifications Eloquent relationship that returns the notifications for the entity. To fetch notifications, you may access this method like any other Eloquent relationship. By default, notifications will be sorted by the <code>created\_at</code> timestamp:

```
$user = App\User::find(1);
foreach ($user->notifications as $notification) {
   echo $notification->type;
}
```

If you want to retrieve only the "unread" notifications, you may use the unreadNotifications relationship. Again, these notifications will be sorted by the created\_at timestamp:

```
$user = App\User::find(1);
foreach ($user->unreadNotifications as $notification) {
    echo $notification->type;
}
```

TIP To access your notifications from your JavaScript client, you should define a notification controller for your application which returns the notifications for a notifiable entity, such as the current user. You may then make an HTTP request to that controller's URI from your JavaScript client.

### **Marking Notifications As Read**

Typically, you will want to mark a notification as "read" when a user views it. The Illuminate\Notifications\Notifiable trait provides a markAsRead method, which updates the read\_at column on the notification's database record:

However, instead of looping through each notification, you may use the markAsRead method directly on a collection of notifications:

```
$user->unreadNotifications->markAsRead();
```

You may also use a mass-update query to mark all of the notifications as read without retrieving them from the database:

```
$user = App\User::find(1);
$user->unreadNotifications()->update(['read_at' => now()]);
```

Of course, you may delete the notifications to remove them from the table entirely:

```
$user->notifications()->delete();
```

### **Broadcast Notifications**

### **Prerequisites**

Before broadcasting notifications, you should configure and be familiar with Laravel's <u>event broadcasting</u> services. Event broadcasting provides a way to react to server-side fired Laravel events from your JavaScript client.

#### **Formatting Broadcast Notifications**

The broadcast channel broadcasts notifications using Laravel's <u>event broadcasting</u> services, allowing your JavaScript client to catch notifications in realtime. If a notification supports broadcasting, you should define a toBroadcast method on the notification class. This method will receive a <code>snotifiable</code> entity and should return a <code>BroadcastMessage</code> instance. The returned data will be encoded as JSON and broadcast to your JavaScript client. Let's take a look at an example toBroadcast method:

 $use \ Illuminate \verb|\Notifications| Messages \verb|\BroadcastMessage|;$ 

### **Broadcast Queue Configuration**

All broadcast notifications are queued for broadcasting. If you would like to configure the queue connection or queue name that is used to queue the broadcast operation, you may use the onconnection and onqueue methods of the BroadcastMessage:

TIP In addition to the data you specify, broadcast notifications will also contain a type field containing the class name of the notification.

### **Listening For Notifications**

Notifications will broadcast on a private channel formatted using a {notifiable}.{id} convention. So, if you are sending a notification to a App\user instance with an ID of 1, the notification will be broadcast on the App.User.1 private channel. When using Laravel Echo, you may easily listen for notifications on a channel using the notification helper method:

```
Echo.private('App.User.' + userId)
    .notification((notification) => {
      console.log(notification.type);
    });
```

#### **Customizing The Notification Channel**

If you would like to customize which channels a notifiable entity receives its broadcast notifications on, you may define a receivesBroadcastNotificationsOn method on the notifiable entity:

```
<?php
namespace App;
use Illuminate\Notifications\Notifiable;
use Illuminate\Broadcasting\PrivateChannel;
use Illuminate\Foundation\Auth\User as Authenticatable;
class User extends Authenticatable
{
    use Notifiable;
    /**
     * The channels the user receives notification broadcasts on.
     *
     * @return string
     */
    public function receivesBroadcastNotificationsOn()
     {
        return 'users.'.$this->id;
     }
}
```

## **SMS Notifications**

### **Prerequisites**

Sending SMS notifications in Laravel is powered by Nexmo. Before you can send notifications via Nexmo, you need to install the nexmo/client Composer package and add a few configuration options to your config/services.php configuration file. You may copy the example configuration below to get started:

```
'nexmo' => [
    'key' => env('NEXMO_KEY'),
    'secret' => env('NEXMO_SECRET'),
    'sms_from' => '15556666666',
],
```

The sms\_from option is the phone number that your SMS messages will be sent from. You should generate a phone number for your application in the Nexmo control panel.

## **Formatting SMS Notifications**

If a notification supports being sent as an SMS, you should define a toNexmo method on the notification class. This method will receive a <code>\$notifiable</code> entity and should return a <code>Illuminate\Notifications\Messages\NexmoMessage</code> instance:

```
/**
  * Get the Nexmo / SMS representation of the notification.
  *
  * @param mixed $notifiable
  * @return NexmoMessage
  */
public function toNexmo($notifiable)
```

#### **Unicode Content**

If your SMS message will contain unicode characters, you should call the unicode method when constructing the NexmoMessage instance:

## **Customizing The "From" Number**

If you would like to send some notifications from a phone number that is different from the phone number specified in your config/services.php file, you may use the from method on a NexmoMessage instance:

## **Routing SMS Notifications**

When sending notifications via the nexmo channel, the notification system will automatically look for a phone\_number attribute on the notifiable entity. If you would like to customize the phone number the notification is delivered to, define a routeNotificationForNexmo method on the entity:

### **Slack Notifications**

## **Prerequisites**

Before you can send notifications via Slack, you must install the Guzzle HTTP library via Composer:

```
composer require guzzlehttp/guzzle
```

You will also need to configure an "Incoming Webhook" integration for your Slack team. This integration will provide you with a URL you may use when routing Slack notifications.

## **Formatting Slack Notifications**

If a notification supports being sent as a Slack message, you should define a toSlack method on the notification class. This method will receive a <code>snotifiable</code> entity and should return a <code>Illuminate\Notifications\Messages\SlackMessage</code> instance. Slack messages may contain text content as well as an "attachment" that formats additional text or an array of fields. Let's take a look at a basic toSlack example:

In this example we are just sending a single line of text to Slack, which will create a message that looks like the following:



\* Get the Slack representation of the notification.

### **Customizing The Sender & Recipient**

You may use the from and to methods to customize the sender and recipient. The from method accepts a username and emoji identifier, while the to method accepts a channel or username:

```
@param mixed $notifiable
   @return SlackMessage
public function toSlack($notifiable)
    return (new SlackMessage)
                 ->from('Ghost',
                                 ':ghost:')
                 ->to('#other')
                 ->content('This will be sent to #other');
}
You may also use an image as your logo instead of an emoji:
 ^{\ast} Get the Slack representation of the notification.
   @param mixed $notifiable
   @return SlackMessage
public function toSlack($notifiable)
    return (new SlackMessage)
                 ->from('Laravel')
                 ->image('https://laravel.com/favicon.png')
                 ->content('This will display the Laravel logo next to the message');
}
```

### **Slack Attachments**

You may also add "attachments" to Slack messages. Attachments provide richer formatting options than simple text messages. In this example, we will send an error notification about an exception that occurred in an application, including a link to view more details about the exception:

```
->attachment(function (\$attachment) use (\$url) {
                    $attachment->title('Exception: File Not Found', $url)
                                ->content('File [background.jpg] was not found.');
                });
}
```

The example above will generate a Slack message that looks like the following:



Laravel BOT 9:12 AM
Whoops! Something went wrong.

Exception: File Not Found
File [background.jpg] was unable to be found.

Attachments also allow you to specify an array of data that should be presented to the user. The given data will be presented in a table-style format for easy reading:

```
^{\star} Get the Slack representation of the notification.
   @param mixed $notifiable
   @return SlackMessage
public function toSlack($notifiable)
    $url = url('/invoices/'.$this->invoice->id);
    return (new SlackMessage)
                 ->success()
                 ->content('One of your invoices has been paid!')
                 ->attachment(function ($attachment) use ($url) {
                    $attachment->title('Invoice 1322', $url)
                                ->fields([
                                      'Title' => 'Server Expenses',
                                     'Amount' => '$1,234',
                                     'Via' => 'American Express',
                                     'Was Overdue' => ':-1:',
                                 ]);
                });
}
```

The example above will create a Slack message that looks like the following:



### Laravel BOT 9:06 AM

One of your invoices has been paid!

### Invoice 1322

Title

Server Expenses

American Express

Amount

\$1,234

Was Overdue



#### **Markdown Attachment Content**

If some of your attachment fields contain Markdown, you may use the markdown method to instruct Slack to parse and display the given attachment fields as Markdown formatted text. The values accepted by this method are: pretext, text, and / or fields. For more information about Slack attachment formatting, check out the Slack API documentation:

```
, * Get the Slack representation of the notification.
  @param mixed $notifiable
  @return SlackMessage
public function toSlack($notifiable)
    $url = url('/exceptions/'.$this->exception->id);
    return (new SlackMessage)
```

### **Routing Slack Notifications**

To route Slack notifications to the proper location, define a routeNotificationForSlack method on your notifiable entity. This should return the webhook URL to which the notification should be delivered. Webhook URLs may be generated by adding an "Incoming Webhook" service to your Slack team:

```
<?php

namespace App;

use Illuminate\Notifications\Notifiable;
use Illuminate\Foundation\Auth\User as Authenticatable;

class User extends Authenticatable
{
    use Notifiable;
    /**
    * Route notifications for the Slack channel.
    *
     * @param \Illuminate\Notifications\Notification $notification
     * @return string
    */
    public function routeNotificationForSlack($notification)
    {
        return 'https://hooks.slack.com/services/...';
    }
}</pre>
```

## **Localizing Notifications**

Laravel allows you to send notifications in a locale other than the current language, and will even remember this locale if the notification is queued.

To accomplish this, the <code>illuminate\Notifications\Notification</code> class offers a locale method to set the desired language. The application will change into this locale when the notification is being formatted and then revert back to the previous locale when formatting is complete:

```
$user->notify((new InvoicePaid($invoice))->locale('es'));
```

Localization of multiple notifiable entries may also be achieved via the Notification facade:

```
Notification::locale('es')->send($users, new InvoicePaid($invoice));
```

#### **User Preferred Locales**

Sometimes, applications store each user's preferred locale. By implementing the HasLocalePreference contract on your notifiable model, you may instruct Laravel to use this stored locale when sending a notification:

```
use Illuminate\Contracts\Translation\HasLocalePreference;

class User extends Model implements HasLocalePreference
{
    /**
    * Get the user's preferred locale.
    *
    * @return string
    */
    public function preferredLocale()
    {
        return $this->locale;
    }
}
```

Once you have implemented the interface, Laravel will automatically use the preferred locale when sending notifications and mailables to the model. Therefore, there is no need to call the locale method when using this interface:

```
$user->notify(new InvoicePaid($invoice));
```

#### **Notification Events**

When a notification is sent, the Illuminate\Notifications\Events\NotificationSent event is fired by the notification system. This contains the "notifiable" entity and the notification instance itself. You may register listeners for this event in your EventServiceProvider:

TIP After registering listeners in your EventServiceProvider, use the event:generate Artisan command to quickly generate listener classes.

Within an event listener, you may access the notifiable, notification, and channel properties on the event to learn more about the notification recipient or the notification itself:

```
/**
  * Handle the event.
  *
  * @param NotificationSent $event
  * @return void
  */
public function handle(NotificationSent $event)
{
    // $event->channel
    // $event->notifiable
    // $event->response
}
```

### **Custom Channels**

Laravel ships with a handful of notification channels, but you may want to write your own drivers to deliver notifications via other channels. Laravel makes it simple. To get started, define a class that contains a send method. The method should receive two arguments: a <code>\$notifiable</code> and a <code>\$notification</code>:

```
<?php

namespace App\Channels;

use Illuminate\Notifications\Notification;

class VoiceChannel
{
    /**
    * Send the given notification.
    *
    * @param mixed $notifiable
    * @param \lluminate\Notifications\Notification $notification
    * @return void
    */
    public function send($notifiable, Notification $notification)
    {
        smessage = $notification->toVoice($notifiable);
        // Send notification to the $notifiable instance...
    }
}
```

Once your notification channel class has been defined, you may return the class name from the via method of any of your notifications:

```
<?php
namespace App\Notifications;
use Illuminate\Bus\Queueable;
use App\Channels\VoiceChannel;
use App\Channels\Messages\VoiceMessage;
use Illuminate\Notifications\Notification;
use Illuminate\Contracts\Queue\ShouldQueue;
class InvoicePaid extends Notification
{
    use Queueable;
    /**</pre>
```

```
* Get the notification channels.

* @param mixed $notifiable
 * @return array|string
 */
public function via($notifiable)
{
    return [VoiceChannel::class];
}

/**
 * Get the voice representation of the notification.
 *
 * @param mixed $notifiable
 * @return VoiceMessage
 */
public function toVoice($notifiable)
{
    // ...
}
```

#### **Digging Deeper**

## **Package Development**

- Introduction
  - o A Note On Facades
- Package Discovery
- Service Providers
- Resources
  - Configuration
  - Migrations
  - o Routes
  - Translations
  - o <u>Views</u>
- Commands
- Public Assets
- Publishing File Groups

#### Introduction

Packages are the primary way of adding functionality to Laravel. Packages might be anything from a great way to work with dates like <u>Carbon</u>, or an entire BDD testing framework like <u>Behat</u>.

Of course, there are different types of packages. Some packages are stand-alone, meaning they work with any PHP framework. Carbon and Behat are examples of stand-alone packages. Any of these packages may be used with Laravel by requesting them in your composer.json file.

On the other hand, other packages are specifically intended for use with Laravel. These packages may have routes, controllers, views, and configuration specifically intended to enhance a Laravel application. This guide primarily covers the development of those packages that are Laravel specific.

#### A Note On Facades

When writing a Laravel application, it generally does not matter if you use contracts or facades since both provide essentially equal levels of testability. However, when writing packages, your package will not typically have access to all of Laravel's testing helpers. If you would like to be able to write your package tests as if they existed inside a typical Laravel application, you may use the Orchestral Testbench package.

#### **Package Discovery**

In a Laravel application's <code>config/app.php</code> configuration file, the providers option defines a list of service providers that should be loaded by Laravel. When someone installs your package, you will typically want your service provider to be included in this list. Instead of requiring users to manually add your service provider to the list, you may define the provider in the <code>extra</code> section of your package's <code>composer.json</code> file. In addition to service providers, you may also list any <code>facades</code> you would like to be registered:

Once your package has been configured for discovery, Laravel will automatically register its service providers and facades when it is installed, creating a convenient installation experience for your package's users.

### **Opting Out Of Package Discovery**

If you are the consumer of a package and would like to disable package discovery for a package, you may list the package name in the extra section of your application's composer.json file:

You may disable package discovery for all packages using the \* character inside of your application's dont-discover directive:

### **Service Providers**

<u>Service providers</u> are the connection points between your package and Laravel. A service provider is responsible for binding things into Laravel's <u>service container</u> and informing Laravel where to load package resources such as views, configuration, and localization files.

A service provider extends the <code>illuminate</code>\support\ServiceProvider class and contains two methods: register and boot. The base <code>ServiceProvider</code> class is located in the <code>illuminate</code>/support Composer package, which you should add to your own package's dependencies. To learn more about the structure and purpose of service providers, check out <a href="their documentation">their documentation</a>.

### Resources

### Configuration

Typically, you will need to publish your package's configuration file to the application's own config directory. This will allow users of your package to easily override your default configuration options. To allow your configuration files to be published, call the publishes method from the boot method of your service provider:

```
/**
  * Perform post-registration booting of services.
  *
  * @return void
  */
public function boot()
{
     $this->publishes([
          __DIR__.'/path/to/config/courier.php' => config_path('courier.php'),
     ]);
}
```

Now, when users of your package execute Laravel's vendor:publish command, your file will be copied to the specified publish location. Of course, once your configuration has been published, its values may be accessed like any other configuration file:

```
$value = config('courier.option');
```

NOTE You should not define Closures in your configuration files. They can not be serialized correctly when users execute the config:cache Artisan command.

### **Default Package Configuration**

You may also merge your own package configuration file with the application's published copy. This will allow your users to define only the options they actually want to override in the published copy of the configuration. To merge the configurations, use the mergeConfigFrom method within your service provider's register method:

NOTE This method only merges the first level of the configuration array. If your users partially define a multi-dimensional configuration array, the missing options will not be merged.

#### Routes

If your package contains routes, you may load them using the loadRoutesFrom method. This method will automatically determine if the application's routes are cached and will not load your routes file if the routes have already been cached:

```
/**
 * Perform post-registration booting of services.
```

```
* @return void
*/
public function boot()
{
    $this->loadRoutesFrom(__DIR__.'/routes.php');
}
```

#### **Migrations**

If your package contains <u>database migrations</u>, you may use the <code>loadMigrationsFrom</code> method to inform Laravel how to load them. The <code>loadMigrationsFrom</code> method accepts the path to your package's migrations as its only argument:

```
/**
    * Perform post-registration booting of services.
    *
    * @return void
    */
public function boot()
{
         $this->loadMigrationsFrom(__DIR__.'/path/to/migrations');
}
```

Once your package's migrations have been registered, they will automatically be run when the php artisan migrate command is executed. You do not need to export them to the application's main database/migrations directory.

#### **Translations**

If your package contains translation files, you may use the loadTranslationsFrom method to inform Laravel how to load them. For example, if your package is named courier, you should add the following to your service provider's boot method:

```
/**
    * Perform post-registration booting of services.
    * @return void
    */
public function boot()
{
        $this->loadTranslationsFrom(__DIR__.'/path/to/translations', 'courier');
}
```

Package translations are referenced using the package::file.line syntax convention. So, you may load the courier package's welcome line from the messages file like so:

```
echo trans('courier::messages.welcome');
```

### **Publishing Translations**

If you would like to publish your package's translations to the application's resources/lang/vendor directory, you may use the service provider's publishes method. The publishes method accepts an array of package paths and their desired publish locations. For example, to publish the translation files for the courier package, you may do the following:

Now, when users of your package execute Laravel's vendor:publish Artisan command, your package's translations will be published to the specified publish location.

#### Views

To register your package's <u>views</u> with Laravel, you need to tell Laravel where the views are located. You may do this using the service provider's <code>loadViewsFrom</code> method. The <code>loadViewsFrom</code> method accepts two arguments: the path to your view templates and your package's name. For example, if your package's name is courier, you would add the following to your service provider's <code>boot</code> method:

```
/**

* Perform post-registration booting of services.
```

```
* @return void
*/
public function boot()
{
    $this->loadViewsFrom(__DIR__.'/path/to/views', 'courier');
}
```

Package views are referenced using the package::view syntax convention. So, once your view path is registered in a service provider, you may load the admin view from the courier package like so:

```
Route::get('admin', function () {
    return view('courier::admin');
});
```

#### **Overriding Package Views**

When you use the <code>loadviewsFrom</code> method, Laravel actually registers two locations for your views: the application's resources/views/vendor directory and the directory you specify. So, using the courier example, Laravel will first check if a custom version of the view has been provided by the developer in <code>resources/views/vendor/courier</code>. Then, if the view has not been customized, Laravel will search the package view directory you specified in your call to <code>loadviewsFrom</code>. This makes it easy for package users to customize / override your package's views.

#### **Publishing Views**

If you would like to make your views available for publishing to the application's resources/views/vendor directory, you may use the service provider's publishes method. The publishes method accepts an array of package view paths and their desired publish locations:

Now, when users of your package execute Laravel's vendor:publish Artisan command, your package's views will be copied to the specified publish location.

### **Commands**

To register your package's Artisan commands with Laravel, you may use the commands method. This method expects an array of command class names. Once the commands have been registered, you may execute them using the <a href="Artisan CLI">Artisan CLI</a>:

### **Public Assets**

Your package may have assets such as JavaScript, CSS, and images. To publish these assets to the application's public directory, use the service provider's publishes method. In this example, we will also add a public asset group tag, which may be used to publish groups of related assets:

```
/**
    * Perform post-registration booting of services.
    *
    * @return void
    */
public function boot()
```

```
{
    $this->publishes([
        __DIR__.'/path/to/assets' => public_path('vendor/courier'),
    ], 'public');
}
```

Now, when your package's users execute the <code>vendor:publish</code> command, your assets will be copied to the specified publish location. Since you will typically need to overwrite the assets every time the package is updated, you may use the --force flag:

```
php artisan vendor:publish --tag=public --force
```

### **Publishing File Groups**

You may want to publish groups of package assets and resources separately. For instance, you might want to allow your users to publish your package's configuration files without being forced to publish your package's assets. You may do this by "tagging" them when calling the publishes method from a package's service provider. For example, let's use tags to define two publish groups in the boot method of a package service provider:

Now your users may publish these groups separately by referencing their tag when executing the vendor:publish command:

```
php artisan vendor:publish --tag=config
```

#### **Digging Deeper**

## Queues

- Introduction
  - o Connections Vs. Queues
  - o Driver Notes & Prerequisites
- Creating Jobs
  - Generating Job Classes
  - Class Structure
- Dispatching Jobs
  - o <u>Delayed Dispatching</u>
  - Job Chaining
  - Customizing The Queue & Connection
  - Specifying Max Job Attempts / Timeout Values
  - Rate Limiting
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- Running The Queue Worker
  - Queue Priorities
  - Queue Workers & Deployment
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- Supervisor Configuration
- Dealing With Failed Jobs
  - Cleaning Up After Failed Jobs
  - Failed Job Events
  - Retrying Failed Jobs
  - o <u>Ignoring Missing Models</u>
- Job Events

### Introduction

TIP Laravel now offers Horizon, a beautiful dashboard and configuration system for your Redis powered queues. Check out the full <u>Horizon documentation</u> for more information.

Laravel queues provide a unified API across a variety of different queue backends, such as Beanstalk, Amazon SQS, Redis, or even a relational database. Queues allow you to defer the processing of a time consuming task, such as sending an email, until a later time. Deferring these time consuming tasks drastically speeds up web requests to your application.

The queue configuration file is stored in <code>config/queue.php</code>. In this file you will find connection configurations for each of the queue drivers that are included with the framework, which includes a database, <a href="Beanstalkd">Beanstalkd</a>, <a href="Amazon SQS">Amazon SQS</a>, <a href="Redia">Redis</a>, and a synchronous driver that will execute jobs immediately (for local use). A null queue driver is also included which discards queued jobs.

### **Connections Vs. Queues**

Before getting started with Laravel queues, it is important to understand the distinction between "connections" and "queues". In your config/queue.php configuration file, there is a connections configuration option. This option defines a particular connection to a backend service such as Amazon SQS, Beanstalk, or Redis. However, any given queue connection may have multiple "queues" which may be thought of as different stacks or piles of queued jobs.

Note that each connection configuration example in the queue configuration file contains a queue attribute. This is the default queue that jobs will be dispatched to when they are sent to a given connection. In other words, if you dispatch a job without explicitly defining which queue it should be dispatched to, the job will be placed on the queue that is defined in the queue attribute of the connection configuration:

```
// This job is sent to the default queue...
Job::dispatch();
// This job is sent to the "emails" queue...
Job::dispatch()->onQueue('emails');
```

Some applications may not need to ever push jobs onto multiple queues, instead preferring to have one simple queue. However, pushing jobs to multiple queues can be especially useful for applications that wish to prioritize or segment how jobs are processed, since the Laravel queue worker allows you to specify which queues it should process by priority. For example, if you push jobs to a high queue, you may run a worker that gives them higher processing priority:

php artisan queue:work --queue=high, default

### **Driver Notes & Prerequisites**

#### **Database**

In order to use the database queue driver, you will need a database table to hold the jobs. To generate a migration that creates this table, run the queue:table Artisan command. Once the migration has been created, you may migrate your database using the migrate command:

```
php artisan queue:table
php artisan migrate
```

#### Redis

In order to use the redis queue driver, you should configure a Redis database connection in your config/database.php configuration file.

#### **Redis Cluster**

If your Redis queue connection uses a Redis Cluster, your queue names must contain a key hash tag. This is required in order to ensure all of the Redis keys for a given queue are placed into the same hash slot:

```
'redis' => [
   'driver' => 'redis',
   'connection' => 'default',
   'queue' => '{default}',
   'retry_after' => 90,
],
```

#### **Blocking**

When using the Redis queue, you may use the block\_for configuration option to specify how long the driver should wait for a job to become available before iterating through the worker loop and re-polling the Redis database.

Adjusting this value based on your queue load can be more efficient than continually polling the Redis database for new jobs. For instance, you may set the value to 5 to indicate that the driver should block for five seconds while waiting for a job to become available:

```
'redis' => [
  'driver' => 'redis',
  'connection' => 'default',
  'queue' => 'default',
  'retry_after' => 90,
  'block_for' => 5,
],
```

NOTE Blocking pop is an experimental feature. There is a small chance that a queued job could be lost if the Redis server or worker crashes at the same time the job is retrieved.

### **Other Driver Prerequisites**

The following dependencies are needed for the listed queue drivers:

- Amazon SQS: aws/aws-sdk-php ~3.0
- Beanstalkd: pda/pheanstalk ~3.0
- Redis: predis/predis ~1.0

### **Creating Jobs**

### **Generating Job Classes**

By default, all of the queueable jobs for your application are stored in the app/Jobs directory. If the app/Jobs directory doesn't exist, it will be created when you run the make: job Artisan command. You may generate a new queued job using the Artisan CLI:

```
php artisan make:job ProcessPodcast
```

The generated class will implement the <code>illuminate\Contracts\Queue\ShouldQueue</code> interface, indicating to Laravel that the job should be pushed onto the queue to run asynchronously.

#### **Class Structure**

Job classes are very simple, normally containing only a handle method which is called when the job is processed by the queue. To get started, let's take a look at an example job class. In this example, we'll pretend we manage a podcast publishing service and need to process the uploaded podcast files before they are published:

```
<?php
namespace App\Jobs;
use App\Podcast;
use App\AudioProcessor;
use Illuminate\Bus\Queueable;
use Illuminate\Queue\SerializesModels;
use Illuminate\Queue\InteractsWithQueue;
use Illuminate\Contracts\Queue\ShouldQueue;
use Illuminate\Foundation\Bus\Dispatchable;
class ProcessPodcast implements ShouldQueue
    use Dispatchable, InteractsWithQueue, Queueable, SerializesModels;
    protected $podcast;
     * Create a new job instance.
       @param Podcast $podcast
      @return void
    public function __construct(Podcast $podcast)
        $this->podcast = $podcast;
    }
     * Execute the job.
       @param AudioProcessor $processor
    public function handle(AudioProcessor $processor)
        // Process uploaded podcast...
    }
}
```

In this example, note that we were able to pass an <u>Eloquent model</u> directly into the queued job's constructor. Because of the <code>SerializesModels</code> trait that the job is using, Eloquent models will be gracefully serialized and unserialized when the job is processing. If your queued job accepts an Eloquent model in its constructor, only the identifier for the model will be serialized onto the queue. When the job is actually handled, the queue system will automatically re-retrieve the full model instance from the database. It's all totally transparent to your application and prevents issues that can arise from serializing full Eloquent model instances.

The handle method is called when the job is processed by the queue. Note that we are able to type-hint dependencies on the handle method of the job. The Laravel <u>service container</u> automatically injects these dependencies.

If you would like to take total control over how the container injects dependencies into the handle method, you may use the container's bindMethod method. The bindMethod method accepts a callback which receives the job and the container. Within the callback, you are free to invoke the handle method however you wish. Typically, you should call this method from a <u>service provider</u>:

```
use App\Jobs\ProcessPodcast;

$this->app->bindMethod(ProcessPodcast::class.'@handle', function ($job, $app) {
    return $job->handle($app->make(AudioProcessor::class));
}):
```

NOTE Binary data, such as raw image contents, should be passed through the base64\_encode function before being passed to a queued job. Otherwise, the job may not properly serialize to JSON when being placed on the queue.

### **Dispatching Jobs**

Once you have written your job class, you may dispatch it using the dispatch method on the job itself. The arguments passed to the dispatch method will be given to the job's constructor:

```
* Store a new podcast.

*
    * @param Request $request
    * @return Response
    */
public function store(Request $request)
{
        // Create podcast...
        ProcessPodcast::dispatch($podcast);
}
```

#### **Delayed Dispatching**

If you would like to delay the execution of a queued job, you may use the delay method when dispatching a job. For example, let's specify that a job should not be available for processing until 10 minutes after it has been dispatched:

NOTE The Amazon SQS queue service has a maximum delay time of 15 minutes.

#### **Job Chaining**

Job chaining allows you to specify a list of queued jobs that should be run in sequence. If one job in the sequence fails, the rest of the jobs will not be run. To execute a queued job chain, you may use the withchain method on any of your dispatchable jobs:

```
ProcessPodcast::withChain([
    new OptimizePodcast,
    new ReleasePodcast
])->dispatch();
```

#### **Chain Connection & Queue**

If you would like to specify the default connection and queue that should be used for the chained jobs, you may use the allonconnection and allonqueue methods. These methods specify the queue connection and queue name that should be used unless the queued job is explicitly assigned a different connection / queue:

```
ProcessPodcast::withChain([
   new OptimizePodcast,
   new ReleasePodcast
])->dispatch()->allOnConnection('redis')->allOnQueue('podcasts');
```

## **Customizing The Queue & Connection**

#### **Dispatching To A Particular Queue**

By pushing jobs to different queues, you may "categorize" your queued jobs and even prioritize how many workers you assign to various queues. Keep in mind, this does not push jobs to different queue "connections" as defined by your queue configuration file, but only to specific queues within a single connection. To specify the queue, use the onqueue method when dispatching the job:

```
<?php
namespace App\Http\Controllers;</pre>
```

```
use App\Jobs\ProcessPodcast;
use Illuminate\Http\Request;
use App\Http\Controllers\Controller;

class PodcastController extends Controller
{
    /**
    * Store a new podcast.
    * @param Request $request
    * @return Response
    */
    public function store(Request $request)
    {
        // Create podcast...
        ProcessPodcast::dispatch($podcast)->onQueue('processing');
     }
}
```

#### **Dispatching To A Particular Connection**

If you are working with multiple queue connections, you may specify which connection to push a job to. To specify the connection, use the onconnection method when dispatching the job:

```
<?php

namespace App\Http\Controllers;

use App\Jobs\ProcessPodcast;
use Illuminate\Http\Request;
use App\Http\Controllers\Controller;

class PodcastController extends Controller
{
    /**
    * Store a new podcast.
    * @param Request $request
    * @return Response
    */
    public function store(Request $request)
{
        // Create podcast...
        ProcessPodcast::dispatch($podcast)->onConnection('sqs');
    }
}
```

Of course, you may chain the onconnection and onqueue methods to specify the connection and the queue for a job:

### Specifying Max Job Attempts / Timeout Values

### Max Attempts

One approach to specifying the maximum number of times a job may be attempted is via the --tries switch on the Artisan command line:

```
php artisan queue:work --tries=3
```

However, you may take a more granular approach by defining the maximum number of attempts on the job class itself. If the maximum number of attempts is specified on the job, it will take precedence over the value provided on the command line:

```
<?php
namespace App\Jobs;
class ProcessPodcast implements ShouldQueue
{
    /**
    * The number of times the job may be attempted.
    *
    * @var int
    */
    public $tries = 5;
}</pre>
```

### **Time Based Attempts**

As an alternative to defining how many times a job may be attempted before it fails, you may define a time at which the job should timeout. This allows a job to be attempted any number of times within a given time frame. To define the time at which a job should timeout, add a retryuntil method to your job class:

```
/**
  * Determine the time at which the job should timeout.
  *
  * @return \DateTime
  */
public function retryUntil()
{
    return now()->addSeconds(5);
}
```

TIP You may also define a retryUntil method on your queued event listeners.

#### Timeout

NOTE The timeout feature is optimized for PHP 7.1+ and the pcnt1 PHP extension.

Likewise, the maximum number of seconds that jobs can run may be specified using the --timeout switch on the Artisan command line:

```
php artisan queue:work --timeout=30
```

However, you may also define the maximum number of seconds a job should be allowed to run on the job class itself. If the timeout is specified on the job, it will take precedence over any timeout specified on the command line:

### **Rate Limiting**

NOTE This feature requires that your application can interact with a **Redis server**.

If your application interacts with Redis, you may throttle your queued jobs by time or concurrency. This feature can be of assistance when your queued jobs are interacting with APIs that are also rate limited.

For example, using the throttle method, you may throttle a given type of job to only run 10 times every 60 seconds. If a lock can not be obtained, you should typically release the job back onto the queue so it can be retried later:

```
Redis::throttle('key')->allow(10)->every(60)->then(function () {
    // Job logic...
}, function () {
    // Could not obtain lock...
    return $this->release(10);
});
```

TIP In the example above, the key may be any string that uniquely identifies the type of job you would like to rate limit. For example, you may wish to construct the key based on the class name of the job and the IDs of the Eloquent models it operates on.

NOTE Releasing a throttled job back onto the queue will still increment the job's total number of attempts.

Alternatively, you may specify the maximum number of workers that may simultaneously process a given job. This can be helpful when a queued job is modifying a resource that should only be modified by one job at a time. For example, using the funnel method, you may limit jobs of a given type to only be processed by one worker at a time:

```
Redis::funnel('key')->limit(1)->then(function () {
    // Job logic...
}, function () {
    // Could not obtain lock...

    return $this->release(10);
});
```

TIP When using rate limiting, the number of attempts your job will need to run successfully can be hard to determine. Therefore, it is useful to combine rate limiting with time based attempts.

### **Error Handling**

If an exception is thrown while the job is being processed, the job will automatically be released back onto the queue so it may be attempted again. The job will continue to be released until it has been attempted the maximum number of times allowed by your application. The maximum number of attempts is defined by the --tries switch used on the queue:work Artisan command. Alternatively, the maximum number of attempts may be defined on the job class itself. More information on running the queue worker can be found below.

### **Running The Queue Worker**

Laravel includes a queue worker that will process new jobs as they are pushed onto the queue. You may run the worker using the queue:work Artisan command. Note that once the queue:work command has started, it will continue to run until it is manually stopped or you close your terminal:

php artisan queue:work

TIP To keep the queue:work process running permanently in the background, you should use a process monitor such as <u>Supervisor</u> to ensure that the queue worker does not stop running.

Remember, queue workers are long-lived processes and store the booted application state in memory. As a result, they will not notice changes in your code base after they have been started. So, during your deployment process, be sure to <u>restart your queue workers</u>.

#### **Specifying The Connection & Queue**

You may also specify which queue connection the worker should utilize. The connection name passed to the work command should correspond to one of the connections defined in your config/queue.php configuration file:

php artisan queue:work redis

You may customize your queue worker even further by only processing particular queues for a given connection. For example, if all of your emails are processed in an emails queue on your redis queue connection, you may issue the following command to start a worker that only processes only that queue:

php artisan queue:work redis --queue=emails

#### **Processing A Single Job**

The --once option may be used to instruct the worker to only process a single job from the queue:

php artisan queue:work --once

#### **Processing All Queued Jobs & Then Exiting**

The --stop-when-empty option may be used to instruct the worker to process all jobs and then exit gracefully. This option can be useful when working Laravel queues within a Docker container if you wish to shutdown the container after the queue is empty:

php artisan queue:work --stop-when-empty

### **Resource Considerations**

Daemon queue workers do not "reboot" the framework before processing each job. Therefore, you should free any heavy resources after each job completes. For example, if you are doing image manipulation with the GD library, you should free the memory with imagedestroy when you are done.

#### **Queue Priorities**

Sometimes you may wish to prioritize how your queues are processed. For example, in your config/queue.php you may set the default queue for your redis connection to low. However, occasionally you may wish to push a job to a high priority queue like so:

```
dispatch((new Job)->onQueue('high'));
```

To start a worker that verifies that all of the high queue jobs are processed before continuing to any jobs on the low queue, pass a comma-delimited list of queue names to the work command:

```
php artisan queue:work --queue=high,low
```

#### **Queue Workers & Deployment**

Since queue workers are long-lived processes, they will not pick up changes to your code without being restarted. So, the simplest way to deploy an application using queue workers is to restart the workers during your deployment process. You may gracefully restart all of the workers by issuing the queue:restart command:

php artisan queue:restart

This command will instruct all queue workers to gracefully "die" after they finish processing their current job so that no existing jobs are lost. Since the queue workers will die when the queue:restart command is executed, you should be running a process manager such as <u>Supervisor</u> to automatically restart the queue workers.

TIP The queue uses the <u>cache</u> to store restart signals, so you should verify a cache driver is properly configured for your application before using this feature.

#### **Job Expirations & Timeouts**

#### Job Expiration

In your config/queue.php configuration file, each queue connection defines a retry\_after option. This option specifies how many seconds the queue connection should wait before retrying a job that is being processed. For example, if the value of retry\_after is set to 90, the job will be released back onto the queue if it has been processing for 90 seconds without being deleted. Typically, you should set the retry\_after value to the maximum number of seconds your jobs should reasonably take to complete processing.

NOTE The only queue connection which does not contain a retry\_after value is Amazon SQS. SQS will retry the job based on the <u>Default Visibility Timeout</u> which is managed within the AWS console.

#### **Worker Timeouts**

The queue:work Artisan command exposes a --timeout option. The --timeout option specifies how long the Laravel queue master process will wait before killing off a child queue worker that is processing a job. Sometimes a child queue process can become "frozen" for various reasons, such as an external HTTP call that is not responding. The --timeout option removes frozen processes that have exceeded that specified time limit:

php artisan queue:work --timeout=60

The retry\_after configuration option and the --timeout CLI option are different, but work together to ensure that jobs are not lost and that jobs are only successfully processed once.

NOTE The --timeout value should always be at least several seconds shorter than your retry\_after configuration value. This will ensure that a worker processing a given job is always killed before the job is retried. If your --timeout option is longer than your retry\_after configuration value, your jobs may be processed twice.

### **Worker Sleep Duration**

When jobs are available on the queue, the worker will keep processing jobs with no delay in between them. However, the sleep option determines how long (in seconds) the worker will "sleep" if there are no new jobs available. While sleeping, the worker will not process any new jobs - the jobs will be processed after the worker wakes up again.

php artisan queue:work --sleep=3

### **Supervisor Configuration**

### **Installing Supervisor**

Supervisor is a process monitor for the Linux operating system, and will automatically restart your queue:work process if it fails. To install Supervisor on Ubuntu, you may use the following command:

sudo apt-get install supervisor

TIP If configuring Supervisor yourself sounds overwhelming, consider using <u>Laravel Forge</u>, which will automatically install and configure Supervisor for your Laravel projects.

#### **Configuring Supervisor**

Supervisor configuration files are typically stored in the /etc/supervisor/conf.d directory. Within this directory, you may create any number of configuration files that instruct supervisor how your processes should be monitored. For example, let's create a laravel-worker.conf file that starts and monitors a queue:work process:

```
[program:laravel-worker]
process_name=%(program_name)s_%(process_num)02d
command=php /home/forge/app.com/artisan queue:work sqs --sleep=3 --tries=3
autostart=true
autorestart=true
user=forge
numprocs=8
redirect_stderr=true
stdout_logfile=/home/forge/app.com/worker.log
```

In this example, the numprocs directive will instruct Supervisor to run 8 queue:work processes and monitor all of them, automatically restarting them if they fail. Of course, you should change the queue:work sqs portion of the command directive to reflect your desired queue connection.

#### **Starting Supervisor**

Once the configuration file has been created, you may update the Supervisor configuration and start the processes using the following commands:

```
sudo supervisorctl reread
sudo supervisorctl update
sudo supervisorctl start laravel-worker:*
```

For more information on Supervisor, consult the Supervisor documentation.

### **Dealing With Failed Jobs**

Sometimes your queued jobs will fail. Don't worry, things don't always go as planned! Laravel includes a convenient way to specify the maximum number of times a job should be attempted. After a job has exceeded this amount of attempts, it will be inserted into the failed\_jobs database table. To create a migration for the failed\_jobs table, you may use the queue:failed-table command:

```
php artisan queue:failed-table
php artisan migrate
```

Then, when running your <u>queue worker</u>, you should specify the maximum number of times a job should be attempted using the --tries switch on the queue:work command. If you do not specify a value for the --tries option, jobs will be attempted indefinitely:

```
php artisan queue:work redis --tries=3
```

### **Cleaning Up After Failed Jobs**

You may define a failed method directly on your job class, allowing you to perform job specific clean-up when a failure occurs. This is the perfect location to send an alert to your users or revert any actions performed by the job. The Exception that caused the job to fail will be passed to the failed method:

```
namespace App\Jobs;
use Exception:
use App\Podcast:
use App\AudioProcessor;
use Illuminate\Bus\Queueable;
use \ Illuminate \verb|\Queue| Serializes Models;
use Illuminate\Oueue\InteractsWithOueue:
use Illuminate\Contracts\Queue\ShouldQueue;
class ProcessPodcast implements ShouldQueue
    use InteractsWithQueue, Queueable, SerializesModels;
    protected $podcast;
     * Create a new job instance.
       @param Podcast $podcast
       @return void
    public function __construct(Podcast $podcast)
        $this->podcast = $podcast;
    }
     * Execute the job.
```

```
* @param AudioProcessor $processor

* @return void

*/
public function handle(AudioProcessor $processor)
{
    // Process uploaded podcast...
}

/**

* The job failed to process.

* * @param Exception $exception

* @return void

*/
public function failed(Exception $exception)
{
    // Send user notification of failure, etc...
}
```

#### **Failed Job Events**

If you would like to register an event that will be called when a job fails, you may use the <code>queue::failing</code> method. This event is a great opportunity to notify your team via email or <a href="Stride">Stride</a>. For example, we may attach a callback to this event from the AppServiceProvider that is included with Laravel:

```
<?php
namespace App\Providers;
use Illuminate\Support\Facades\Queue;
use Illuminate\Queue\Events\JobFailed;
use Illuminate\Support\ServiceProvider;
class AppServiceProvider extends ServiceProvider
       Bootstrap any application services.
       @return void
    public function boot()
        Queue::failing(function (JobFailed $event) {
            // $event->connectionName
            // $event->job
            // $event->exception
        });
    }
     * Register the service provider.
       @return void
    public function register()
        //
    }
}
```

### **Retrying Failed Jobs**

To view all of your failed jobs that have been inserted into your failed\_jobs database table, you may use the queue:failed Artisan command:

```
php artisan queue:failed
```

The queue:failed command will list the job ID, connection, queue, and failure time. The job ID may be used to retry the failed job. For instance, to retry a failed job that has an ID of 5, issue the following command:

```
php artisan queue:retry 5
```

To retry all of your failed jobs, execute the queue:retry command and pass all as the ID:

```
php artisan queue:retry all
```

If you would like to delete a failed job, you may use the queue:forget command:

```
php artisan queue:forget 5
```

To delete all of your failed jobs, you may use the queue:flush command:

```
php artisan queue:flush
```

### **Ignoring Missing Models**

When injecting an Eloquent model into a job, it is automatically serialized before being placed on the queue and restored when the job is processed. However, if the model has been deleted while the job was waiting to be processed by a worker, your job may fail with a ModelNotFoundException.

For convenience, you may choose to automatically delete jobs with missing models by setting your job's deleteWhenMissingModels property to true:

```
/**
  * Delete the job if its models no longer exist.
  *
    @var bool
    */
public $deleteWhenMissingModels = true;
```

### **Job Events**

Using the before and after methods on the Queue <u>facade</u>, you may specify callbacks to be executed before or after a queued job is processed. These callbacks are a great opportunity to perform additional logging or increment statistics for a dashboard. Typically, you should call these methods from a <u>service provider</u>. For example, we may use the AppServiceProvider that is included with Laravel:

```
<?php
namespace App\Providers;
use Illuminate\Support\Facades\Oueue:
use Illuminate\Support\ServiceProvider;
use Illuminate\Queue\Events\JobProcessed;
use Illuminate\Queue\Events\JobProcessing;
class AppServiceProvider extends ServiceProvider
     * Bootstrap any application services.
      @return void
    public function boot()
        Queue::before(function (JobProcessing $event) {
            // $event->connectionName
            // $event->job
            // $event->job->payload()
       });
        Queue::after(function (JobProcessed $event) {
            // $event->connectionName
            // $event->job
            // $event->job->payload()
       });
    }
     * Register the service provider.
       @return void
    public function register()
    }
```

Using the looping method on the Queue <u>facade</u>, you may specify callbacks that execute before the worker attempts to fetch a job from a queue. For example, you might register a Closure to rollback any transactions that were left open by a previously failed job:

```
Queue::looping(function () {
    while (DB::transactionLevel() > 0) {
        DB::rollBack();
    }
});
```

#### **Digging Deeper**

## **Task Scheduling**

- Introduction
- Defining Schedules
  - Scheduling Artisan Commands
  - Scheduling Queued Jobs
  - o Scheduling Shell Commands
  - Schedule Frequency Options
  - <u>Timezones</u>
  - Preventing Task Overlaps
  - Running Tasks On One Server
  - <u>Background Tasks</u>
  - o Maintenance Mode
- Task Output
- Task Hooks

#### Introduction

In the past, you may have generated a Cron entry for each task you needed to schedule on your server. However, this can quickly become a pain, because your task schedule is no longer in source control and you must SSH into your server to add additional Cron entries.

Laravel's command scheduler allows you to fluently and expressively define your command schedule within Laravel itself. When using the scheduler, only a single Cron entry is needed on your server. Your task schedule is defined in the app/Console/Kernel.php file's schedule method. To help you get started, a simple example is defined within the method.

#### **Starting The Scheduler**

When using the scheduler, you only need to add the following Cron entry to your server. If you do not know how to add Cron entries to your server, consider using a service such as <u>Laravel Forge</u> which can manage the Cron entries for you:

```
* * * * cd /path-to-your-project && php artisan schedule:run >> /dev/null 2>&1 \,
```

This Cron will call the Laravel command scheduler every minute. When the schedule:run command is executed, Laravel will evaluate your scheduled tasks and runs the tasks that are due.

### **Defining Schedules**

You may define all of your scheduled tasks in the schedule method of the App\Console\Kernel class. To get started, let's look at an example of scheduling a task. In this example, we will schedule a closure to be called every day at midnight. Within the closure we will execute a database query to clear a table:

```
namespace App\Console;
use Illuminate\Support\Facades\DB;
use Illuminate\Console\Scheduling\Schedule;
use Illuminate\Foundation\Console\Kernel as ConsoleKernel;
class Kernel extends ConsoleKernel
     ^{\star} The Artisan commands provided by your application.
     * @var array
    protected $commands = [
        //
    ];
     ^{\star}\ \mbox{Define} the application's command schedule.
       @param \Illuminate\Console\Scheduling\Schedule $schedule
       @return void
    protected function schedule(Schedule $schedule)
        $schedule->call(function () {
    DB::table('recent_users')->delete();
         })->daily();
```

```
}
```

In addition to scheduling using Closures, you may also use <u>invokable objects</u>. Invokable objects are simple PHP classes that contain an <u>\_\_invoke</u> method:

```
$schedule->call(new DeleteRecentUsers)->daily();
```

#### **Scheduling Artisan Commands**

In addition to scheduling Closure calls, you may also schedule <u>Artisan commands</u> and operating system commands. For example, you may use the command method to schedule an Artisan command using either the command's name or class:

```
$schedule->command('emails:send --force')->daily();
$schedule->command(EmailsCommand::class, ['--force'])->daily();
```

### **Scheduling Queued Jobs**

The job method may be used to schedule a <u>queued job</u>. This method provides a convenient way to schedule jobs without using the call method to manually create Closures to queue the job:

```
$schedule->job(new Heartbeat)->everyFiveMinutes();
// Dispatch the job to the "heartbeats" queue...
$schedule->job(new Heartbeat, 'heartbeats')->everyFiveMinutes();
```

#### **Scheduling Shell Commands**

The exec method may be used to issue a command to the operating system:

```
$schedule->exec('node /home/forge/script.js')->daily();
```

### **Schedule Frequency Options**

Of course, there are a variety of schedules you may assign to your task:

#### Method Description ->cron('\* \* \* \* \*'); Run the task on a custom Cron schedule ->everyMinute(); Run the task every minute ->everyFiveMinutes(); Run the task every five minutes ->everyTenMinutes(); Run the task every ten minutes ->everyFifteenMinutes(); Run the task every fifteen minutes ->everyThirtyMinutes(); Run the task every thirty minutes ->hourly(); Run the task every hour ->hourlyAt(17); Run the task every hour at 17 mins past the hour ->daily(); Run the task every day at midnight ->dailyAt('13:00'); Run the task every day at 13:00 ->twiceDaily(1, 13); Run the task daily at 1:00 & 13:00 ->weekly(); Run the task every week ->weeklyOn(1, '8:00'); Run the task every week on Monday at 8:00 ->monthly(); Run the task every month ->monthlyOn(4, '15:00'); Run the task every month on the 4th at 15:00 ->quarterly(); Run the task every quarter ->vearly(); Run the task every year ->timezone('America/New\_York'); Set the timezone

These methods may be combined with additional constraints to create even more finely tuned schedules that only run on certain days of the week. For example, to schedule a command to run weekly on Monday:

```
// Run once per week on Monday at 1 PM...
$schedule->call(function () {
    //
})->weekly()->mondays()->at('13:00');

// Run hourly from 8 AM to 5 PM on weekdays...
$schedule->command('foo')
    ->weekdays()
```

```
->hourly()
->timezone('America/Chicago')
->between('8:00', '17:00');
```

Below is a list of the additional schedule constraints:

| Method                                   | Description                                       |
|--|---|
| ->weekdays();                            | Limit the task to weekdays                        |
| ->weekends();                            | Limit the task to weekends                        |
| ->sundays();                             | Limit the task to Sunday                          |
| ->mondays();                             | Limit the task to Monday                          |
| ->tuesdays();                            | Limit the task to Tuesday                         |
| ->wednesdays();                          | Limit the task to Wednesday                       |
| ->thursdays();                           | Limit the task to Thursday                        |
| ->fridays();                             | Limit the task to Friday                          |
| ->saturdays();                           | Limit the task to Saturday                        |
| <pre>-&gt;between(\$start, \$end);</pre> | Limit the task to run between start and end times |
| ->when(Closure);                         | Limit the task based on a truth test              |
| <pre>-&gt;environments(\$env);</pre>     | Limit the task to specific environments           |

#### **Between Time Constraints**

The between method may be used to limit the execution of a task based on the time of day:

Similarly, the unlessBetween method can be used to exclude the execution of a task for a period of time:

#### **Truth Test Constraints**

The when method may be used to limit the execution of a task based on the result of a given truth test. In other words, if the given closure returns true, the task will execute as long as no other constraining conditions prevent the task from running:

```
$schedule->command('emails:send')->daily()->when(function () {
    return true;
});
```

The skip method may be seen as the inverse of when. If the skip method returns true, the scheduled task will not be executed:

```
$schedule->command('emails:send')->daily()->skip(function () {
    return true;
});
```

When using chained when methods, the scheduled command will only execute if all when conditions return true.

#### **Environment Constraints**

The environments method may be used to execute tasks only on the given environments:

```
$schedule->command('emails:send')
          ->daily()
          ->environments(['staging', 'production']);
```

### **Timezones**

Using the timezone method, you may specify that a scheduled task's time should be interpreted within a given timezone:

NOTE Remember that some timezones utilize daylight savings time. When daylight saving time changes occur, your scheduled task may run twice or even not run at all. For this reason, we recommend avoiding timezone scheduling when possible.

#### **Preventing Task Overlaps**

By default, scheduled tasks will be run even if the previous instance of the task is still running. To prevent this, you may use the withoutOverlapping method:

```
$schedule->command('emails:send')->withoutOverlapping();
```

In this example, the <code>emails:send</code> Artisan command will be run every minute if it is not already running. The <code>withoutoverlapping</code> method is especially useful if you have tasks that vary drastically in their execution time, preventing you from predicting exactly how long a given task will take.

If needed, you may specify how many minutes must pass before the "without overlapping" lock expires. By default, the lock will expire after 24 hours:

```
$schedule->command('emails:send')->withoutOverlapping(10);
```

### **Running Tasks On One Server**

NOTE To utilize this feature, your application must be using the memcached or redis cache driver as your application's default cache driver. In addition, all servers must be communicating with the same central cache server.

If your application is running on multiple servers, you may limit a scheduled job to only execute on a single server. For instance, assume you have a scheduled task that generates a new report every Friday night. If the task scheduler is running on three worker servers, the scheduled task will run on all three servers and generate the report three times. Not good!

To indicate that the task should run on only one server, use the ononeServer method when defining the scheduled task. The first server to obtain the task will secure an atomic lock on the job to prevent other servers from running the same task at the same time:

#### **Background Tasks**

By default, multiple commands scheduled at the same time will execute sequentially. If you have long-running commands, this may cause subsequent commands to start much later than anticipated. If you would like to run commands in the background so that they may all run simultaneously, you may use the runInBackground method:

#### **Maintenance Mode**

Laravel's scheduled tasks will not run when Laravel is in <u>maintenance mode</u>, since we don't want your tasks to interfere with any unfinished maintenance you may be performing on your server. However, if you would like to force a task to run even in maintenance mode, you may use the evenInMaintenanceMode method:

```
$schedule->command('emails:send')->evenInMaintenanceMode();
```

### Task Output

The Laravel scheduler provides several convenient methods for working with the output generated by scheduled tasks. First, using the sendOutputTo method, you may send the output to a file for later inspection:

If you would like to append the output to a given file, you may use the appendOutputTo method:

```
$schedule->command('emails:send')
          ->daily()
          ->appendOutputTo($filePath);
```

Using the emailoutputTo method, you may e-mail the output to an e-mail address of your choice. Before e-mailing the output of a task, you should configure Laravel's <u>e-mail services</u>:

NOTE The emailOutputTo, sendOutputTo and appendOutputTo methods are exclusive to the command and exec methods.

### **Task Hooks**

Using the before and after methods, you may specify code to be executed before and after the scheduled task is complete:

### **Pinging URLs**

Using the pingBefore and thenPing methods, the scheduler can automatically ping a given URL before or after a task is complete. This method is useful for notifying an external service, such as <u>Laravel Envoyer</u>, that your scheduled task is commencing or has finished execution:

The pingBeforeIf and thenPingIf methods may be used to ping a given URL only if the given condition is true:

```
$schedule->command('emails:send')
    ->daily()
    ->pingBeforeIf($condition, $url)
    ->thenPingIf($condition, $url);
```

All of the ping methods require the Guzzle HTTP library. You can add Guzzle to your project using the Composer package manager:

```
composer require guzzlehttp/guzzle
```

#### **Database**

# **Database: Getting Started**

- Introduction
  - Configuration
  - Read & Write Connections
  - Using Multiple Database Connections
- Running Raw SQL Queries
  - Listening For Query Events
- Database Transactions

### Introduction

Laravel makes interacting with databases extremely simple across a variety of database backends using either raw SQL, the <u>fluent query builder</u>, and the <u>Eloquent ORM</u>. Currently, Laravel supports four databases:

- MySQL
- PostgreSQL
- SQLite
- SQL Server

#### Configuration

The database configuration for your application is located at config/database.php. In this file you may define all of your database connections, as well as specify which connection should be used by default. Examples for most of the supported database systems are provided in this file.

By default, Laravel's sample environment configuration is ready to use with Laravel Homestead, which is a convenient virtual machine for doing Laravel development on your local machine. Of course, you are free to modify this configuration as needed for your local database.

### **SQLite Configuration**

After creating a new SQLite database using a command such as touch database.sqlite, you can easily configure your environment variables to point to this newly created database by using the database's absolute path:

```
DB_CONNECTION=sqlite
DB_DATABASE=/absolute/path/to/database.sqlite
```

To enable foreign key constraints for SQLite connections, you should add the foreign\_key\_constraints option to your config/database.php configuration file:

```
'sqlite' => [
   // ...
  'foreign_key_constraints' => true,
],
```

### **Read & Write Connections**

Sometimes you may wish to use one database connection for SELECT statements, and another for INSERT, UPDATE, and DELETE statements. Laravel makes this a breeze, and the proper connections will always be used whether you are using raw queries, the query builder, or the Eloquent ORM.

To see how read / write connections should be configured, let's look at this example:

```
'mysql' => [
    'read' => [
        'host' => ['192.168.1.1'],
],
    'write' => [
        'host' => ['196.168.1.2'],
],
    'sticky' => true,
        'driver' => 'mysql',
        'database' => 'database',
        'username' => 'root',
        'password' => '',
        'charset' => 'utf8mb4',
        'collation' => 'utf8mb4_unicode_ci',
        'prefix' => '',
],
```

Note that three keys have been added to the configuration array: read, write and sticky. The read and write keys have array values containing a single key: host. The rest of the database options for the read and write connections will be merged from the main mysql array.

You only need to place items in the read and write arrays if you wish to override the values from the main array. So, in this case, 192.168.1.1 will be used as the host for the "read" connection, while 192.168.1.2 will be used for the "write" connection. The database credentials, prefix, character set, and all other options in the main mysql array will be shared across both connections.

#### The sticky Option

The sticky option is an *optional* value that can be used to allow the immediate reading of records that have been written to the database during the current request cycle. If the sticky option is enabled and a "write" operation has been performed against the database during the current request cycle, any further "read" operations will use the "write" connection. This ensures that any data written during the request cycle can be immediately read back from the database during that same request. It is up to you to decide if this is the desired behavior for your application.

#### **Using Multiple Database Connections**

When using multiple connections, you may access each connection via the connection method on the DB facade. The name passed to the connection method should correspond to one of the connections listed in your config/database.php configuration file:

```
$users = DB::connection('foo')->select(...);
```

You may also access the raw, underlying PDO instance using the getPdo method on a connection instance:

```
$pdo = DB::connection()->getPdo();
```

## **Running Raw SQL Queries**

Once you have configured your database connection, you may run queries using the DB facade. The DB facade provides methods for each type of query: select, update, insert, delete, and statement.

#### **Running A Select Query**

To run a basic query, you may use the  $\mathsf{select}$  method on the  $\mathsf{DB}$  facade:

The first argument passed to the select method is the raw SQL query, while the second argument is any parameter bindings that need to be bound to the query. Typically, these are the values of the where clause constraints. Parameter binding provides protection against SQL injection.

The select method will always return an array of results. Each result within the array will be a PHP stdClass object, allowing you to access the values of the results:

```
foreach ($users as $user) {
    echo $user->name;
}
```

### **Using Named Bindings**

Instead of using? to represent your parameter bindings, you may execute a query using named bindings:

```
$results = DB::select('select * from users where id = :id', ['id' => 1]);
```

#### **Running An Insert Statement**

To execute an insert statement, you may use the insert method on the DB facade. Like select, this method takes the raw SQL query as its first argument and bindings as its second argument:

```
DB::insert('insert into users (id, name) values (?, ?)', [1, 'Dayle']);
```

#### **Running An Update Statement**

The update method should be used to update existing records in the database. The number of rows affected by the statement will be returned:

```
$affected = DB::update('update users set votes = 100 where name = ?', ['John']);
```

#### **Running A Delete Statement**

The delete method should be used to delete records from the database. Like update, the number of rows affected will be returned:

```
$deleted = DB::delete('delete from users');
```

#### **Running A General Statement**

Some database statements do not return any value. For these types of operations, you may use the statement method on the DB facade:

```
DB::statement('drop table users');
```

### **Listening For Query Events**

If you would like to receive each SQL query executed by your application, you may use the listen method. This method is useful for logging queries or debugging. You may register your query listener in a service provider:

```
namespace App\Providers;
use Illuminate\Support\Facades\DB;
use Illuminate\Support\ServiceProvider;
class AppServiceProvider extends ServiceProvider
     * Bootstrap any application services.
     * @return void
    public function boot()
        DB::listen(function ($query) {
            // $query->sql
            // $query->bindings
            // $query->time
        });
    }
     ^{\star} Register the service provider.
       @return void
    public function register()
    }
```

### **Database Transactions**

You may use the transaction method on the DB facade to run a set of operations within a database transaction. If an exception is thrown within the transaction closure, the transaction will automatically be rolled back. If the closure executes successfully, the transaction will automatically be committed. You don't need to worry about manually rolling back or committing while using the transaction method:

```
DB::transaction(function () {
    DB::table('users')->update(['votes' => 1]);

DB::table('posts')->delete();
```

});

#### **Handling Deadlocks**

The transaction method accepts an optional second argument which defines the number of times a transaction should be reattempted when a deadlock occurs. Once these attempts have been exhausted, an exception will be thrown:

```
DB::transaction(function () {
    DB::table('users')->update(['votes' => 1]);
    DB::table('posts')->delete();
}, 5);
```

### **Manually Using Transactions**

If you would like to begin a transaction manually and have complete control over rollbacks and commits, you may use the beginTransaction method on the DB facade:

```
DB::beginTransaction();
```

You can rollback the transaction via the rollback method:

```
DB::rollBack();
```

Lastly, you can commit a transaction via the commit method:

```
DB::commit();
```

TIP The DB facade's transaction methods control the transactions for both the query builder and Eloquent ORM.

#### **Database**

# **Database: Query Builder**

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- Deletes
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### Introduction

Laravel's database query builder provides a convenient, fluent interface to creating and running database queries. It can be used to perform most database operations in your application and works on all supported database systems.

The Laravel query builder uses PDO parameter binding to protect your application against SQL injection attacks. There is no need to clean strings being passed as bindings.

### **Retrieving Results**

#### Retrieving All Rows From A Table

You may use the table method on the DB facade to begin a query. The table method returns a fluent query builder instance for the given table, allowing you to chain more constraints onto the query and then finally get the results using the get method:

The get method returns an Illuminate\Support\Collection containing the results where each result is an instance of the PHP stdClass object. You may access each column's value by accessing the column as a property of the object:

```
foreach ($users as $user) {
    echo $user->name;
}
```

#### Retrieving A Single Row / Column From A Table

If you just need to retrieve a single row from the database table, you may use the first method. This method will return a single

```
stdClass object:
```

```
$user = DB::table('users')->where('name', 'John')->first();
echo $user->name;
```

If you don't even need an entire row, you may extract a single value from a record using the value method. This method will return the value of the column directly:

```
$email = DB::table('users')->where('name', 'John')->value('email');
```

#### **Retrieving A List Of Column Values**

If you would like to retrieve a Collection containing the values of a single column, you may use the pluck method. In this example, we'll retrieve a Collection of role titles:

```
$titles = DB::table('roles')->pluck('title');
foreach ($titles as $title) {
    echo $title;
}

You may also specify a custom key column for the returned Collection:
$roles = DB::table('roles')->pluck('title', 'name');
foreach ($roles as $name => $title) {
```

#### **Chunking Results**

echo \$title;

If you need to work with thousands of database records, consider using the chunk method. This method retrieves a small chunk of the results at a time and feeds each chunk into a closure for processing. This method is very useful for writing Artisan commands that process thousands of records. For example, let's work with the entire users table in chunks of 100 records at a time:

```
DB::table('users')->orderBy('id')->chunk(100, function ($users) {
    foreach ($users as $user) {
        //
    }
});
```

You may stop further chunks from being processed by returning false from the Closure:

```
DB::table('users')->orderBy('id')->chunk(100, function ($users) {
    // Process the records...
    return false;
});
```

If you are updating database records while chunking results, your chunk results could change in unexpected ways. So, when updating records while chunking, it is always best to use the chunkById method instead. This method will automatically paginate the results based on the record's primary key:

NOTE When updating or deleting records inside the chunk callback, any changes to the primary key or foreign keys could affect the chunk query. This could potentially result in records not being included in the chunked results.

### **Aggregates**

The query builder also provides a variety of aggregate methods such as count, max, min, avg, and sum. You may call any of these methods after constructing your query:

```
$users = DB::table('users')->count();
$price = DB::table('orders')->max('price');
```

Of course, you may combine these methods with other clauses:

```
->avg('price');
```

#### **Determining If Records Exist**

Instead of using the count method to determine if any records exist that match your query's constraints, you may use the exists and doesntExist methods:

```
return DB::table('orders')->where('finalized', 1)->exists();
return DB::table('orders')->where('finalized', 1)->doesntExist();
```

#### Selects

### **Specifying A Select Clause**

Of course, you may not always want to select all columns from a database table. Using the select method, you can specify a custom select clause for the query:

```
$users = DB::table('users')->select('name', 'email as user_email')->get();
```

The distinct method allows you to force the query to return distinct results:

```
$users = DB::table('users')->distinct()->get();
```

If you already have a query builder instance and you wish to add a column to its existing select clause, you may use the addSelect method:

```
$query = DB::table('users')->select('name');
$users = $query->addSelect('age')->get();
```

### Raw Expressions

Sometimes you may need to use a raw expression in a query. To create a raw expression, you may use the DB::raw method:

NOTE Raw statements will be injected into the query as strings, so you should be extremely careful to not create SQL injection vulnerabilities.

### **Raw Methods**

Instead of using DB::raw, you may also use the following methods to insert a raw expression into various parts of your query.

#### selectRaw

The selectRaw method can be used in place of select(DB::raw(...)). This method accepts an optional array of bindings as its second argument:

### whereRaw / orWhereRaw

The whereRaw and orWhereRaw methods can be used to inject a raw where clause into your query. These methods accept an optional array of bindings as their second argument:

#### havingRaw / orHavingRaw

The havingRaw and orHavingRaw methods may be used to set a raw string as the value of the having clause. These methods accept an optional array of bindings as their second argument:

```
->havingRaw('SUM(price) > ?', [2500])
->get();
```

#### orderByRaw

The orderByRaw method may be used to set a raw string as the value of the order by clause:

#### **Joins**

#### **Inner Join Clause**

The query builder may also be used to write join statements. To perform a basic "inner join", you may use the join method on a query builder instance. The first argument passed to the join method is the name of the table you need to join to, while the remaining arguments specify the column constraints for the join. Of course, as you can see, you can join to multiple tables in a single query:

```
$users = DB::table('users')
    ->join('contacts', 'users.id', '=', 'contacts.user_id')
    ->join('orders', 'users.id', '=', 'orders.user_id')
    ->select('users.*', 'contacts.phone', 'orders.price')
    ->qet();
```

#### Left Join / Right Join Clause

If you would like to perform a "left join" or "right join" instead of an "inner join", use the leftJoin or rightJoin methods. These methods have the same signature as the join method:

#### **Cross Join Clause**

To perform a "cross join" use the crossJoin method with the name of the table you wish to cross join to. Cross joins generate a cartesian product between the first table and the joined table:

#### **Advanced Join Clauses**

You may also specify more advanced join clauses. To get started, pass a Closure as the second argument into the join method. The Closure will receive a JoinClause object which allows you to specify constraints on the join clause:

If you would like to use a "where" style clause on your joins, you may use the where and orwhere methods on a join. Instead of comparing two columns, these methods will compare the column against a value:

#### **Sub-Query Joins**

You may use the joinSub, leftJoinSub, and rightJoinSub methods to join a query to a sub-query. Each of these methods receive three arguments: the sub-query, its table alias, and a Closure that defines the related columns:

```
$latestPosts = DB::table('posts')
```

#### Unions

The query builder also provides a quick way to "union" two queries together. For example, you may create an initial query and use the union method to union it with a second query:

TIP The unionAll method is also available and has the same method signature as union.

#### Where Clauses

#### **Simple Where Clauses**

You may use the where method on a query builder instance to add where clauses to the query. The most basic call to where requires three arguments. The first argument is the name of the column. The second argument is an operator, which can be any of the database's supported operators. Finally, the third argument is the value to evaluate against the column.

For example, here is a query that verifies the value of the "votes" column is equal to 100:

```
$users = DB::table('users')->where('votes', '=', 100)->get();
```

For convenience, if you want to verify that a column is equal to a given value, you may pass the value directly as the second argument to the where method:

```
$users = DB::table('users')->where('votes', 100)->get();
```

Of course, you may use a variety of other operators when writing a where clause:

You may also pass an array of conditions to the where function:

### Or Statements

You may chain where constraints together as well as add or clauses to the query. The orWhere method accepts the same arguments as the where method:

```
$users = DB::table('users')
    ->where('votes', '>', 100)
    ->orWhere('name', 'John')
    ->qet();
```

#### **Additional Where Clauses**

### whereBetween

The whereBetween method verifies that a column's value is between two values:

#### whereNotBetween

The whereNotBetween method verifies that a column's value lies outside of two values:

#### whereIn / whereNotIn

The whereIn method verifies that a given column's value is contained within the given array:

The whereNotIn method verifies that the given column's value is **not** contained in the given array:

#### whereNull / whereNotNull

The whereNull method verifies that the value of the given column is NULL:

The whereNotNull method verifies that the column's value is not NULL:

### whereDate / whereMonth / whereDay / whereYear / whereTime

The where  $\mbox{\tt Date}$  method may be used to compare a column's value against a date:

The where Month method may be used to compare a column's value against a specific month of a year:

The wherebay method may be used to compare a column's value against a specific day of a month:

The where Year method may be used to compare a column's value against a specific year:

The whereTime method may be used to compare a column's value against a specific time:

#### whereColumn

The where  ${\tt Column}$  method may be used to verify that two columns are equal:

You may also pass a comparison operator to the method:

The wherecolumn method can also be passed an array of multiple conditions. These conditions will be joined using the and operator:

#### **Parameter Grouping**

Sometimes you may need to create more advanced where clauses such as "where exists" clauses or nested parameter groupings. The Laravel query builder can handle these as well. To get started, let's look at an example of grouping constraints within parenthesis:

As you can see, passing a closure into the where method instructs the query builder to begin a constraint group. The closure will receive a query builder instance which you can use to set the constraints that should be contained within the parenthesis group. The example above will produce the following SQL:

```
select * from users where name = 'John' and (votes > 100 or title = 'Admin')
```

TIP You should always group orwhere calls in order to avoid unexpected behavior when global scopes are applied.

#### Where Exists Clauses

The whereExists method allows you to write where exists SQL clauses. The whereExists method accepts a closure argument, which will receive a query builder instance allowing you to define the query that should be placed inside of the "exists" clause:

The query above will produce the following SQL:

```
select * from users
where exists (
    select 1 from orders where orders.user_id = users.id
)
```

### JSON Where Clauses

Laravel also supports querying JSON column types on databases that provide support for JSON column types. Currently, this includes MySQL 5.7, PostgreSQL, SQL Server 2016, and SQLite 3.9.0 (with the <u>JSON1 extension</u>). To query a JSON column, use the -> operator:

You may use where  ${\tt JsonContains}$  to query  ${\tt JSON}$  arrays (not supported on  ${\tt SQLite})$  :

 $MySQL \ and \ PostgreSQL \ support \ where \texttt{JsonContains} \ with \ multiple \ values:$ 

```
->get();
```

You may use where Json Length to query JSON arrays by their length:

# Ordering, Grouping, Limit, & Offset

#### orderBy

The orderBy method allows you to sort the result of the query by a given column. The first argument to the orderBy method should be the column you wish to sort by, while the second argument controls the direction of the sort and may be either asc or desc:

#### latest / oldest

The latest and oldest methods allow you to easily order results by date. By default, result will be ordered by the created\_at column. Or, you may pass the column name that you wish to sort by:

#### inRandomOrder

The inRandomOrder method may be used to sort the query results randomly. For example, you may use this method to fetch a random user:

#### groupBy / having

The groupBy and having methods may be used to group the query results. The having method's signature is similar to that of the where method:

You may pass multiple arguments to the groupBy method to group by multiple columns:

For more advanced having statements, see the  $\underline{\text{havingRaw}}$  method.

#### skip / take

To limit the number of results returned from the query, or to skip a given number of results in the query, you may use the skip and take methods:

```
susers = DB::table('users')->skip(10)->take(5)->get();
```

Alternatively, you may use the limit and offset methods:

#### **Conditional Clauses**

Sometimes you may want clauses to apply to a query only when something else is true. For instance you may only want to apply a where statement if a given input value is present on the incoming request. You may accomplish this using the when method:

The when method only executes the given Closure when the first parameter is true. If the first parameter is false, the Closure will not be executed.

You may pass another Closure as the third parameter to the when method. This Closure will execute if the first parameter evaluates as false. To illustrate how this feature may be used, we will use it to configure the default sorting of a query:

#### **Inserts**

The query builder also provides an insert method for inserting records into the database table. The insert method accepts an array of column names and values:

```
DB::table('users')->insert(
    ['email' => 'john@example.com', 'votes' => 0]
):
```

You may even insert several records into the table with a single call to insert by passing an array of arrays. Each array represents a row to be inserted into the table:

```
DB::table('users')->insert([
    ['email' => 'taylor@example.com', 'votes' => 0],
    ['email' => 'dayle@example.com', 'votes' => 0]
]);
```

#### **Auto-Incrementing IDs**

If the table has an auto-incrementing id, use the insertGetId method to insert a record and then retrieve the ID:

```
$id = DB::table('users')->insertGetId(
    ['email' => 'john@example.com', 'votes' => 0]
);
```

NOTE When using PostgreSQL the insertGetId method expects the auto-incrementing column to be named id. If you would like to retrieve the ID from a different "sequence", you may pass the column name as the second parameter to the insertGetId method.

# **Updates**

Of course, in addition to inserting records into the database, the query builder can also update existing records using the update method. The update method, like the insert method, accepts an array of column and value pairs containing the columns to be updated. You may constrain the update query using where clauses:

#### **Updating JSON Columns**

When updating a JSON column, you should use -> syntax to access the appropriate key in the JSON object. This operation is only supported on MySQL 5.7+:

```
DB::table('users')
          ->where('id', 1)
           ->update(['options->enabled' => true]);
```

#### **Increment & Decrement**

The query builder also provides convenient methods for incrementing or decrementing the value of a given column. This is a shortcut, providing a more expressive and terse interface compared to manually writing the update statement.

Both of these methods accept at least one argument: the column to modify. A second argument may optionally be passed to control the amount by which the column should be incremented or decremented:

```
DB::table('users')->increment('votes');
DB::table('users')->increment('votes', 5);
DB::table('users')->decrement('votes');
DB::table('users')->decrement('votes', 5);
```

You may also specify additional columns to update during the operation:

```
DB::table('users')->increment('votes', 1, ['name' => 'John']);
```

#### **Deletes**

The query builder may also be used to delete records from the table via the delete method. You may constrain delete statements by adding where clauses before calling the delete method:

```
DB::table('users')->delete();
DB::table('users')->where('votes', '>', 100)->delete();
```

If you wish to truncate the entire table, which will remove all rows and reset the auto-incrementing ID to zero, you may use the truncate method:

```
DB::table('users')->truncate();
```

# **Pessimistic Locking**

The query builder also includes a few functions to help you do "pessimistic locking" on your select statements. To run the statement with a "shared lock", you may use the sharedLock method on a query. A shared lock prevents the selected rows from being modified until your transaction commits:

```
DB::table('users')->where('votes', '>', 100)->sharedLock()->get();
```

Alternatively, you may use the lockForUpdate method. A "for update" lock prevents the rows from being modified or from being selected with another shared lock:

```
DB::table('users')->where('votes', '>', 100)->lockForUpdate()->get();
```

#### **Database**

# **Database: Pagination**

- Introduction
- Basic Usage
  - o Paginating Query Builder Results
  - Paginating Eloquent Results
  - o Manually Creating A Paginator
- Displaying Pagination Results
  - o Converting Results To JSON
- Customizing The Pagination View
- Paginator Instance Methods

# Introduction

In other frameworks, pagination can be very painful. Laravel's paginator is integrated with the <u>query builder</u> and <u>Eloquent ORM</u> and provides convenient, easy-to-use pagination of database results out of the box. The HTML generated by the paginator is compatible with the <u>Bootstrap CSS framework</u>.

#### **Basic Usage**

#### **Paginating Query Builder Results**

There are several ways to paginate items. The simplest is by using the paginate method on the <u>query builder</u> or an <u>Eloquent</u> <u>query</u>. The paginate method automatically takes care of setting the proper limit and offset based on the current page being viewed by the user. By default, the current page is detected by the value of the page query string argument on the HTTP request. Of course, this value is automatically detected by Laravel, and is also automatically inserted into links generated by the paginator.

In this example, the only argument passed to the paginate method is the number of items you would like displayed "per page". In this case, let's specify that we would like to display 15 items per page:

```
ramespace App\Http\Controllers;

use Illuminate\Support\Facades\DB;
use App\Http\Controllers\Controller;

class UserController extends Controller

{
    /**
     * Show all of the users for the application.
     *
     * @return Response
     */
    public function index()
     {
          $users = DB::table('users')->paginate(15);
          return view('user.index', ['users' => $users]);
     }
}
```

NOTE Currently, pagination operations that use a groupBy statement cannot be executed efficiently by Laravel. If you need to use a groupBy with a paginated result set, it is recommended that you query the database and create a paginator manually.

#### "Simple Pagination"

If you only need to display simple "Next" and "Previous" links in your pagination view, you may use the simplePaginate method to perform a more efficient query. This is very useful for large datasets when you do not need to display a link for each page number when rendering your view:

```
$users = DB::table('users')->simplePaginate(15);
```

#### **Paginating Eloquent Results**

You may also paginate <u>Eloquent</u> queries. In this example, we will paginate the user model with 15 items per page. As you can see, the syntax is nearly identical to paginating query builder results:

```
$users = App\User::paginate(15);
```

Of course, you may call paginate after setting other constraints on the query, such as where clauses:

```
$users = User::where('votes', '>', 100)->paginate(15);
```

You may also use the simplePaginate method when paginating Eloquent models:

```
$users = User::where('votes', '>', 100)->simplePaginate(15);
```

#### **Manually Creating A Paginator**

Sometimes you may wish to create a pagination instance manually, passing it an array of items. You may do so by creating either an Illuminate\Pagination\Paginator or Illuminate\Pagination\LengthAwarePaginator instance, depending on your needs.

The Paginator class does not need to know the total number of items in the result set; however, because of this, the class does not have methods for retrieving the index of the last page. The LengthAwarePaginator accepts almost the same arguments as the Paginator; however, it does require a count of the total number of items in the result set.

In other words, the Paginator corresponds to the simplePaginate method on the query builder and Eloquent, while the LengthAwarePaginator corresponds to the paginate method.

NOTE When manually creating a paginator instance, you should manually "slice" the array of results you pass to the paginator. If you're unsure how to do this, check out the <u>array slice</u> PHP function.

# **Displaying Pagination Results**

When calling the paginate method, you will receive an instance of Illuminate\Pagination\LengthawarePaginator. When calling the simplePaginate method, you will receive an instance of Illuminate\Pagination\Paginator. These objects provide several methods that describe the result set. In addition to these helpers methods, the paginator instances are iterators and may be looped as an array. So, once you have retrieved the results, you may display the results and render the page links using Blade:

```
<div class="container">
    @foreach ($users as $user)
         {{ $user->name }}
    @endforeach
</div>
{{ $users->links() }}
```

The links method will render the links to the rest of the pages in the result set. Each of these links will already contain the proper page query string variable. Remember, the HTML generated by the links method is compatible with the <a href="Bootstrap CSS">Bootstrap CSS</a> framework.

#### **Customizing The Paginator URI**

The withPath method allows you to customize the URI used by the paginator when generating links. For example, if you want the paginator to generate links like http://example.com/custom/url?page=N, you should pass custom/url to the withPath method:

```
Route::get('users', function () {
    $users = App\User::paginate(15);
    $users->withPath('custom/url');
    //
});
```

#### **Appending To Pagination Links**

You may append to the query string of pagination links using the appends method. For example, to append sort=votes to each pagination link, you should make the following call to appends:

```
{{ $users->appends(['sort' => 'votes'])->links() }}
```

If you wish to append a "hash fragment" to the paginator's URLs, you may use the fragment method. For example, to append #foo to the end of each pagination link, make the following call to the fragment method:

```
{{ $users->fragment('foo')->links() }}
```

#### **Adjusting The Pagination Link Window**

You may control how many additional links are displayed on each side of the paginator's URL "window". By default, three links are displayed on each side of the primary paginator links. However, you may control this number using the onEachSide method:

```
{{ $users->onEachSide(5)->links() }}
```

#### **Converting Results To JSON**

The Laravel paginator result classes implement the <code>illuminate\Contracts\Support\Jsonable</code> Interface contract and expose the toJson method, so it's very easy to convert your pagination results to JSON. You may also convert a paginator instance to JSON by returning it from a route or controller action:

```
Route::get('users', function () {
    return App\User::paginate();
});
```

The JSON from the paginator will include meta information such as total, current\_page, last\_page, and more. The actual result objects will be available via the data key in the JSON array. Here is an example of the JSON created by returning a paginator instance from a route:

# **Customizing The Pagination View**

By default, the views rendered to display the pagination links are compatible with the Bootstrap CSS framework. However, if you are not using Bootstrap, you are free to define your own views to render these links. When calling the links method on a paginator instance, pass the view name as the first argument to the method:

```
{{ $paginator->links('view.name') }}
// Passing data to the view...
{{ $paginator->links('view.name', ['foo' => 'bar']) }}
```

However, the easiest way to customize the pagination views is by exporting them to your resources/views/vendor directory using the vendor:publish command:

```
php artisan vendor:publish --tag=laravel-pagination
```

This command will place the views in the resources/views/vendor/pagination directory. The bootstrap-4.blade.php file within this directory corresponds to the default pagination view. You may edit this file to modify the pagination HTML.

If you would like to designate a different file as the default pagination view, you may use the paginator's defaultView and defaultSimpleView methods within your AppServiceProvider:

```
use Illuminate\Pagination\Paginator;
public function boot()
{
    Paginator::defaultView('view-name');
    Paginator::defaultSimpleView('view-name');
}
```

#### **Paginator Instance Methods**

Each paginator instance provides additional pagination information via the following methods:

```
$results->count()
$results->currentPage()
$results->firstItem()
$results->hasMorePages()
$results->lastItem()
$results->lastPage() (Not available when using simplePaginate)
```

- \$results->nextPageUrl()
- \$results->onFirstPage()
- \$results->perPage()
- \$results->previousPageUrl()
- \$results->total() (Not available when using simplePaginate)
- \$results->url(\$page)

#### **Database**

# **Database: Migrations**

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#### Introduction

Migrations are like version control for your database, allowing your team to easily modify and share the application's database schema. Migrations are typically paired with Laravel's schema builder to easily build your application's database schema. If you have ever had to tell a teammate to manually add a column to their local database schema, you've faced the problem that database migrations solve.

The Laravel schema <u>facade</u> provides database agnostic support for creating and manipulating tables across all of Laravel's supported database systems.

# **Generating Migrations**

To create a migration, use the make: migration Artisan command:

```
php artisan make:migration create_users_table
```

The new migration will be placed in your database/migrations directory. Each migration file name contains a timestamp which allows Laravel to determine the order of the migrations.

The --table and --create options may also be used to indicate the name of the table and whether the migration will be creating a new table. These options pre-fill the generated migration stub file with the specified table:

```
php artisan make:migration create_users_table --create=users
php artisan make:migration add_votes_to_users_table --table=users
```

If you would like to specify a custom output path for the generated migration, you may use the --path option when executing the make:migration command. The given path should be relative to your application's base path.

#### **Migration Structure**

A migration class contains two methods: up and down. The up method is used to add new tables, columns, or indexes to your database, while the down method should reverse the operations performed by the up method.

Within both of these methods you may use the Laravel schema builder to expressively create and modify tables. To learn about all of the methods available on the schema builder, check out its documentation. For example, this migration example creates a flights table:

```
<?php
use Illuminate\Support\Facades\Schema;
use Illuminate\Database\Schema\Blueprint;
use Illuminate\Database\Migrations\Migration;
class CreateFlightsTable extends Migration
{
    /**</pre>
```

# **Running Migrations**

To run all of your outstanding migrations, execute the migrate Artisan command:

```
php artisan migrate
```

NOTE If you are using the Homestead virtual machine, you should run this command from within your virtual machine.

#### **Forcing Migrations To Run In Production**

Some migration operations are destructive, which means they may cause you to lose data. In order to protect you from running these commands against your production database, you will be prompted for confirmation before the commands are executed. To force the commands to run without a prompt, use the --force flag:

```
php artisan migrate --force
```

#### **Rolling Back Migrations**

To rollback the latest migration operation, you may use the rollback command. This command rolls back the last "batch" of migrations, which may include multiple migration files:

```
php artisan migrate:rollback
```

You may rollback a limited number of migrations by providing the step option to the rollback command. For example, the following command will rollback the last five migrations:

```
php artisan migrate:rollback --step=5
```

The migrate:reset command will roll back all of your application's migrations:

```
php artisan migrate:reset
```

# Rollback & Migrate In Single Command

The migrate:refresh command will roll back all of your migrations and then execute the migrate command. This command effectively re-creates your entire database:

```
php artisan migrate:refresh
// Refresh the database and run all database seeds...
php artisan migrate:refresh --seed
```

You may rollback & re-migrate a limited number of migrations by providing the step option to the refresh command. For example, the following command will rollback & re-migrate the last five migrations:

```
php artisan migrate:refresh --step=5
```

#### **Drop All Tables & Migrate**

The migrate: fresh command will drop all tables from the database and then execute the migrate command:

```
php artisan migrate:fresh
```

php artisan migrate:fresh --seed

#### **Tables**

#### **Creating Tables**

To create a new database table, use the create method on the Schema facade. The create method accepts two arguments. The first is the name of the table, while the second is a Closure which receives a Blueprint object that may be used to define the new table:

```
Schema::create('users', function (Blueprint $table) {
    $table->increments('id');
});
```

Of course, when creating the table, you may use any of the schema builder's column methods to define the table's columns.

#### **Checking For Table / Column Existence**

You may easily check for the existence of a table or column using the hasTable and hasColumn methods:

```
if (Schema::hasTable('users')) {
    //
}
if (Schema::hasColumn('users', 'email')) {
    //
}
```

#### **Database Connection & Table Options**

If you want to perform a schema operation on a database connection that is not your default connection, use the connection method:

You may use the following commands on the schema builder to define the table's options:

# Command Description \$table->engine = 'InnoDB'; Specify the table storage engine (MySQL). \$table->charset = 'utf8'; Specify a default character set for the table (MySQL). \$table->collation = 'utf8\_unicode\_ci'; Specify a default collation for the table (MySQL). \$table->temporary(); Create a temporary table (except SQL Server).

#### **Renaming / Dropping Tables**

To rename an existing database table, use the rename method:

```
Schema::rename($from, $to);
```

To drop an existing table, you may use the drop or dropIfExists methods:

```
Schema::drop('users');
Schema::dropIfExists('users');
```

#### **Renaming Tables With Foreign Keys**

Before renaming a table, you should verify that any foreign key constraints on the table have an explicit name in your migration files instead of letting Laravel assign a convention based name. Otherwise, the foreign key constraint name will refer to the old table name.

#### **Columns**

#### **Creating Columns**

The table method on the Schema facade may be used to update existing tables. Like the create method, the table method accepts two arguments: the name of the table and a Closure that receives a Blueprint instance you may use to add columns to the table:

```
Schema::table('users', function (Blueprint $table) {
```

```
$table->string('email');
});
```

# **Available Column Types**

Of course, the schema builder contains a variety of column types that you may specify when building your tables:

| Command  | Description   |
|--|---|
| <pre>\$table-&gt;bigIncrements('id');</pre>              | Auto-incrementing UNSIGNED BIGINT (primary key) equivalent column.  |
| <pre>\$table-&gt;bigInteger('votes');</pre>              | BIGINT equivalent column.   |
| <pre>\$table-&gt;binary('data');</pre>                   | BLOB equivalent column.   |
| <pre>\$table-&gt;boolean('confirmed');</pre>             | BOOLEAN equivalent column.  |
| <pre>\$table-&gt;char('name', 100);</pre>                | CHAR equivalent column with an optional length.   |
| <pre>\$table-&gt;date('created_at');</pre>               | DATE equivalent column.   |
| <pre>\$table-&gt;dateTime('created_at');</pre>           | DATETIME equivalent column.   |
| <pre>\$table-&gt;dateTimeTz('created_at');</pre>         | DATETIME (with timezone) equivalent column.   |
| <pre>\$table-&gt;decimal('amount', 8, 2);</pre>          | DECIMAL equivalent column with a precision (total digits) and scale (decimal digits).                           |
| <pre>\$table-&gt;double('amount', 8, 2);</pre>           | DOUBLE equivalent column with a precision (total digits) and scale (decimal digits).                            |
| <pre>\$table-&gt;enum('level', ['easy', 'hard']);</pre>  | ENUM equivalent column.   |
| <pre>\$table-&gt;float('amount', 8, 2);</pre>            | FLOAT equivalent column with a precision (total digits) and scale (decimal digits).                             |
| <pre>\$table-&gt;geometry('positions');</pre>            | GEOMETRY equivalent column.   |
| <pre>\$table- &gt;geometryCollection('positions');</pre> | GEOMETRYCOLLECTION equivalent column.   |
| <pre>\$table-&gt;increments('id');</pre>                 | Auto-incrementing UNSIGNED INTEGER (primary key) equivalent column.   |
| <pre>\$table-&gt;integer('votes');</pre>                 | INTEGER equivalent column.  |
| <pre>\$table-&gt;ipAddress('visitor');</pre>             | IP address equivalent column.   |
| <pre>\$table-&gt;json('options');</pre>                  | JSON equivalent column.   |
| <pre>\$table-&gt;jsonb('options');</pre>                 | JSONB equivalent column.  |
| <pre>\$table-&gt;lineString('positions');</pre>          | LINESTRING equivalent column.   |
| <pre>\$table-&gt;longText('description');</pre>          | LONGTEXT equivalent column.   |
| <pre>\$table-&gt;macAddress('device');</pre>             | MAC address equivalent column.  |
| <pre>\$table-&gt;mediumIncrements('id');</pre>           | Auto-incrementing UNSIGNED MEDIUMINT (primary key) equivalent column.   |
| <pre>\$table-&gt;mediumInteger('votes');</pre>           | MEDIUMINT equivalent column.  |
| <pre>\$table-&gt;mediumText('description');</pre>        | MEDIUMTEXT equivalent column.   |
| <pre>\$table-&gt;morphs('taggable');</pre>               | $Adds \ {\tt taggable\_id} \ UNSIGNED \ BIGINT \ and \ {\tt taggable\_type} \ VARCHAR \ equivalent \\ columns.$ |
| <pre>\$table- &gt;multiLineString('positions');</pre>    | MULTILINESTRING equivalent column.  |
| <pre>\$table-&gt;multiPoint('positions');</pre>          | MULTIPOINT equivalent column.   |
| <pre>\$table-&gt;multiPolygon('positions');</pre>        | MULTIPOLYGON equivalent column.   |
| <pre>\$table-&gt;nullableMorphs('taggable');</pre>       | Adds nullable versions of morphs() columns.   |
| <pre>\$table-&gt;nullableTimestamps();</pre>             | Alias of timestamps() method.   |
| <pre>\$table-&gt;point('position');</pre>                | POINT equivalent column.  |
| <pre>\$table-&gt;polygon('positions');</pre>             | POLYGON equivalent column.  |
| <pre>\$table-&gt;rememberToken();</pre>                  | Adds a nullable remember_token VARCHAR(100) equivalent column.  |
| <pre>\$table-&gt;smallIncrements('id');</pre>            | Auto-incrementing UNSIGNED SMALLINT (primary key) equivalent column.  |
| <pre>\$table-&gt;smallInteger('votes');</pre>            | SMALLINT equivalent column.   |
| <pre>\$table-&gt;softDeletes();</pre>                    | Adds a nullable deleted_at TIMESTAMP equivalent column for soft deletes.  |
| <pre>\$table-&gt;softDeletesTz();</pre>                  | Adds a nullable ${\tt deleted\_at}$ TIMESTAMP (with timezone) equivalent column for soft deletes.               |
| <pre>\$table-&gt;string('name', 100);</pre>              | VARCHAR equivalent column with a optional length.   |
| <pre>\$table-&gt;text('description');</pre>              | TEXT equivalent column.   |
| <pre>\$table-&gt;time('sunrise');</pre>                  | TIME equivalent column.   |
| <pre>\$table-&gt;timeTz('sunrise');</pre>                | TIME (with timezone) equivalent column.   |
| <pre>\$table-&gt;timestamp('added_on');</pre>            | TIMESTAMP equivalent column.  |
| <pre>\$table-&gt;timestampTz('added_on');</pre>          | TIMESTAMP (with timezone) equivalent column.  |
|  |   |

```
$table->timestamps();
                                    Adds nullable created_at and updated_at TIMESTAMP equivalent columns.
                                    Adds nullable created_at and updated_at TIMESTAMP (with timezone) equivalent
$table->timestampsTz();
                                    columns.
$table->tinyIncrements('id');
                                    Auto-incrementing UNSIGNED TINYINT (primary key) equivalent column.
$table->tinyInteger('votes');
                                    TINYINT equivalent column.
$table-
                                    UNSIGNED BIGINT equivalent column.
>unsignedBigInteger('votes');
$table->unsignedDecimal('amount',
                                    UNSIGNED DECIMAL equivalent column with a precision (total digits) and scale
                                    (decimal digits).
$table->unsignedInteger('votes');
                                    UNSIGNED INTEGER equivalent column.
$table-
                                    UNSIGNED MEDIUMINT equivalent column.
>unsignedMediumInteger('votes');
                                    UNSIGNED SMALLINT equivalent column.
>unsignedSmallInteger('votes');
                                    UNSIGNED TINYINT equivalent column.
>unsignedTinyInteger('votes');
$table->uuid('id');
                                    UUID equivalent column.
$table->year('birth_year');
                                    YEAR equivalent column.
```

#### **Column Modifiers**

In addition to the column types listed above, there are several column "modifiers" you may use while adding a column to a database table. For example, to make the column "nullable", you may use the nullable method:

```
Schema::table('users', function (Blueprint $table) {
    $table->string('email')->nullable();
});
```

Below is a list of all the available column modifiers. This list does not include the index modifiers:

| Modifier                       | Description  |
|--------------------------------|--|
| ->after('column')              | Place the column "after" another column (MySQL)  |
| ->autoIncrement()              | Set INTEGER columns as auto-increment (primary key)                                      |
| ->charset('utf8')              | Specify a character set for the column (MySQL)   |
| ->collation('utf8_unicode_ci') | Specify a collation for the column (MySQL/SQL Server)                                    |
| ->comment('my comment')        | Add a comment to a column (MySQL/PostgreSQL)   |
| ->default(\$value)             | Specify a "default" value for the column   |
| ->first()                      | Place the column "first" in the table (MySQL)  |
| ->nullable(\$value = true)     | Allows (by default) NULL values to be inserted into the column                           |
| ->storedAs(\$expression)       | Create a stored generated column (MySQL)   |
| ->unsigned()                   | Set INTEGER columns as UNSIGNED (MySQL)  |
| ->useCurrent()                 | Set TIMESTAMP columns to use CURRENT_TIMESTAMP as default value                          |
| ->virtualAs(\$expression)      | Create a virtual generated column (MySQL)  |
| ->generatedAs(\$expression)    | Create an identity column with specified sequence options (PostgreSQL)                   |
| ->always()                     | Defines the precedence of sequence values over input for an identity column (PostgreSQL) |

#### **Modifying Columns**

#### **Prerequisites**

Before modifying a column, be sure to add the doctrine/dbal dependency to your composer.json file. The Doctrine DBAL library is used to determine the current state of the column and create the SQL queries needed to make the specified adjustments to the column:

```
composer require doctrine/dbal
```

#### **Updating Column Attributes**

The change method allows you to modify some existing column types to a new type or modify the column's attributes. For example, you may wish to increase the size of a string column. To see the change method in action, let's increase the size of the name column from 25 to 50:

```
Schema::table('users', function (Blueprint $table) {
    $table->string('name', 50)->change();
```

```
});
```

We could also modify a column to be nullable:

```
Schema::table('users', function (Blueprint $table) {
    $table->string('name', 50)->nullable()->change();
});
```

NOTE Only the following column types can be "changed": bigInteger, binary, boolean, date, dateTime, dateTimeTz, decimal, integer, json, longText, mediumText, smallInteger, string, text, time, unsignedBigInteger, unsignedInteger and unsignedSmallInteger.

#### **Renaming Columns**

To rename a column, you may use the renameColumn method on the Schema builder. Before renaming a column, be sure to add the doctrine/dbal dependency to your composer.json file:

```
Schema::table('users', function (Blueprint $table) {
    $table->renameColumn('from', 'to');
});
```

NOTE Renaming any column in a table that also has a column of type enum is not currently supported.

#### **Dropping Columns**

To drop a column, use the <code>dropcolumn</code> method on the Schema builder. Before dropping columns from a SQLite database, you will need to add the <code>doctrine/dbal</code> dependency to your <code>composer.json</code> file and run the <code>composer</code> update command in your terminal to install the library:

```
Schema::table('users', function (Blueprint $table) {
    $table->dropColumn('votes');
});
```

You may drop multiple columns from a table by passing an array of column names to the dropcolumn method:

**Description** 

```
Schema::table('users', function (Blueprint $table) {
    $table->dropColumn(['votes', 'avatar', 'location']);
});
```

NOTE Dropping or modifying multiple columns within a single migration while using a SQLite database is not supported.

#### **Available Command Aliases**

Command

# \$table->dropRememberToken(); Drop the remember\_token column. \$table->dropSoftDeletes(); Drop the deleted\_at column. \$table->dropSoftDeletesTz(); Alias of dropSoftDeletes() method. \$table->dropTimestamps(); Drop the created\_at and updated\_at columns.

\$table->dropTimestampsTz(); Alias of dropTimestamps() method.

#### **Indexes**

# **Creating Indexes**

The schema builder supports several types of indexes. First, let's look at an example that specifies a column's values should be unique. To create the index, we can chain the unique method onto the column definition:

```
$table->string('email')->unique();
```

Alternatively, you may create the index after defining the column. For example:

```
$table->unique('email');
```

You may even pass an array of columns to an index method to create a compound (or composite) index:

```
$table->index(['account_id', 'created_at']);
```

Laravel will automatically generate a reasonable index name, but you may pass a second argument to the method to specify the name yourself:

```
$table->unique('email', 'unique_email');
```

#### **Available Index Types**

Each index method accepts an optional second argument to specify the name of the index. If omitted, the name will be derived from the names of the table and column(s).

# Command Description \$table->primary('id'); Adds a primary key. \$table->primary(['id', 'parent\_id']); Adds composite keys. \$table->unique('email'); Adds a unique index. \$table->index('state'); Adds a plain index. \$table->spatialIndex('location'); Adds a spatial index. (except SQLite)

#### Index Lengths & MySQL / MariaDB

Laravel uses the utf8mb4 character set by default, which includes support for storing "emojis" in the database. If you are running a version of MySQL older than the 5.7.7 release or MariaDB older than the 10.2.2 release, you may need to manually configure the default string length generated by migrations in order for MySQL to create indexes for them. You may configure this by calling the Schema::defaultStringLength method within your AppServiceProvider:

use Illuminate\Support\Facades\Schema;
/\*\*
 \* Bootstrap any application services.
 \* @return void
 \*/
public function boot()
{
 Schema::defaultStringLength(191);

Alternatively, you may enable the innodb\_large\_prefix option for your database. Refer to your database's documentation for instructions on how to properly enable this option.

#### **Renaming Indexes**

To rename an index, you may use the renameIndex method. This method accepts the current index name as its first argument and the desired name as its second argument:

```
$table->renameIndex('from', 'to')
```

#### **Dropping Indexes**

To drop an index, you must specify the index's name. By default, Laravel automatically assigns a reasonable name to the indexes. Concatenate the table name, the name of the indexed column, and the index type. Here are some examples:

Command Description

\$table->dropPrimary('users\_id\_primary'); Drop a primary key from the "users" table.

\$table->dropUnique('users\_email\_unique'); Drop a unique index from the "users" table.

\$table->dropIndex('geo\_state\_index'); Drop a basic index from the "geo" table.

\$table->dropSpatialIndex('geo\_location\_spatialindex'); Drop a spatial index from the "geo" table (except SQLite).

If you pass an array of columns into a method that drops indexes, the conventional index name will be generated based on the table name, columns and key type:

```
Schema::table('geo', function (Blueprint $table) {
     $table->dropIndex(['state']); // Drops index 'geo_state_index'
});
```

# **Foreign Key Constraints**

Laravel also provides support for creating foreign key constraints, which are used to force referential integrity at the database level. For example, let's define a user\_id column on the posts table that references the id column on a users table:

```
Schema::table('posts', function (Blueprint $table) {
    $table->unsignedInteger('user_id');

$table->foreign('user_id')->references('id')->on('users');
});
```

You may also specify the desired action for the "on delete" and "on update" properties of the constraint:

```
$table->foreign('user_id')
    ->references('id')->on('users')
    ->onDelete('cascade');
```

To drop a foreign key, you may use the dropForeign method. Foreign key constraints use the same naming convention as indexes. So, we will concatenate the table name and the columns in the constraint then suffix the name with "\_foreign":

```
$table->dropForeign('posts_user_id_foreign');
```

Or, you may pass an array value which will automatically use the conventional constraint name when dropping:

```
$table->dropForeign(['user_id']);
```

You may enable or disable foreign key constraints within your migrations by using the following methods:

```
Schema::enableForeignKeyConstraints();
Schema::disableForeignKeyConstraints();
```

NOTE SQLite disables foreign key constraints by default. When using SQLite, make sure to <u>enable foreign key support</u> in your database configuration before attempting to create them in your migrations.

#### **Database**

# **Database: Seeding**

- Introduction
- Writing Seeders
  - <u>Using Model Factories</u>
  - Calling Additional Seeders
- Running Seeders

#### Introduction

Laravel includes a simple method of seeding your database with test data using seed classes. All seed classes are stored in the database/seeds directory. Seed classes may have any name you wish, but probably should follow some sensible convention, such as UsersTableSeeder, etc. By default, a DatabaseSeeder class is defined for you. From this class, you may use the call method to run other seed classes, allowing you to control the seeding order.

# **Writing Seeders**

To generate a seeder, execute the make: seeder <u>Artisan command</u>. All seeders generated by the framework will be placed in the database/seeds directory:

```
php artisan make:seeder UsersTableSeeder
```

A seeder class only contains one method by default: run. This method is called when the db: seed Artisan command is executed. Within the run method, you may insert data into your database however you wish. You may use the <u>query builder</u> to manually insert data or you may use <u>Eloquent model factories</u>.

TIP Mass assignment protection is automatically disabled during database seeding.

As an example, let's modify the default DatabaseSeeder class and add a database insert statement to the run method:

TIP You may type-hint any dependencies you need within the run method's signature. They will automatically be resolved via the Laravel service container.

#### **Using Model Factories**

Of course, manually specifying the attributes for each model seed is cumbersome. Instead, you can use <u>model factories</u> to conveniently generate large amounts of database records. First, review the <u>model factory documentation</u> to learn how to define your factories. Once you have defined your factories, you may use the factory helper function to insert records into your database.

For example, let's create 50 users and attach a relationship to each user:

```
/**

* Run the database seeds.

* @return void

*/
public function run()
{
factory(App\User::class, 50)->create()->each(function ($user) {
```

```
$user->posts()->save(factory(App\Post::class)->make());
});
}
```

# **Calling Additional Seeders**

Within the DatabaseSeeder class, you may use the call method to execute additional seed classes. Using the call method allows you to break up your database seeding into multiple files so that no single seeder class becomes overwhelmingly large. Pass the name of the seeder class you wish to run:

```
/**
  * Run the database seeds.
  *
  * @return void
  */
public function run()
{
    $this->call([
        UsersTableSeeder::class,
        PostsTableSeeder::class,
        CommentsTableSeeder::class,
    ]);
}
```

# **Running Seeders**

Once you have written your seeder, you may need to regenerate Composer's autoloader using the dump-autoload command:

```
composer dump-autoload
```

Now you may use the db:seed Artisan command to seed your database. By default, the db:seed command runs the DatabaseSeeder class, which may be used to call other seed classes. However, you may use the --class option to specify a specific seeder class to run individually:

```
php artisan db:seed
php artisan db:seed --class=UsersTableSeeder
```

You may also seed your database using the migrate:refresh command, which will also rollback and re-run all of your migrations. This command is useful for completely re-building your database:

```
php artisan migrate:refresh --seed
```

#### **Database**

# Redis

- Introduction
  - Configuration
  - o <u>Predis</u>
  - PhpRedis
- Interacting With Redis
  - o Pipelining Commands
- Pub / Sub

#### Introduction

Redis is an open source, advanced key-value store. It is often referred to as a data structure server since keys can contain strings, hashes, lists, sets, and sorted sets.

Before using Redis with Laravel, you will need to install the predis/predis package via Composer:

```
composer require predis/predis
```

Alternatively, you may install the <u>PhpRedis</u> PHP extension via PECL. The extension is more complex to install but may yield better performance for applications that make heavy use of Redis.

#### Configuration

The Redis configuration for your application is located in the config/database.php configuration file. Within this file, you will see a redis array containing the Redis servers utilized by your application:

```
'redis' => [
    'client' => 'predis',
    'default' => [
        'host' => env('REDIS_HOST', '127.0.0.1'),
        'password' => env('REDIS_PASSWORD', null),
        'port' => env('REDIS_PORT', 6379),
        'database' => env('REDIS_DB', 0),
],

'cache' => [
        'host' => env('REDIS_HOST', '127.0.0.1'),
        'password' => env('REDIS_PASSWORD', null),
        'port' => env('REDIS_PORT', 6379),
        'database' => env('REDIS_CACHE_DB', 1),
],
```

The default server configuration should suffice for development. However, you are free to modify this array based on your environment. Each Redis server defined in your configuration file is required to have a name, host, and port.

#### **Configuring Clusters**

If your application is utilizing a cluster of Redis servers, you should define these clusters within a clusters key of your Redis configuration:

By default, clusters will perform client-side sharding across your nodes, allowing you to pool nodes and create a large amount of

available RAM. However, note that client-side sharding does not handle failover; therefore, is primarily suited for cached data that is available from another primary data store. If you would like to use native Redis clustering, you should specify this in the options key of your Redis configuration:

#### **Predis**

In addition to the default host, port, database, and password server configuration options, Predis supports additional connection parameters that may be defined for each of your Redis servers. To utilize these additional configuration options, add them to your Redis server configuration in the config/database.php configuration file:

```
'default' => [
   'host' => env('REDIS_HOST', 'localhost'),
   'password' => env('REDIS_PASSWORD', null),
   'port' => env('REDIS_PORT', 6379),
   'database' => 0,
   'read_write_timeout' => 60,
],
```

#### **PhpRedis**

To utilize the PhpRedis extension, you should change the client option of your Redis configuration to phpredis. This option is found in your config/database.php configuration file:

```
'redis' => [
    'client' => 'phpredis',
    // Rest of Redis configuration...
],
```

In addition to the default host, port, database, and password server configuration options, PhpRedis supports the following additional connection parameters: persistent, prefix, read\_timeout and timeout. You may add any of these options to your Redis server configuration in the config/database.php configuration file:

```
'default' => [
    'host' => env('REDIS_HOST', 'localhost'),
    'password' => env('REDIS_PASSWORD', null),
    'port' => env('REDIS_PORT', 6379),
    'database' => 0,
    'read_timeout' => 60,
1.
```

# **Interacting With Redis**

You may interact with Redis by calling various methods on the Redis facade. The Redis facade supports dynamic methods, meaning you may call any Redis command on the facade and the command will be passed directly to Redis. In this example, we will call the Redis GET command by calling the get method on the Redis facade:

```
<?php
namespace App\Http\Controllers;
use App\Http\Controllers\Controller;
use Illuminate\Support\Facades\Redis;
class UserController extends Controller
{
    /**
     * Show the profile for the given user.
     * @param int $id
     * @return Response
     */
    public function showProfile($id)
    {
          suser = Redis::get('user:profile:'.$id);
    }
}</pre>
```

```
return view('user.profile', ['user' => $user]);
}
```

Of course, as mentioned above, you may call any of the Redis commands on the Redis facade. Laravel uses magic methods to pass the commands to the Redis server, so pass the arguments the Redis command expects:

```
Redis::set('name', 'Taylor');

$values = Redis::lrange('names', 5, 10);
```

Alternatively, you may also pass commands to the server using the command method, which accepts the name of the command as its first argument, and an array of values as its second argument:

```
$values = Redis::command('lrange', ['name', 5, 10]);
```

#### **Using Multiple Redis Connections**

You may get a Redis instance by calling the Redis::connection method:

```
$redis = Redis::connection();
```

This will give you an instance of the default Redis server. You may also pass the connection or cluster name to the connection method to get a specific server or cluster as defined in your Redis configuration:

```
$redis = Redis::connection('my-connection');
```

#### **Pipelining Commands**

Pipelining should be used when you need to send many commands to the server in one operation. The pipeline method accepts one argument: a closure that receives a Redis instance. You may issue all of your commands to this Redis instance and they will all be executed within a single operation:

```
Redis::pipeline(function ($pipe) {
    for ($i = 0; $i < 1000; $i++) {
        $pipe->set("key:$i", $i);
    }
});
```

#### Pub / Sub

Laravel provides a convenient interface to the Redis publish and subscribe commands. These Redis commands allow you to listen for messages on a given "channel". You may publish messages to the channel from another application, or even using another programming language, allowing easy communication between applications and processes.

First, let's setup a channel listener using the subscribe method. We'll place this method call within an <u>Artisan command</u> since calling the subscribe method begins a long-running process:

```
ramespace App\Console\Commands;
use Illuminate\Console\Command;
use Illuminate\Support\Facades\Redis;

class RedisSubscribe extends Command
{
    /**
     * The name and signature of the console command.
     *
     * @var string
     */
     protected $signature = 'redis:subscribe';

    /**
     * The console command description.
     *
     * @var string
     */
     protected $description = 'Subscribe to a Redis channel';

    /**
     * Execute the console command.
     *
          * @return mixed
     */
     public function handle()
     */
}
```

```
Redis::subscribe(['test-channel'], function ($message) {
          echo $message;
      });
}
```

Now we may publish messages to the channel using the  ${\tt publish}$  method:

```
Route::get('publish', function () {
    // Route logic...

Redis::publish('test-channel', json_encode(['foo' => 'bar']));
});
```

#### **Wildcard Subscriptions**

Using the psubscribe method, you may subscribe to a wildcard channel, which may be useful for catching all messages on all channels. The \$channel name will be passed as the second argument to the provided callback closure:

```
Redis::psubscribe(['*'], function ($message, $channel) {
    echo $message;
});

Redis::psubscribe(['users.*'], function ($message, $channel) {
    echo $message;
});
```

#### **Eloquent ORM**

# **Eloquent: Getting Started**

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# Introduction

The Eloquent ORM included with Laravel provides a beautiful, simple ActiveRecord implementation for working with your database. Each database table has a corresponding "Model" which is used to interact with that table. Models allow you to query for data in your tables, as well as insert new records into the table.

Before getting started, be sure to configure a database connection in config/database.php. For more information on configuring your database, check out <a href="the-documentation">the-documentation</a>.

#### **Defining Models**

To get started, let's create an Eloquent model. Models typically live in the app directory, but you are free to place them anywhere that can be auto-loaded according to your composer.json file. All Eloquent models extend Illuminate\Database\Eloquent\Model class.

The easiest way to create a model instance is using the make:model Artisan command:

```
php artisan make:model Flight
```

If you would like to generate a <u>database migration</u> when you generate the model, you may use the --migration or -m option:

```
php artisan make:model Flight --migration
php artisan make:model Flight -m
```

#### **Eloquent Model Conventions**

Now, let's look at an example Flight model, which we will use to retrieve and store information from our flights database table:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    //
}</pre>
```

#### **Table Names**

Note that we did not tell Eloquent which table to use for our Flight model. By convention, the "snake case", plural name of the class will be used as the table name unless another name is explicitly specified. So, in this case, Eloquent will assume the Flight model stores records in the flights table. You may specify a custom table by defining a table property on your model:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
    * The table associated with the model.
    *
    * @var string
    */
    protected $table = 'my_flights';
}</pre>
```

#### **Primary Keys**

Eloquent will also assume that each table has a primary key column named id. You may define a protected primarykey property to override this convention.

In addition, Eloquent assumes that the primary key is an incrementing integer value, which means that by default the primary key will be cast to an int automatically. If you wish to use a non-incrementing or a non-numeric primary key you must set the public <code>\$incrementing</code> property on your model to <code>false</code>. If your primary key is not an integer, you should set the protected <code>\$keyType</code> property on your model to <code>string</code>.

#### **Timestamps**

By default, Eloquent expects created\_at and updated\_at columns to exist on your tables. If you do not wish to have these columns automatically managed by Eloquent, set the <code>\$timestamps</code> property on your model to false:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
    * Indicates if the model should be timestamped.
    *
    * @var bool
    */
    public $timestamps = false;
}</pre>
```

If you need to customize the format of your timestamps, set the \$dateFormat property on your model. This property determines how date attributes are stored in the database, as well as their format when the model is serialized to an array or JSON:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
    * The storage format of the model's date columns.
    *
    @var string
    */
    protected $dateFormat = 'U';
}</pre>
```

If you need to customize the names of the columns used to store the timestamps, you may set the CREATED\_AT and UPDATED\_AT constants in your model:

```
<?php

class Flight extends Model
{
    const CREATED_AT = 'creation_date';
    const UPDATED_AT = 'last_update';
}</pre>
```

#### **Database Connection**

By default, all Eloquent models will use the default database connection configured for your application. If you would like to specify a different connection for the model, use the \$connection property:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
    * The connection name for the model.
    *
    * @var string
    */
    protected $connection = 'connection-name';
}</pre>
```

#### **Default Attribute Values**

If you would like to define the default values for some of your model's attributes, you may define an \$attributes property on your model:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
    * The model's default values for attributes.
    *
    @var array
    */
    protected $attributes = [
        'delayed' => false,
    ];
}
```

# **Retrieving Models**

Once you have created a model and <u>its associated database table</u>, you are ready to start retrieving data from your database. Think of each Eloquent model as a powerful <u>query builder</u> allowing you to fluently query the database table associated with the model. For example:

```
<?php
$flights = App\Flight::all();
foreach ($flights as $flight) {
    echo $flight->name;
}
```

#### **Adding Additional Constraints**

The Eloquent all method will return all of the results in the model's table. Since each Eloquent model serves as a <u>query builder</u>, you may also add constraints to queries, and then use the get method to retrieve the results:

TIP Since Eloquent models are query builders, you should review all of the methods available on the <u>query builder</u>. You may use any of these methods in your Eloquent queries.

#### **Refreshing Models**

You can refresh models using the fresh and refresh methods. The fresh method will re-retrieve the model from the database. The existing model instance will not be affected:

```
$flight = App\Flight::where('number', 'FR 900')->first();
```

```
$freshFlight = $flight->fresh();
```

The refresh method will re-hydrate the existing model using fresh data from the database. In addition, all of its loaded relationships will be refreshed as well:

```
$flight = App\Flight::where('number', 'FR 900')->first();
$flight->number = 'FR 456';
$flight->refresh();
$flight->number; // "FR 900"
```

#### **Collections**

For Eloquent methods like all and get which retrieve multiple results, an instance of illuminate\Database\Eloquent\Collection will be returned. The collection class provides a variety of helpful methods for working with your Eloquent results:

```
$flights = $flights->reject(function ($flight) {
    return $flight->cancelled;
});

Of course, you may also loop over the collection like an array:
foreach ($flights as $flight) {
    echo $flight->name;
}
```

#### **Chunking Results**

If you need to process thousands of Eloquent records, use the chunk command. The chunk method will retrieve a "chunk" of Eloquent models, feeding them to a given closure for processing. Using the chunk method will conserve memory when working with large result sets:

The first argument passed to the method is the number of records you wish to receive per "chunk". The Closure passed as the second argument will be called for each chunk that is retrieved from the database. A database query will be executed to retrieve each chunk of records passed to the Closure.

#### **Using Cursors**

The cursor method allows you to iterate through your database records using a cursor, which will only execute a single query. When processing large amounts of data, the cursor method may be used to greatly reduce your memory usage:

# **Retrieving Single Models / Aggregates**

Of course, in addition to retrieving all of the records for a given table, you may also retrieve single records using find or first. Instead of returning a collection of models, these methods return a single model instance:

```
// Retrieve a model by its primary key...
$flight = App\Flight::find(1);
// Retrieve the first model matching the query constraints...
$flight = App\Flight::where('active', 1)->first();
```

You may also call the find method with an array of primary keys, which will return a collection of the matching records:

```
$flights = App\Flight::find([1, 2, 3]);
```

# **Not Found Exceptions**

Sometimes you may wish to throw an exception if a model is not found. This is particularly useful in routes or controllers. The findOrFail and firstOrFail methods will retrieve the first result of the query; however, if no result is found, a Illuminate\Database\Eloquent\Model\NotFoundException will be thrown:

```
$model = App\Flight::findOrFail(1);
```

```
$model = App\Flight::where('legs', '>', 100)->firstOrFail();
```

If the exception is not caught, a 404 HTTP response is automatically sent back to the user. It is not necessary to write explicit checks to return 404 responses when using these methods:

```
Route::get('/api/flights/{id}', function ($id) {
    return App\Flight::findOrFail($id);
});
```

#### **Retrieving Aggregates**

You may also use the count, sum, max, and other <u>aggregate methods</u> provided by the <u>query builder</u>. These methods return the appropriate scalar value instead of a full model instance:

```
$count = App\Flight::where('active', 1)->count();
$max = App\Flight::where('active', 1)->max('price');
```

# **Inserting & Updating Models**

#### **Inserts**

To create a new record in the database, create a new model instance, set attributes on the model, then call the save method:

In this example, we assign the name parameter from the incoming HTTP request to the name attribute of the App\Flight model instance. When we call the save method, a record will be inserted into the database. The created\_at and updated\_at timestamps will automatically be set when the save method is called, so there is no need to set them manually.

#### **Updates**

The save method may also be used to update models that already exist in the database. To update a model, you should retrieve it, set any attributes you wish to update, and then call the save method. Again, the updated\_at timestamp will automatically be updated, so there is no need to manually set its value:

```
$flight = App\Flight::find(1);
$flight->name = 'New Flight Name';
$flight->save();
```

#### **Mass Updates**

Updates can also be performed against any number of models that match a given query. In this example, all flights that are active and have a destination of San Diego will be marked as delayed:

```
App\Flight::where('active', 1)
    ->where('destination', 'San Diego')
    ->update(['delayed' => 1]);
```

The update method expects an array of column and value pairs representing the columns that should be updated.

NOTE When issuing a mass update via Eloquent, the saved and updated model events will not be fired for the updated models. This is because the models are never actually retrieved when issuing a mass update.

#### **Mass Assignment**

You may also use the create method to save a new model in a single line. The inserted model instance will be returned to you from the method. However, before doing so, you will need to specify either a fillable or guarded attribute on the model, as all Eloquent models protect against mass-assignment by default.

A mass-assignment vulnerability occurs when a user passes an unexpected HTTP parameter through a request, and that parameter changes a column in your database you did not expect. For example, a malicious user might send an <code>is\_admin</code> parameter through an HTTP request, which is then passed into your model's <code>create</code> method, allowing the user to escalate themselves to an <code>administrator</code>.

So, to get started, you should define which model attributes you want to make mass assignable. You may do this using the \$fillable property on the model. For example, let's make the name attribute of our Flight model mass assignable:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
    * The attributes that are mass assignable.
    *
    * @var array
    */
    protected $fillable = ['name'];
}</pre>
```

Once we have made the attributes mass assignable, we can use the create method to insert a new record in the database. The create method returns the saved model instance:

```
$flight = App\Flight::create(['name' => 'Flight 10']);
```

If you already have a model instance, you may use the fill method to populate it with an array of attributes:

```
$flight->fill(['name' => 'Flight 22']);
```

#### **Guarding Attributes**

While \$fillable serves as a "white list" of attributes that should be mass assignable, you may also choose to use \$guarded. The \$guarded property should contain an array of attributes that you do not want to be mass assignable. All other attributes not in the array will be mass assignable. So, \$guarded functions like a "black list". Of course, you should use either \$fillable or \$guarded - not both. In the example below, all attributes except for price will be mass assignable:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
     * The attributes that aren't mass assignable.
     *
     * @var array
     */
     protected $guarded = ['price'];
}</pre>
```

If you would like to make all attributes mass assignable, you may define the \$guarded property as an empty array:

```
/**
    * The attributes that aren't mass assignable.
    *
    * @var array
    */
protected $guarded = [];
```

#### **Other Creation Methods**

firstOrCreate/firstOrNew

There are two other methods you may use to create models by mass assigning attributes: firstorCreate and firstorNew. The firstorCreate method will attempt to locate a database record using the given column / value pairs. If the model can not be found in the database, a record will be inserted with the attributes from the first parameter, along with those in the optional second parameter.

The firstorNew method, like firstorCreate will attempt to locate a record in the database matching the given attributes. However, if a model is not found, a new model instance will be returned. Note that the model returned by firstorNew has not yet been persisted to the database. You will need to call save manually to persist it:

```
// Retrieve flight by name, or create it if it doesn't exist...
$flight = App\Flight::firstOrCreate(['name' => 'Flight 10']);

// Retrieve flight by name, or create it with the name and delayed attributes...
$flight = App\Flight::firstOrCreate(
        ['name' => 'Flight 10'], ['delayed' => 1]
);

// Retrieve by name, or instantiate...
$flight = App\Flight::firstOrNew(['name' => 'Flight 10']);

// Retrieve by name, or instantiate with the name and delayed attributes...
$flight = App\Flight::firstOrNew(
        ['name' => 'Flight 10'], ['delayed' => 1]
);
```

#### updateOrCreate

You may also come across situations where you want to update an existing model or create a new model if none exists. Laravel provides an updateOrCreate method to do this in one step. Like the firstOrCreate method, updateOrCreate persists the model, so there's no need to call save():

```
// If there's a flight from Oakland to San Diego, set the price to $99.
// If no matching model exists, create one.
$flight = App\Flight::updateOrCreate(
    ['departure' => 'Oakland', 'destination' => 'San Diego'],
    ['price' => 99]
):
```

# **Deleting Models**

To delete a model, call the delete method on a model instance:

```
$flight = App\Flight::find(1);
$flight->delete();
```

#### **Deleting An Existing Model By Key**

In the example above, we are retrieving the model from the database before calling the delete method. However, if you know the primary key of the model, you may delete the model without retrieving it by calling the destroy method. In addition to a single primary key as its argument, the destroy method will accept multiple primary keys, an array of primary keys, or a collection of primary keys:

```
App\Flight::destroy(1);
App\Flight::destroy(1, 2, 3);
App\Flight::destroy([1, 2, 3]);
App\Flight::destroy(collect([1, 2, 3]));
```

#### **Deleting Models By Query**

Of course, you may also run a delete statement on a set of models. In this example, we will delete all flights that are marked as inactive. Like mass updates, mass deletes will not fire any model events for the models that are deleted:

```
$deletedRows = App\Flight::where('active', 0)->delete();
```

NOTE When executing a mass delete statement via Eloquent, the deleting and deleted model events will not be fired for the deleted models. This is because the models are never actually retrieved when executing the delete statement.

#### **Soft Deleting**

In addition to actually removing records from your database, Eloquent can also "soft delete" models. When models are soft deleted, they are not actually removed from your database. Instead, a deleted\_at attribute is set on the model and inserted into the database. If a model has a non-null deleted\_at value, the model has been soft deleted. To enable soft deletes for a model, use the

Illuminate\Database\Eloquent\SoftDeletes trait on the model and add the deleted\_at column to your \$dates property:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
use Illuminate\Database\Eloquent\SoftDeletes;

class Flight extends Model
{
    use SoftDeletes;
    /**
     * The attributes that should be mutated to dates.
     *
     * @var array
     */
     protected $dates = ['deleted_at'];
}</pre>
```

Of course, you should add the deleted\_at column to your database table. The Laravel schema builder contains a helper method to create this column:

```
Schema::table('flights', function (Blueprint $table) {
    $table->softDeletes();
});
```

Now, when you call the delete method on the model, the deleted\_at column will be set to the current date and time. And, when querying a model that uses soft deletes, the soft deleted models will automatically be excluded from all query results.

To determine if a given model instance has been soft deleted, use the trashed method:

#### **Querying Soft Deleted Models**

#### **Including Soft Deleted Models**

As noted above, soft deleted models will automatically be excluded from query results. However, you may force soft deleted models to appear in a result set using the withTrashed method on the query:

The withTrashed method may also be used on a relationship query:

```
$flight->history()->withTrashed()->get();
```

#### **Retrieving Only Soft Deleted Models**

The onlyTrashed method will retrieve **only** soft deleted models:

#### **Restoring Soft Deleted Models**

Sometimes you may wish to "un-delete" a soft deleted model. To restore a soft deleted model into an active state, use the restore method on a model instance:

```
$flight->restore();
```

You may also use the restore method in a query to quickly restore multiple models. Again, like other "mass" operations, this will not fire any model events for the models that are restored:

```
App\Flight::withTrashed()
    ->where('airline_id', 1)
    ->restore();
```

Like the with Trashed method, the restore method may also be used on  $\underline{\text{relationships}}$ :

```
$flight->history()->restore();
```

#### **Permanently Deleting Models**

Sometimes you may need to truly remove a model from your database. To permanently remove a soft deleted model from the database, use the forcepelete method:

```
// Force deleting a single model instance...
$flight->forceDelete();
// Force deleting all related models...
$flight->history()->forceDelete();
```

# **Query Scopes**

#### **Global Scopes**

Global scopes allow you to add constraints to all queries for a given model. Laravel's own <u>soft delete</u> functionality utilizes global scopes to only pull "non-deleted" models from the database. Writing your own global scopes can provide a convenient, easy way to make sure every query for a given model receives certain constraints.

#### **Writing Global Scopes**

Writing a global scope is simple. Define a class that implements the Illuminate\Database\Eloquent\Scope interface. This interface requires you to implement one method: apply. The apply method may add where constraints to the query as needed:

```
<?php

namespace App\Scopes;

use Illuminate\Database\Eloquent\Scope;
use Illuminate\Database\Eloquent\Model;
use Illuminate\Database\Eloquent\Builder;

class AgeScope implements Scope
{
    /**
        * Apply the scope to a given Eloquent query builder.
        * @param \Illuminate\Database\Eloquent\Builder $builder
        * @param \Illuminate\Database\Eloquent\Model $model
        * @return void
        */
    public function apply(Builder $builder, Model $model)
        {
            $ $builder->where('age', '>', 200);
        }
}
```

TIP If your global scope is adding columns to the select clause of the query, you should use the addselect method instead of select. This will prevent the unintentional replacement of the query's existing select clause.

#### **Applying Global Scopes**

To assign a global scope to a model, you should override a given model's boot method and use the addGlobalScope method:

select \* from `users` where `age` > 200

#### **Anonymous Global Scopes**

Eloquent also allows you to define global scopes using Closures, which is particularly useful for simple scopes that do not warrant a separate class:

#### **Removing Global Scopes**

If you would like to remove a global scope for a given query, you may use the withoutGlobalScope method. The method accepts the class name of the global scope as its only argument:

```
User::withoutGlobalScope(AgeScope::class)->get();
```

Or, if you defined the global scope using a Closure:

```
User::withoutGlobalScope('age')->get();
```

If you would like to remove several or even all of the global scopes, you may use the  ${\tt withoutGlobalScopes}$  method:

```
// Remove all of the global scopes...
User::withoutGlobalScopes()->get();
// Remove some of the global scopes...
User::withoutGlobalScopes([
    FirstScope::class, SecondScope::class
])->get();
```

#### **Local Scopes**

Local scopes allow you to define common sets of constraints that you may easily re-use throughout your application. For example, you may need to frequently retrieve all users that are considered "popular". To define a scope, prefix an Eloquent model method with scope.

Scopes should always return a query builder instance:

```
<?php

namespace App;

use Illuminate\Database\Eloquent\Model;

class User extends Model
{
    /**
    * Scope a query to only include popular users.
    *
          * @param \Illuminate\Database\Eloquent\Builder $query
          * @return \Illuminate\Database\Eloquent\Builder
          */
    public function scopePopular($query)
          {
                return $query->where('votes', '>', 100);
        }

          /**
          * Scope a query to only include active users.
          * @param \Illuminate\Database\Eloquent\Builder $query
          * @return \Illuminate\Database\Eloquent\Builder $query
          * @return \Illuminate\Database\Eloquent\Builder $query
          * @return \Illuminate\Database\Eloquent\Builder
```

```
*/
public function scopeActive($query)
{
    return $query->where('active', 1);
}
```

# **Utilizing A Local Scope**

Once the scope has been defined, you may call the scope methods when querying the model. However, you should not include the scope prefix when calling the method. You can even chain calls to various scopes, for example:

```
$users = App\User::popular()->active()->orderBy('created_at')->get();
```

#### **Dynamic Scopes**

Sometimes you may wish to define a scope that accepts parameters. To get started, just add your additional parameters to your scope. Scope parameters should be defined after the \$query parameter:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * Scope a query to only include users of a given type.
    *
     * @param \Illuminate\Database\Eloquent\Builder $query
     * @param mixed $type
     * @return \Illuminate\Database\Eloquent\Builder
     */
    public function scopeOfType($query, $type)
     {
        return $query->where('type', $type);
     }
}
```

Now, you may pass the parameters when calling the scope:

```
$users = App\User::ofType('admin')->get();
```

#### **Comparing Models**

Sometimes you may need to determine if two models are the "same". The is method may be used to quickly verify two models have same primary key, table, and database connection:

```
if ($post->is($anotherPost)) {
    //
}
```

# **Events**

Eloquent models fire several events, allowing you to hook into the following points in a model's lifecycle: retrieved, creating, created, updating, updated, saving, saved, deleting, deleted, restoring, restored. Events allow you to easily execute code each time a specific model class is saved or updated in the database. Each event receives the instance of the model through its constructor.

The retrieved event will fire when an existing model is retrieved from the database. When a new model is saved for the first time, the creating and created events will fire. If a model already existed in the database and the save method is called, the updating / updated events will fire. However, in both cases, the saving / saved events will fire.

NOTE When issuing a mass update via Eloquent, the saved and updated model events will not be fired for the updated models. This is because the models are never actually retrieved when issuing a mass update.

To get started, define a \$dispatchesEvents property on your Eloquent model that maps various points of the Eloquent model's lifecycle to your own event classes:

```
<?php
namespace App;
use App\Events\UserSaved;
use App\Events\UserDeleted;
use Illuminate\Notifications\Notifiable;</pre>
```

After defining and mapping your Eloquent events, you may use event listeners to handle the events.

#### **Observers**

#### **Defining Observers**

If you are listening for many events on a given model, you may use observers to group all of your listeners into a single class. Observers classes have method names which reflect the Eloquent events you wish to listen for. Each of these methods receives the model as their only argument. The make:observer Artisan command is the easiest way to create a new observer class:

```
php artisan make:observer UserObserver --model=User
```

This command will place the new observer in your App/Observers directory. If this directory does not exist, Artisan will create it for you. Your fresh observer will look like the following:

```
namespace App\Observers;
use App\User;
class UserObserver
     * Handle the User "created" event.
     * @param \App\User $user
      @return void
    public function created(User $user)
    }
     * Handle the User "updated" event.
       @param \App\User $user
      @return void
    public function updated(User $user)
    }
     * Handle the User "deleted" event.
       @param \App\User $user
       @return void
    public function deleted(User $user)
    }
}
```

To register an observer, use the observe method on the model you wish to observe. You may register observers in the boot method of one of your service providers. In this example, we'll register the observer in the AppServiceProvider:

```
<?php
namespace App\Providers;
use App\User;
use App\Observers\UserObserver;</pre>
```

```
use Illuminate\Support\ServiceProvider;
class AppServiceProvider extends ServiceProvider
{
    /**
    * Bootstrap any application services.
    *
    * @return void
    */
    public function boot()
    {
        User::observe(UserObserver::class);
    }
    /**
    * Register the service provider.
    *
    * @return void
    */
    public function register()
    {
        //
     }
}
```

#### **Eloquent ORM**

# **Eloquent: Relationships**

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#### Introduction

Database tables are often related to one another. For example, a blog post may have many comments, or an order could be related to the user who placed it. Eloquent makes managing and working with these relationships easy, and supports several different types of relationships:

- One To One
- One To Many
- Many To Many
- Has Many Through
- One To One (Polymorphic)
- One To Many (Polymorphic)
- Many To Many (Polymorphic)

# **Defining Relationships**

Eloquent relationships are defined as methods on your Eloquent model classes. Since, like Eloquent models themselves, relationships also serve as powerful <u>query builders</u>, defining relationships as methods provides powerful method chaining and querying capabilities. For example, we may chain additional constraints on this posts relationship:

```
$user->posts()->where('active', 1)->get();
```

But, before diving too deep into using relationships, let's learn how to define each type.

#### One To One

A one-to-one relationship is a very basic relation. For example, a User model might be associated with one Phone. To define this relationship, we place a phone method on the User model. The phone method should call the hasone method and return its result:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * Get the phone record associated with the user.</pre>
```

```
*/
public function phone()
{
    return $this->hasOne('App\Phone');
}
```

The first argument passed to the hasone method is the name of the related model. Once the relationship is defined, we may retrieve the related record using Eloquent's dynamic properties. Dynamic properties allow you to access relationship methods as if they were properties defined on the model:

```
$phone = User::find(1)->phone;
```

Eloquent determines the foreign key of the relationship based on the model name. In this case, the Phone model is automatically assumed to have a user\_id foreign key. If you wish to override this convention, you may pass a second argument to the hasone method:

```
return $this->hasOne('App\Phone', 'foreign_key');
```

Additionally, Eloquent assumes that the foreign key should have a value matching the id (or the custom \$primaryKey) column of the parent. In other words, Eloquent will look for the value of the user's id column in the user\_id column of the Phone record. If you would like the relationship to use a value other than id, you may pass a third argument to the hasone method specifying your custom key:

```
return $this->hasOne('App\Phone', 'foreign_key', 'local_key');
```

#### **Defining The Inverse Of The Relationship**

So, we can access the Phone model from our User. Now, let's define a relationship on the Phone model that will let us access the User that owns the phone. We can define the inverse of a hasone relationship using the belongsTo method:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Phone extends Model
{
    /**
    * Get the user that owns the phone.
    */
    public function user()
    {
        return $this->belongsTo('App\User');
    }
}
```

In the example above, Eloquent will try to match the user\_id from the Phone model to an id on the user model. Eloquent determines the default foreign key name by examining the name of the relationship method and suffixing the method name with \_id. However, if the foreign key on the Phone model is not user\_id, you may pass a custom key name as the second argument to the belongsTo method:

```
/**
  * Get the user that owns the phone.
  */
public function user()
{
    return $this->belongsTo('App\User', 'foreign_key');
}
```

If your parent model does not use id as its primary key, or you wish to join the child model to a different column, you may pass a third argument to the belongs method specifying your parent table's custom key:

```
/**
  * Get the user that owns the phone.
  */
public function user()
{
    return $this->belongsTo('App\User', 'foreign_key', 'other_key');
}
```

#### One To Many

A one-to-many relationship is used to define relationships where a single model owns any amount of other models. For example, a blog post may have an infinite number of comments. Like all other Eloquent relationships, one-to-many relationships are defined by placing a function on your Eloquent model:

```
<?php
```

```
namespace App;
use Illuminate\Database\Eloquent\Model;
class Post extends Model
{
    /**
    * Get the comments for the blog post.
    */
    public function comments()
    {
        return $this->hasMany('App\Comment');
    }
}
```

Remember, Eloquent will automatically determine the proper foreign key column on the comment model. By convention, Eloquent will take the "snake case" name of the owning model and suffix it with \_id. So, for this example, Eloquent will assume the foreign key on the comment model is post\_id.

Once the relationship has been defined, we can access the collection of comments by accessing the comments property. Remember, since Eloquent provides "dynamic properties", we can access relationship methods as if they were defined as properties on the model:

```
$comments = App\Post::find(1)->comments;
foreach ($comments as $comment) {
    //
}
```

Of course, since all relationships also serve as query builders, you can add further constraints to which comments are retrieved by calling the comments method and continuing to chain conditions onto the query:

```
$comment = App\Post::find(1)->comments()->where('title', 'foo')->first();
```

Like the hasone method, you may also override the foreign and local keys by passing additional arguments to the hasMany method:

```
return $this->hasMany('App\Comment', 'foreign_key');
return $this->hasMany('App\Comment', 'foreign_key', 'local_key');
```

## One To Many (Inverse)

Now that we can access all of a post's comments, let's define a relationship to allow a comment to access its parent post. To define the inverse of a hasMany relationship, define a relationship function on the child model which calls the belongs to method:

Once the relationship has been defined, we can retrieve the Post model for a Comment by accessing the post "dynamic property":

```
$comment = App\Comment::find(1);
echo $comment->post->title;
```

In the example above, Eloquent will try to match the post\_id from the Comment model to an id on the Post model. Eloquent determines the default foreign key name by examining the name of the relationship method and suffixing the method name with a \_ followed by the name of the primary key column. However, if the foreign key on the Comment model is not post\_id, you may pass a custom key name as the second argument to the belongsTo method:

```
/**
  * Get the post that owns the comment.
  */
public function post()
{
    return $this->belongsTo('App\Post', 'foreign_key');}
```

If your parent model does not use id as its primary key, or you wish to join the child model to a different column, you may pass a third argument to the belongs to method specifying your parent table's custom key:

```
/**
  * Get the post that owns the comment.
  */
public function post()
{
    return $this->belongsTo('App\Post', 'foreign_key', 'other_key');
}
```

## Many To Many

Many-to-many relations are slightly more complicated than hasone and hasMany relationships. An example of such a relationship is a user with many roles, where the roles are also shared by other users. For example, many users may have the role of "Admin". To define this relationship, three database tables are needed: users, roles, and role\_user. The role\_user table is derived from the alphabetical order of the related model names, and contains the user\_id and role\_id columns.

Many-to-many relationships are defined by writing a method that returns the result of the belongsToMany method. For example, let's define the roles method on our User model:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * The roles that belong to the user.
    */
    public function roles()
    {
        return $this->belongsToMany('App\Role');
    }
}
```

Once the relationship is defined, you may access the user's roles using the roles dynamic property:

```
$user = App\User::find(1);
foreach ($user->roles as $role) {
   //
}
```

Of course, like all other relationship types, you may call the roles method to continue chaining query constraints onto the relationship:

```
p = App\User::find(1)->roles()->orderBy('name')->get();
```

As mentioned previously, to determine the table name of the relationship's joining table, Eloquent will join the two related model names in alphabetical order. However, you are free to override this convention. You may do so by passing a second argument to the belongsToMany method:

```
return $this->belongsToMany('App\Role', 'role_user');
```

In addition to customizing the name of the joining table, you may also customize the column names of the keys on the table by passing additional arguments to the belongstomany method. The third argument is the foreign key name of the model on which you are defining the relationship, while the fourth argument is the foreign key name of the model that you are joining to:

```
return $this->belongsToMany('App\Role', 'role_user', 'user_id', 'role_id');
```

## **Defining The Inverse Of The Relationship**

To define the inverse of a many-to-many relationship, you place another call to belongsToMany on your related model. To continue our user roles example, let's define the users method on the Role model:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Role extends Model
{
    /**
    * The users that belong to the role.
    */</pre>
```

```
public function users()
{
    return $this->belongsToMany('App\User');
}
```

As you can see, the relationship is defined exactly the same as its user counterpart, with the exception of referencing the App\user model. Since we're reusing the belongsToMany method, all of the usual table and key customization options are available when defining the inverse of many-to-many relationships.

#### **Retrieving Intermediate Table Columns**

As you have already learned, working with many-to-many relations requires the presence of an intermediate table. Eloquent provides some very helpful ways of interacting with this table. For example, let's assume our user object has many Role objects that it is related to. After accessing this relationship, we may access the intermediate table using the pivot attribute on the models:

```
$user = App\User::find(1);
foreach ($user->roles as $role) {
    echo $role->pivot->created_at;
}
```

Notice that each Role model we retrieve is automatically assigned a pivot attribute. This attribute contains a model representing the intermediate table, and may be used like any other Eloquent model.

By default, only the model keys will be present on the pivot object. If your pivot table contains extra attributes, you must specify them when defining the relationship:

```
return $this->belongsToMany('App\Role')->withPivot('column1', 'column2');
```

If you want your pivot table to have automatically maintained created\_at and updated\_at timestamps, use the withTimestamps method on the relationship definition:

```
return $this->belongsToMany('App\Role')->withTimestamps();
```

#### **Customizing The pivot Attribute Name**

As noted earlier, attributes from the intermediate table may be accessed on models using the pivot attribute. However, you are free to customize the name of this attribute to better reflect its purpose within your application.

For example, if your application contains users that may subscribe to podcasts, you probably have a many-to-many relationship between users and podcasts. If this is the case, you may wish to rename your intermediate table accessor to subscription instead of pivot. This can be done using the as method when defining the relationship:

Once this is done, you may access the intermediate table data using the customized name:

```
$users = User::with('podcasts')->get();
foreach ($users->flatMap->podcasts as $podcast) {
    echo $podcast->subscription->created_at;
}
```

#### Filtering Relationships Via Intermediate Table Columns

You can also filter the results returned by belongsToMany using the wherePivot and wherePivotIn methods when defining the relationship:

```
\label{lem:continuous} return $$ this->belongsToMany('App\Role')-> where Pivot('approved', 1); $$ return $$ this->belongsToMany('App\Role')-> where PivotIn('priority', [1, 2]); $$ return $$ this->belongsToMany('App\Role')-> where PivotIn('priority', [1, 2]) $$ return $$ this->belongsToMany('App\Role')-> where PivotIn('pr
```

#### **Defining Custom Intermediate Table Models**

If you would like to define a custom model to represent the intermediate table of your relationship, you may call the using method when defining the relationship. Custom many-to-many pivot models should extend the

Illuminate\Database\Eloquent\Relations\Pivot class while custom polymorphic many-to-many pivot models should extend the Illuminate\Database\Eloquent\Relations\MorphPivot class. For example, we may define a Role which uses a custom UserRole pivot model:

```
<?php
```

```
namespace App;
use Illuminate\Database\Eloquent\Model;
class Role extends Model
{
    /**
        * The users that belong to the role.
        */
    public function users()
        {
            return $this->belongsToMany('App\User')->using('App\UserRole');
        }
}
When defining the UserRole model, we will extend the Pivot class:
<?php
namespace App;
use Illuminate\Database\Eloquent\Relations\Pivot;
class UserRole extends Pivot
{
        //
}</pre>
```

Of course, you can combine using and withPivot in order to retrieve columns from the intermediate table. For example, you may retrieve the created\_by and updated\_by columns from the UserRole pivot table by passing the column names to the withPivot method:

# **Has Many Through**

The "has-many-through" relationship provides a convenient shortcut for accessing distant relations via an intermediate relation. For example, a country model might have many Post models through an intermediate User model. In this example, you could easily gather all blog posts for a given country. Let's look at the tables required to define this relationship:

```
countries
   id - integer
   name - string

users
   id - integer
   country_id - integer
   name - string

posts
   id - integer
   user_id - integer
   title - string
```

Though posts does not contain a country\_id column, the hasManyThrough relation provides access to a country's posts via \$country->posts. To perform this query, Eloquent inspects the country\_id on the intermediate users table. After finding the matching user IDs, they are used to query the posts table.

Now that we have examined the table structure for the relationship, let's define it on the country model:

```
<?php
namespace App;</pre>
```

```
use Illuminate\Database\Eloquent\Model;

class Country extends Model
{
    /**
    * Get all of the posts for the country.
    */
    public function posts()
    {
        return $this->hasManyThrough('App\Post', 'App\User');
    }
}
```

The first argument passed to the hasManyThrough method is the name of the final model we wish to access, while the second argument is the name of the intermediate model.

Typical Eloquent foreign key conventions will be used when performing the relationship's queries. If you would like to customize the keys of the relationship, you may pass them as the third and fourth arguments to the hasManyThrough method. The third argument is the name of the foreign key on the intermediate model. The fourth argument is the name of the foreign key on the final model. The fifth argument is the local key, while the sixth argument is the local key of the intermediate model:

# **Polymorphic Relationships**

A polymorphic relationship allows the target model to belong to more than one type of model using a single association.

## One To One (Polymorphic)

#### **Table Structure**

A one-to-one polymorphic relation is similar to a simple one-to-one relation; however, the target model can belong to more than one type of model on a single association. For example, a blog Post and a User may share a polymorphic relation to an Image model. Using a one-to-one polymorphic relation allows you to have a single list of unique images that are used for both blog posts and user accounts. First, let's examine the table structure:

```
posts
   id - integer
   name - string

users
   id - integer
   name - string

images
   id - integer
   url - string
   imageable_id - integer
   imageable_type - string
```

Take note of the <code>imageable\_id</code> and <code>imageable\_type</code> columns on the <code>images</code> table. The <code>imageable\_id</code> column will contain the ID value of the post or user, while the <code>imageable\_type</code> column will contain the class name of the parent model. The <code>imageable\_type</code> column is used by Eloquent to determine which "type" of parent model to return when accessing the <code>imageable</code> relation.

#### **Model Structure**

Next, let's examine the model definitions needed to build this relationship:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Image extends Model</pre>
```

```
* Get all of the owning imageable models.
    public function imageable()
        return $this->morphTo();
}
class Post extends Model
    * Get the post's image.
    public function image()
        return $this->morphOne('App\Image', 'imageable');
    }
}
class User extends Model
     * Get the user's image.
    public function image()
        return $this->morphOne('App\Image', 'imageable');
    }
}
```

## **Retrieving The Relationship**

Once your database table and models are defined, you may access the relationships via your models. For example, to retrieve the image for a post, we can use the <code>image</code> dynamic property:

```
$post = App\Post::find(1);
$image = $post->image;
```

You may also retrieve the parent from the polymorphic model by accessing the name of the method that performs the call to morphTo. In our case, that is the imageable method on the Image model. So, we will access that method as a dynamic property:

```
$image = App\Image::find(1);
$imageable = $image->imageable;
```

The imageable relation on the Image model will return either a Post or User instance, depending on which type of model owns the image

## One To Many (Polymorphic)

## **Table Structure**

A one-to-many polymorphic relation is similar to a simple one-to-many relation; however, the target model can belong to more than one type of model on a single association. For example, imagine users of your application can "comment" on both posts and videos. Using polymorphic relationships, you may use a single comments table for both of these scenarios. First, let's examine the table structure required to build this relationship:

```
posts
   id - integer
   title - string
   body - text

videos
   id - integer
   title - string
   url - string

comments
   id - integer
   body - text
   commentable_id - integer
   commentable_type - string
```

#### **Model Structure**

Next, let's examine the model definitions needed to build this relationship:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Comment extends Model
     * Get all of the owning commentable models.
    public function commentable()
        return $this->morphTo():
    }
}
class Post extends Model
     * Get all of the post's comments.
    public function comments()
        return $this->morphMany('App\Comment', 'commentable');
    }
}
class Video extends Model
     * Get all of the video's comments.
    public function comments()
        return $this->morphMany('App\Comment', 'commentable');
    }
}
```

## **Retrieving The Relationship**

Once your database table and models are defined, you may access the relationships via your models. For example, to access all of the comments for a post, we can use the comments dynamic property:

```
$post = App\Post::find(1);
foreach ($post->comments as $comment) {
    //
```

You may also retrieve the owner of a polymorphic relation from the polymorphic model by accessing the name of the method that performs the call to morphTo. In our case, that is the commentable method on the comment model. So, we will access that method as a dynamic property:

```
$comment = App\Comment::find(1);
$commentable = $comment->commentable;
```

The commentable relation on the comment model will return either a Post or Video instance, depending on which type of model owns the comment.

## Many To Many (Polymorphic)

## **Table Structure**

Many-to-many polymorphic relations are slightly more complicated than morphone and morphone relationships. For example, a blog Post and Video model could share a polymorphic relation to a Tag model. Using a many-to-many polymorphic relation allows you to have a single list of unique tags that are shared across blog posts and videos. First, let's examine the table structure:

```
posts
id - integer
name - string

videos
id - integer
name - string

tags
id - integer
name - string

taggables
```

```
tag_id - integer
taggable_id - integer
taggable_type - string
```

#### **Model Structure**

Next, we're ready to define the relationships on the model. The Post and Video models will both have a tags method that calls the morphToMany method on the base Eloquent class:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Post extends Model
{
    /**
    * Get all of the tags for the post.
    */
    public function tags()
    {
        return $this->morphToMany('App\Tag', 'taggable');
    }
}
```

## **Defining The Inverse Of The Relationship**

Next, on the Tag model, you should define a method for each of its related models. So, for this example, we will define a posts method and a videos method:

```
<?php

namespace App;

use Illuminate\Database\Eloquent\Model;

class Tag extends Model
{
    /**
    * Get all of the posts that are assigned this tag.
    */
    public function posts()
    {
        return $this->morphedByMany('App\Post', 'taggable');
    }

    /**
    * Get all of the videos that are assigned this tag.
    */
    public function videos()
    {
        return $this->morphedByMany('App\Video', 'taggable');
    }
}
```

## **Retrieving The Relationship**

Once your database table and models are defined, you may access the relationships via your models. For example, to access all of the tags for a post, you can use the tags dynamic property:

```
$post = App\Post::find(1);
foreach ($post->tags as $tag) {
    //
}
```

You may also retrieve the owner of a polymorphic relation from the polymorphic model by accessing the name of the method that performs the call to morphedByMany. In our case, that is the posts or videos methods on the Tag model. So, you will access those methods as dynamic properties:

```
$tag = App\Tag::find(1);
foreach ($tag->videos as $video) {
   //
}
```

## **Custom Polymorphic Types**

By default, Laravel will use the fully qualified class name to store the type of the related model. For instance, given the one-to-

many example above where a Comment may belong to a Post or a Video, the default commentable\_type would be either App\Post or App\Video, respectively. However, you may wish to decouple your database from your application's internal structure. In that case, you may define a "morph map" to instruct Eloquent to use a custom name for each model instead of the class name:

use Illuminate\Database\Eloquent\Relations\Relation;

```
Relation::morphMap([
   'posts' => 'App\Post',
   'videos' => 'App\Video',
]);
```

You may register the morphMap in the boot function of your AppServiceProvider or create a separate service provider if you wish.

# **Querying Relations**

Since all types of Eloquent relationships are defined via methods, you may call those methods to obtain an instance of the relationship without actually executing the relationship queries. In addition, all types of Eloquent relationships also serve as <u>query builders</u>, allowing you to continue to chain constraints onto the relationship query before finally executing the SQL against your database.

For example, imagine a blog system in which a user model has many associated Post models:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * Get all of the posts for the user.
    */
    public function posts()
    {
        return $this->hasMany('App\Post');
    }
}
```

You may query the posts relationship and add additional constraints to the relationship like so:

```
$user = App\User::find(1);
$user->posts()->where('active', 1)->get();
```

You are able to use any of the <u>query builder</u> methods on the relationship, so be sure to explore the query builder documentation to learn about all of the methods that are available to you.

## **Relationship Methods Vs. Dynamic Properties**

If you do not need to add additional constraints to an Eloquent relationship query, you may access the relationship as if it were a property. For example, continuing to use our User and Post example models, we may access all of a user's posts like so:

Dynamic properties are "lazy loading", meaning they will only load their relationship data when you actually access them. Because of this, developers often use <a href="eager loading">eager loading</a> to pre-load relationships they know will be accessed after loading the model. Eager loading provides a significant reduction in SQL queries that must be executed to load a model's relations.

# **Querying Relationship Existence**

When accessing the records for a model, you may wish to limit your results based on the existence of a relationship. For example, imagine you want to retrieve all blog posts that have at least one comment. To do so, you may pass the name of the relationship to the has and or Has methods:

```
// Retrieve all posts that have at least one comment...
$posts = App\Post::has('comments')->get();
```

You may also specify an operator and count to further customize the query:

```
// Retrieve all posts that have three or more comments...
$posts = App\Post::has('comments', '>=', 3)->get();
```

Nested has statements may also be constructed using "dot" notation. For example, you may retrieve all posts that have at least one comment and vote:

```
// Retrieve posts that have at least one comment with votes...
$posts = App\Post::has('comments.votes')->get();
```

If you need even more power, you may use the whereHas and orWhereHas methods to put "where" conditions on your has queries. These methods allow you to add customized constraints to a relationship constraint, such as checking the content of a comment:

## **Querying Relationship Absence**

When accessing the records for a model, you may wish to limit your results based on the absence of a relationship. For example, imagine you want to retrieve all blog posts that **don't** have any comments. To do so, you may pass the name of the relationship to the doesntHave and orDoesntHave methods:

```
$posts = App\Post::doesntHave('comments')->get();
```

If you need even more power, you may use the whereDoesntHave and orWhereDoesntHave methods to put "where" conditions on your doesntHave queries. These methods allows you to add customized constraints to a relationship constraint, such as checking the content of a comment:

You may use "dot" notation to execute a query against a nested relationship. For example, the following query will retrieve all posts with comments from authors that are not banned:

```
$posts = App\Post::whereDoesntHave('comments.author', function ($query) {
    $query->where('banned', 1);
})->get();
```

#### **Counting Related Models**

If you want to count the number of results from a relationship without actually loading them you may use the withcount method, which will place a {relation}\_count column on your resulting models. For example:

```
$posts = App\Post::withCount('comments')->get();
foreach ($posts as $post) {
    echo $post->comments_count;
}
```

You may add the "counts" for multiple relations as well as add constraints to the queries:

You may also alias the relationship count result, allowing multiple counts on the same relationship:

If you're combining withCount with a select statement, ensure that you call withCount after the select method:

```
$query = App\Post::select(['title', 'body'])->withCount('comments');
echo $posts[0]->title;
```

```
echo $posts[0]->body;
echo $posts[0]->comments_count;
```

# **Eager Loading**

When accessing Eloquent relationships as properties, the relationship data is "lazy loaded". This means the relationship data is not actually loaded until you first access the property. However, Eloquent can "eager load" relationships at the time you query the parent model. Eager loading alleviates the N+1 query problem. To illustrate the N+1 query problem, consider a Book model that is related to Author:

```
<?php

namespace App;

use Illuminate\Database\Eloquent\Model;

class Book extends Model
{
    /**
    * Get the author that wrote the book.
    */
    public function author()
    {
        return $this->belongsTo('App\Author');
    }
}

Now, let's retrieve all books and their authors:

$books = App\Book::all();

foreach ($books as $book) {
        echo $book->author->name;
}
```

This loop will execute 1 query to retrieve all of the books on the table, then another query for each book to retrieve the author. So, if we have 25 books, this loop would run 26 queries: 1 for the original book, and 25 additional queries to retrieve the author of each book.

Thankfully, we can use eager loading to reduce this operation to just 2 queries. When querying, you may specify which relationships should be eager loaded using the with method:

```
$books = App\Book::with('author')->get();
foreach ($books as $book) {
    echo $book->author->name;
}
For this operation, only two queries will be executed:
select * from books
```

## **Eager Loading Multiple Relationships**

Sometimes you may need to eager load several different relationships in a single operation. To do so, just pass additional arguments to the with method:

```
\begin{cases} books = App\Book::with(['author', 'publisher'])->get(); \end{cases}
```

select \* from authors where id in  $(1, 2, 3, 4, 5, \ldots)$ 

## **Nested Eager Loading**

To eager load nested relationships, you may use "dot" syntax. For example, let's eager load all of the book's authors and all of the author's personal contacts in one Eloquent statement:

```
$books = App\Book::with('author.contacts')->get();
```

#### **Eager Loading Specific Columns**

You may not always need every column from the relationships you are retrieving. For this reason, Eloquent allows you to specify which columns of the relationship you would like to retrieve:

```
$users = App\Book::with('author:id, name')->get();
```

 $NOTE\ When\ using\ this\ feature,\ you\ should\ always\ include\ the\ {\tt id}\ column\ in\ the\ list\ of\ columns\ you\ wish\ to\ retrieve.$ 

## **Constraining Eager Loads**

Sometimes you may wish to eager load a relationship, but also specify additional query constraints for the eager loading query. Here's an example:

```
$users = App\User::with(['posts' => function ($query) {
    $query->where('title', 'like', '%first%');
}])->get();
```

In this example, Eloquent will only eager load posts where the post's title column contains the word first. Of course, you may call other <u>query builder</u> methods to further customize the eager loading operation:

```
$users = App\User::with(['posts' => function ($query) {
    $query->orderBy('created_at', 'desc');
}])->get();
```

## **Lazy Eager Loading**

Sometimes you may need to eager load a relationship after the parent model has already been retrieved. For example, this may be useful if you need to dynamically decide whether to load related models:

```
$books = App\Book::all();
if ($someCondition) {
        $books->load('author', 'publisher');
}
```

If you need to set additional query constraints on the eager loading query, you may pass an array keyed by the relationships you wish to load. The array values should be closure instances which receive the query instance:

```
$books->load(['author' => function ($query) {
    $query->orderBy('published_date', 'asc');
}]);
```

To load a relationship only when it has not already been loaded, use the loadMissing method:

# **Inserting & Updating Related Models**

## The Save Method

Eloquent provides convenient methods for adding new models to relationships. For example, perhaps you need to insert a new Comment for a Post model. Instead of manually setting the post\_id attribute on the Comment, you may insert the Comment directly from the relationship's save method:

```
$comment = new App\Comment(['message' => 'A new comment.']);
$post = App\Post::find(1);
$post->comments()->save($comment);
```

Notice that we did not access the comments relationship as a dynamic property. Instead, we called the comments method to obtain an instance of the relationship. The save method will automatically add the appropriate post\_id value to the new Comment model.

If you need to save multiple related models, you may use the saveMany method:

```
$post = App\Post::find(1);

$post->comments()->saveMany([
    new App\Comment(['message' => 'A new comment.']),
    new App\Comment(['message' => 'Another comment.']),
]);
```

#### **Recursively Saving Models & Relationships**

If you would like to save your model and all of its associated relationships, you may use the push method:

```
$post = App\Post::find(1);
```

```
$post->comments[0]->message = 'Message';
$post->comments[0]->author->name = 'Author Name';
$post->push();
```

#### The Create Method

In addition to the save and saveMany methods, you may also use the create method, which accepts an array of attributes, creates a model, and inserts it into the database. Again, the difference between save and create is that save accepts a full Eloquent model instance while create accepts a plain PHP array:

```
$post = App\Post::find(1);
$comment = $post->comments()->create([
    'message' => 'A new comment.',
1):
```

TIP Before using the create method, be sure to review the documentation on attribute <u>mass assignment</u>.

You may use the createMany method to create multiple related models:

You may also use the findOrNew, firstOrNew, firstOrCreate and updateOrCreate methods to <u>create and update models on relationships</u>.

## **Belongs To Relationships**

When updating a belongsTo relationship, you may use the associate method. This method will set the foreign key on the child model:

```
$account = App\Account::find(10);
$user->account()->associate($account);
$user->save();
```

When removing a belongs to relationship, you may use the dissociate method. This method will set the relationship's foreign key to null:

```
$user->account()->dissociate();
$user->save();
```

## **Default Models**

The belongsTo relationship allows you to define a default model that will be returned if the given relationship is null. This pattern is often referred to as the Null Object pattern and can help remove conditional checks in your code. In the following example, the user relation will return an empty App\user model if no user is attached to the post:

```
/**
    * Get the author of the post.
    */
public function user()
{
    return $this->belongsTo('App\User')->withDefault();
}
```

To populate the default model with attributes, you may pass an array or Closure to the withDefault method:

```
/**
  * Get the author of the post.
  */
public function user()
{
    return $this->belongsTo('App\User')->withDefault(function ($user) {
        $user->name = 'Guest Author';
    });
}
```

## **Many To Many Relationships**

## Attaching / Detaching

Eloquent also provides a few additional helper methods to make working with related models more convenient. For example, let's imagine a user can have many roles and a role can have many users. To attach a role to a user by inserting a record in the intermediate table that joins the models, use the attach method:

```
$user = App\User::find(1);
$user->roles()->attach($roleId);
```

When attaching a relationship to a model, you may also pass an array of additional data to be inserted into the intermediate table:

```
$user->roles()->attach($roleId, ['expires' => $expires]);
```

Of course, sometimes it may be necessary to remove a role from a user. To remove a many-to-many relationship record, use the detach method. The detach method will delete the appropriate record out of the intermediate table; however, both models will remain in the database:

```
// Detach a single role from the user...
$user->roles()->detach($roleId);

// Detach all roles from the user...
$user->roles()->detach();
```

For convenience, attach and detach also accept arrays of IDs as input:

```
$user = App\User::find(1);
$user->roles()->detach([1, 2, 3]);
$user->roles()->attach([
    1 => ['expires' => $expires],
    2 => ['expires' => $expires]]);
```

## **Syncing Associations**

You may also use the sync method to construct many-to-many associations. The sync method accepts an array of IDs to place on the intermediate table. Any IDs that are not in the given array will be removed from the intermediate table. So, after this operation is complete, only the IDs in the given array will exist in the intermediate table:

```
$user->roles()->sync([1, 2, 3]);
```

You may also pass additional intermediate table values with the IDs:

```
$user->roles()->sync([1 => ['expires' => true], 2, 3]);
```

If you do not want to detach existing IDs, you may use the syncwithoutDetaching method:

```
$user->roles()->syncWithoutDetaching([1, 2, 3]);
```

# **Toggling Associations**

The many-to-many relationship also provides a toggle method which "toggles" the attachment status of the given IDs. If the given ID is currently attached, it will be detached. Likewise, if it is currently detached, it will be attached:

```
$user->roles()->toggle([1, 2, 3]);
```

## Saving Additional Data On A Pivot Table

When working with a many-to-many relationship, the save method accepts an array of additional intermediate table attributes as its second argument:

```
App\User::find(1)->roles()->save($role, ['expires' => $expires]);
```

## **Updating A Record On A Pivot Table**

If you need to update an existing row in your pivot table, you may use updateExistingPivot method. This method accepts the pivot record foreign key and an array of attributes to update:

```
$user = App\User::find(1);
$user->roles()->updateExistingPivot($roleId, $attributes);
```

# **Touching Parent Timestamps**

When a model belongsTo or belongsToMany another model, such as a comment which belongs to a Post, it is sometimes helpful to update the parent's timestamp when the child model is updated. For example, when a comment model is updated, you may want to automatically "touch" the updated\_at timestamp of the owning Post. Eloquent makes it easy. Just add a touches property containing the names of the relationships to the child model:

```
<?php

namespace App;

use Illuminate\Database\Eloquent\Model;

class Comment extends Model
{
    /**
     * All of the relationships to be touched.
     *
     * @var array
     */
    protected $touches = ['post'];

    /**
     * Get the post that the comment belongs to.
     */
    public function post()
     {
          return $this->belongsTo('App\Post');
     }
}
```

Now, when you update a comment, the owning Post will have its updated\_at column updated as well, making it more convenient to know when to invalidate a cache of the Post model:

```
$comment = App\Comment::find(1);
$comment->text = 'Edit to this comment!';
$comment->save();
```

#### **Eloquent ORM**

# **Eloquent: Collections**

- Introduction
- Available Methods
- Custom Collections

## Introduction

All multi-result sets returned by Eloquent are instances of the <code>illuminate\Database\Eloquent\Collection</code> object, including results retrieved via the <code>get</code> method or accessed via a relationship. The Eloquent collection object extends the Laravel <a href="mailto:base collection">base collection</a>, so it naturally inherits dozens of methods used to fluently work with the underlying array of Eloquent models.

Of course, all collections also serve as iterators, allowing you to loop over them as if they were simple PHP arrays:

```
$users = App\User::where('active', 1)->get();
foreach ($users as $user) {
    echo $user->name;
}
```

However, collections are much more powerful than arrays and expose a variety of map / reduce operations that may be chained using an intuitive interface. For example, let's remove all inactive models and gather the first name for each remaining user:

```
$users = App\User::all();
$names = $users->reject(function ($user) {
    return $user->active === false;
})
->map(function ($user) {
    return $user->name;
});
```

NOTE While most Eloquent collection methods return a new instance of an Eloquent collection, the pluck, keys, zip, collapse, flatten and flip methods return a base collection instance. Likewise, if a map operation returns a collection that does not contain any Eloquent models, it will be automatically cast to a base collection.

# **Available Methods**

## **The Base Collection**

All Eloquent collections extend the base <u>Laravel collection</u> object; therefore, they inherit all of the powerful methods provided by the base collection class:

all average avg chunk collapse combine concat contains containsStrict count crossJoin dd diff diffKeys dump each eachSpread every except filter first flatMap flatten flip forget forPage get groupBy has implode intersect isEmpty isNotEmpty keyBy keys last map mapInto mapSpread mapToGroups mapWithKeys max median merge min mode nth only pad partition pipe pluck pop prepend pull push put random reduce reject reverse search shift shuffle slice some sort sortBy sortByDesc splice split sum take tap toArray toJson transform union unique uniqueStrict unless values when where whereStrict whereIn whereInStrict whereNotIn whereNotInStrict zip

# **Custom Collections**

If you need to use a custom collection object with your own extension methods, you may override the newCollection method on your model:

```
<?php
namespace App;
use App\CustomCollection;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
     * Create a new Eloquent Collection instance.
     *
     * @param array $models
     * @return \Illuminate\Database\Eloquent\Collection
     */
     public function newCollection(array $models = [])
     */
}</pre>
```

```
return new CustomCollection($models);
}
```

Once you have defined a newCollection method, you will receive an instance of your custom collection anytime Eloquent returns a Collection instance of that model. If you would like to use a custom collection for every model in your application, you should override the newCollection method on a base model class that is extended by all of your models.

#### **Eloquent ORM**

# **Eloquent: Mutators**

- Introduction
- Accessors & Mutators
  - Defining An Accessor
  - Defining A Mutator
- Date Mutators
- Attribute Casting
  - o Array & JSON Casting

## Introduction

Accessors and mutators allow you to format Eloquent attribute values when you retrieve or set them on model instances. For example, you may want to use the <u>Laravel encrypter</u> to encrypt a value while it is stored in the database, and then automatically decrypt the attribute when you access it on an Eloquent model.

In addition to custom accessors and mutators, Eloquent can also automatically cast date fields to <u>Carbon</u> instances or even <u>cast</u> text fields to <u>JSON</u>.

## **Accessors & Mutators**

## **Defining An Accessor**

To define an accessor, create a <code>getFooAttribute</code> method on your model where <code>Foo</code> is the "studly" cased name of the column you wish to access. In this example, we'll define an accessor for the <code>first\_name</code> attribute. The accessor will automatically be called by Eloquent when attempting to retrieve the value of the <code>first\_name</code> attribute:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * Get the user's first name.
    *
    * @param string $value
    * @return string
    */
    public function getFirstNameAttribute($value)
    {
        return ucfirst($value);
    }
}</pre>
```

As you can see, the original value of the column is passed to the accessor, allowing you to manipulate and return the value. To access the value of the accessor, you may access the first\_name attribute on a model instance:

```
$user = App\User::find(1);
$firstName = $user->first_name;
```

Of course, you may also use accessors to return new, computed values from existing attributes:

```
/**
  * Get the user's full name.
  *
  * @return string
  */
public function getFullNameAttribute()
{
     return "{$this->first_name} {$this->last_name}";
}
```

TIP If you would like these computed values to be added to the array / JSON representations of your model, <u>you will need to append them.</u>

# **Defining A Mutator**

To define a mutator, define a setFooAttribute method on your model where Foo is the "studly" cased name of the column you

wish to access. So, again, let's define a mutator for the first\_name attribute. This mutator will be automatically called when we attempt to set the value of the first\_name attribute on the model:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * Set the user's first name.
    * @param string $value
    * @return void
    */
    public function setFirstNameAttribute($value)
    {
        $this->attributes['first_name'] = strtolower($value);
    }
}
```

The mutator will receive the value that is being set on the attribute, allowing you to manipulate the value and set the manipulated value on the Eloquent model's internal <code>\$attributes</code> property. So, for example, if we attempt to set the <code>first\_name</code> attribute to <code>sally</code>:

```
$user = App\User::find(1);
$user->first_name = 'Sally';
```

In this example, the setFirstNameAttribute function will be called with the value Sally. The mutator will then apply the strtolower function to the name and set its resulting value in the internal \$attributes array.

#### **Date Mutators**

By default, Eloquent will convert the created\_at and updated\_at columns to instances of <u>Carbon</u>, which extends the PHP DateTime class and provides an assortment of helpful methods. You may add additional date attributes by setting the \$dates property of your model:

TIP You may disable the default created\_at and updated\_at timestamps by setting the public \$timestamps property of your model to false.

When a column is considered a date, you may set its value to a UNIX timestamp, date string (Y-m-d), date-time string, and of course a DateTime / Carbon instance. The date's value will be correctly converted and stored in your database:

```
$user = App\User::find(1);
$user->deleted_at = now();
$user->save();
```

As noted above, when retrieving attributes that are listed in your \$dates property, they will automatically be cast to <u>Carbon</u> instances, allowing you to use any of Carbon's methods on your attributes:

```
$user = App\User::find(1);
return $user->deleted_at->getTimestamp();
```

# **Date Formats**

By default, timestamps are formatted as 'Y-m-d H:i:s'. If you need to customize the timestamp format, set the \$dateFormat

property on your model. This property determines how date attributes are stored in the database, as well as their format when the model is serialized to an array or JSON:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class Flight extends Model
{
    /**
    * The storage format of the model's date columns.
    *
    @var string
    */
    protected $dateFormat = 'U';
}</pre>
```

# **Attribute Casting**

The \$casts property on your model provides a convenient method of converting attributes to common data types. The \$casts property should be an array where the key is the name of the attribute being cast and the value is the type you wish to cast the column to. The supported cast types are: integer, real, float, double, decimal:<digits>, string, boolean, object, array, collection, date, datetime, and timestamp. When casting to decimal, you should define the number of digits, eg. decimal:2

For example, let's cast the is\_admin attribute, which is stored in our database as an integer (0 or 1) to a boolean value:

Now the is\_admin attribute will always be cast to a boolean when you access it, even if the underlying value is stored in the database as an integer:

```
$user = App\User::find(1);
if ($user->is_admin) {
    //
```

## **Array & JSON Casting**

The array cast type is particularly useful when working with columns that are stored as serialized JSON. For example, if your database has a JSON or TEXT field type that contains serialized JSON, adding the array cast to that attribute will automatically deserialize the attribute to a PHP array when you access it on your Eloquent model:

Once the cast is defined, you may access the options attribute and it will automatically be descrialized from JSON into a PHP array. When you set the value of the options attribute, the given array will automatically be serialized back into JSON for storage:

```
$user = App\User::find(1);
$options = $user->options;
$options['key'] = 'value';
$user->options = $options;
$user->save();
```

# **Date Casting**

When using the date or datetime cast type, you may specify the date's format. This format will be used when the  $\underline{\text{model is}}$   $\underline{\text{serialized to an array or JSON}}$ :

```
/**
  * The attributes that should be cast to native types.
  * @var array
  */
protected $casts = [
    'created_at' => 'datetime:Y-m-d',
];
```

#### **Eloquent ORM**

# **Eloquent: API Resources**

- Introduction
- **Generating Resources**
- **Concept Overview**
- Writing Resources
  - o Data Wrapping
  - o Pagination

  - o Conditional Attributes
  - Conditional Relationships
  - Adding Meta Data
- Resource Responses

## Introduction

When building an API, you may need a transformation layer that sits between your Eloquent models and the JSON responses that are actually returned to your application's users. Laravel's resource classes allow you to expressively and easily transform your models and model collections into JSON.

# **Generating Resources**

To generate a resource class, you may use the make:resource Artisan command. By default, resources will be placed in the app/Http/Resources directory of your application. Resources extend the Illuminate\Http\Resources\Json\JsonResource class:

```
php artisan make:resource User
```

#### **Resource Collections**

In addition to generating resources that transform individual models, you may generate resources that are responsible for transforming collections of models. This allows your response to include links and other meta information that is relevant to an entire collection of a given resource.

To create a resource collection, you should use the --collection flag when creating the resource. Or, including the word collection in the resource name will indicate to Laravel that it should create a collection resource. Collection resources extend the Illuminate\Http\Resources\Json\ResourceCollection class:

```
php artisan make:resource Users --collection
php artisan make:resource UserCollection
```

# **Concept Overview**

TIP This is a high-level overview of resources and resource collections. You are highly encouraged to read the other sections of this documentation to gain a deeper understanding of the customization and power offered to you by resources.

Before diving into all of the options available to you when writing resources, let's first take a high-level look at how resources are used within Laravel. A resource class represents a single model that needs to be transformed into a JSON structure. For example, here is a simple user resource class:

```
namespace App\Http\Resources;
use Illuminate\Http\Resources\Json\JsonResource;
class User extends JsonResource
     * Transform the resource into an array.
       @param \Illuminate\Http\Request $request
       @return array
    public function toArray($request)
             'id => $this->id,
             'name' => $this->name,
'email' => $this->email,
             'created_at' => $this->created_at,
```

```
'updated_at' => $this->updated_at,
];
}
```

Every resource class defines a toArray method which returns the array of attributes that should be converted to JSON when sending the response. Notice that we can access model properties directly from the \$this variable. This is because a resource class will automatically proxy property and method access down to the underlying model for convenient access. Once the resource is defined, it may be returned from a route or controller:

```
use App\User;
use App\Http\Resources\User as UserResource;
Route::get('/user', function () {
    return new UserResource(User::find(1));
});
```

## **Resource Collections**

If you are returning a collection of resources or a paginated response, you may use the collection method when creating the resource instance in your route or controller:

```
use App\User;
use App\Http\Resources\User as UserResource;
Route::get('/user', function () {
    return UserResource::collection(User::all());
});
```

Of course, this does not allow any addition of meta data that may need to be returned with the collection. If you would like to customize the resource collection response, you may create a dedicated resource to represent the collection:

```
php artisan make:resource UserCollection
```

Once the resource collection class has been generated, you may easily define any meta data that should be included with the response:

After defining your resource collection, it may be returned from a route or controller:

```
use App\User;
use App\Http\Resources\UserCollection;
Route::get('/users', function () {
    return new UserCollection(User::all());
}):
```

## **Customizing The Underlying Resource Class**

Typically, the \$this->collection property of a resource collection is automatically populated with the result of mapping each item of the collection to its singular resource class. The singular resource class is assumed to be the collection's class name without the trailing collection string.

For example, UserCollection will attempt to map the given user instances into the User resource. To customize this behavior, you may override the \$collects property of your resource collection:

# **Writing Resources**

TIP If you have not read the <u>concept overview</u>, you are highly encouraged to do so before proceeding with this documentation.

In essence, resources are simple. They only need to transform a given model into an array. So, each resource contains a toArray method which translates your model's attributes into an API friendly array that can be returned to your users:

Once a resource has been defined, it may be returned directly from a route or controller:

```
use App\User;
use App\Http\Resources\User as UserResource;
Route::get('/user', function () {
    return new UserResource(User::find(1));
});
```

#### Relationships

If you would like to include related resources in your response, you may add them to the array returned by your toArray method. In this example, we will use the Post resource's collection method to add the user's blog posts to the resource response:

```
/**
 * Transform the resource into an array.
 *
 * @param \Illuminate\Http\Request $request
 * @return array
 */
public function toArray($request)
{
    return [
        'id' => $this->id,
        'name' => $this->name,
        'email' => $this->email,
        'posts' => PostResource::collection($this->posts),
        'created_at' => $this->created_at,
        'updated_at' => $this->updated_at,
    ];
}
```

TIP If you would like to include relationships only when they have already been loaded, check out the documentation on conditional relationships.

#### **Resource Collections**

While resources translate a single model into an array, resource collections translate a collection of models into an array. It is not absolutely necessary to define a resource collection class for each one of your model types since all resources provide a collection method to generate an "ad-hoc" resource collection on the fly:

```
use App\User;
use App\Http\Resources\User as UserResource;
Route::get('/user', function () {
    return UserResource::collection(User::all());
});
```

However, if you need to customize the meta data returned with the collection, it will be necessary to define a resource collection:

Like singular resources, resource collections may be returned directly from routes or controllers:

```
use App\User;
use App\Http\Resources\UserCollection;
Route::get('/users', function () {
    return new UserCollection(User::all());
}):
```

# **Data Wrapping**

By default, your outer-most resource is wrapped in a data key when the resource response is converted to JSON. So, for example, a typical resource collection response looks like the following:

If you would like to disable the wrapping of the outer-most resource, you may use the withoutwrapping method on the base resource class. Typically, you should call this method from your AppServiceProvider or another service provider that is loaded on every request to your application:

```
<?php
namespace App\Providers;
use Illuminate\Support\ServiceProvider;
use Illuminate\Http\Resources\Json\Resource;</pre>
```

NOTE The withoutwrapping method only affects the outer-most response and will not remove data keys that you manually add to your own resource collections.

## **Wrapping Nested Resources**

You have total freedom to determine how your resource's relationships are wrapped. If you would like all resource collections to be wrapped in a data key, regardless of their nesting, you should define a resource collection class for each resource and return the collection within a data key.

Of course, you may be wondering if this will cause your outer-most resource to be wrapped in two data keys. Don't worry, Laravel will never let your resources be accidentally double-wrapped, so you don't have to be concerned about the nesting level of the resource collection you are transforming:

```
<?php
namespace App\Http\Resources;
use Illuminate\Http\Resources\Json\ResourceCollection;
class CommentsCollection extends ResourceCollection
{
    /**
    * Transform the resource collection into an array.
    *
     * @param \Illuminate\Http\Request $request
     * @return array
     */
    public function toArray($request)
     {
          return ['data' => $this->collection];
     }
}
```

## **Data Wrapping And Pagination**

When returning paginated collections in a resource response, Laravel will wrap your resource data in a data key even if the withoutWrapping method has been called. This is because paginated responses always contain meta and links keys with information about the paginator's state:

```
"current_page": 1,
    "from": 1,
    "last_page": 1,
    "path": "http://example.com/pagination",
    "per_page": 15,
    "to": 10,
    "total": 10
}
```

## **Pagination**

You may always pass a paginator instance to the collection method of a resource or to a custom resource collection:

```
use App\Http\Resources\UserCollection;

Route::get('/users', function () {
    return new UserCollection(User::paginate());
});

Paginated responses always contain meta and links keys with information about the paginator's state:
```

## **Conditional Attributes**

Sometimes you may wish to only include an attribute in a resource response if a given condition is met. For example, you may wish to only include a value if the current user is an "administrator". Laravel provides a variety of helper methods to assist you in this situation. The when method may be used to conditionally add an attribute to a resource response:

In this example, the secret key will only be returned in the final resource response if the authenticated user's isAdmin method returns true. If the method returns false, the secret key will be removed from the resource response entirely before it is sent back to the client. The when method allows you to expressively define your resources without resorting to conditional statements when building the array.

The when method also accepts a Closure as its second argument, allowing you to calculate the resulting value only if the given

condition is true:

```
'secret' => $this->when(Auth::user()->isAdmin(), function () {
    return 'secret-value';
}),
```

#### **Merging Conditional Attributes**

Sometimes you may have several attributes that should only be included in the resource response based on the same condition. In this case, you may use the mergewhen method to include the attributes in the response only when the given condition is true:

Again, if the given condition is false, these attributes will be removed from the resource response entirely before it is sent to the client.

NOTE The mergewhen method should not be used within arrays that mix string and numeric keys. Furthermore, it should not be used within arrays with numeric keys that are not ordered sequentially.

#### **Conditional Relationships**

In addition to conditionally loading attributes, you may conditionally include relationships on your resource responses based on if the relationship has already been loaded on the model. This allows your controller to decide which relationships should be loaded on the model and your resource can easily include them only when they have actually been loaded.

Ultimately, this makes it easier to avoid "N+1" query problems within your resources. The whenLoaded method may be used to conditionally load a relationship. In order to avoid unnecessarily loading relationships, this method accepts the name of the relationship instead of the relationship itself:

```
/**
  * Transform the resource into an array.
  * @param \Illuminate\Http\Request $request
  * @return array
  */
public function toArray($request)
{
    return [
        'id' => $this->id,
        'name' => $this->name,
        'email' => $this->email,
        'posts' => PostResource::collection($this->whenLoaded('posts')),
        'created_at' => $this->created_at,
        'updated_at' => $this->updated_at,
];
}
```

In this example, if the relationship has not been loaded, the posts key will be removed from the resource response entirely before it is sent to the client.

## **Conditional Pivot Information**

In addition to conditionally including relationship information in your resource responses, you may conditionally include data from the intermediate tables of many-to-many relationships using the whenPivotLoaded method. The whenPivotLoaded method accepts the name of the pivot table as its first argument. The second argument should be a Closure that defines the value to be returned if the pivot information is available on the model:

```
/**
    * Transform the resource into an array.
```

```
* @param \Illuminate\Http\Request $request
* @return array
*/
public function toArray($request)
{
    return [
        'id' => $this->id,
        'name' => $this->name,
        'expires_at' => $this->whenPivotLoaded('role_user', function () {
            return $this->pivot->expires_at;
        }),
    ];
}
```

If your intermediate table is using an accessor other than pivot, you may use the whenPivotLoadedAs method:

```
/**
 * Transform the resource into an array.
 * @param \Illuminate\Http\Request $request
 * @return array
 */
public function toArray($request)
{
    return [
         'id' => $this->id,
         'name' => $this->name,
         'expires_at' => $this->whenPivotLoadedAs('subscription', 'role_user', function () {
         return $this->subscription->expires_at;
        }),
    ];
}
```

## **Adding Meta Data**

Some JSON API standards require the addition of meta data to your resource and resource collections responses. This often includes things like links to the resource or related resources, or meta data about the resource itself. If you need to return additional meta data about a resource, include it in your toArray method. For example, you might include link information when transforming a resource collection:

```
/**
  * Transform the resource into an array.
  * @param \Illuminate\Http\Request $request
  * @return array
  */
public function toArray($request)
{
  return [
    'data' => $this->collection,
    'links' => [
        'self' => 'link-value',
    ],
  ];
}
```

When returning additional meta data from your resources, you never have to worry about accidentally overriding the links or meta keys that are automatically added by Laravel when returning paginated responses. Any additional links you define will be merged with the links provided by the paginator.

## **Top Level Meta Data**

Sometimes you may wish to only include certain meta data with a resource response if the resource is the outer-most resource being returned. Typically, this includes meta information about the response as a whole. To define this meta data, add a with method to your resource class. This method should return an array of meta data to be included with the resource response only when the resource is the outer-most resource being rendered:

```
<?php
namespace App\Http\Resources;
use Illuminate\Http\Resources\Json\ResourceCollection;
class UserCollection extends ResourceCollection
{
    /**
        * Transform the resource collection into an array.
        * @param \Illuminate\Http\Request $request
        * @return array
        */
    public function toArray($request)</pre>
```

#### **Adding Meta Data When Constructing Resources**

You may also add top-level data when constructing resource instances in your route or controller. The additional method, which is available on all resources, accepts an array of data that should be added to the resource response:

# **Resource Responses**

As you have already read, resources may be returned directly from routes and controllers:

```
use App\User;
use App\Http\Resources\User as UserResource;
Route::get('/user', function () {
    return new UserResource(User::find(1));
});
```

However, sometimes you may need to customize the outgoing HTTP response before it is sent to the client. There are two ways to accomplish this. First, you may chain the response method onto the resource. This method will return an <code>Illuminate\Http\Response</code> instance, allowing you full control of the response's headers:

Alternatively, you may define a withResponse method within the resource itself. This method will be called when the resource is returned as the outer-most resource in a response:

#### **Eloquent ORM**

# **Eloquent: Serialization**

- Introduction
- Serializing Models & Collections
  - Serializing To Arrays
  - Serializing To JSON
- Hiding Attributes From JSON
- Appending Values To JSON
- Date Serialization

## Introduction

When building JSON APIs, you will often need to convert your models and relationships to arrays or JSON. Eloquent includes convenient methods for making these conversions, as well as controlling which attributes are included in your serializations.

# **Serializing Models & Collections**

## **Serializing To Arrays**

To convert a model and its loaded <u>relationships</u> to an array, you should use the toArray method. This method is recursive, so all attributes and all relations (including the relations of relations) will be converted to arrays:

```
$user = App\User::with('roles')->first();
return $user->toArray();
You may also convert entire collections of models to arrays:
$users = App\User::all();
return $users->toArray();
```

## **Serializing To JSON**

To convert a model to JSON, you should use the toJson method. Like toArray, the toJson method is recursive, so all attributes and relations will be converted to JSON. You may also specify JSON encoding options supported by PHP:

```
$user = App\User::find(1);
return $user->toJson();
return $user->toJson(JSON_PRETTY_PRINT);
```

Alternatively, you may cast a model or collection to a string, which will automatically call the toJson method on the model or collection:

```
$user = App\User::find(1);
return (string) $user;
```

Since models and collections are converted to JSON when cast to a string, you can return Eloquent objects directly from your application's routes or controllers:

```
Route::get('users', function () {
    return App\User::all();
});
```

# **Hiding Attributes From JSON**

Sometimes you may wish to limit the attributes, such as passwords, that are included in your model's array or JSON representation. To do so, add a \$hidden property to your model:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{</pre>
```

```
* The attributes that should be hidden for arrays.
    *
    * @var array
    */
    protected $hidden = ['password'];
}
```

NOTE When hiding relationships, use the relationship's method name.

Alternatively, you may use the visible property to define a white-list of attributes that should be included in your model's array and JSON representation. All other attributes will be hidden when the model is converted to an array or JSON:

## **Temporarily Modifying Attribute Visibility**

If you would like to make some typically hidden attributes visible on a given model instance, you may use the makeVisible method. The makeVisible method returns the model instance for convenient method chaining:

```
return $user->makeVisible('attribute')->toArray();
```

Likewise, if you would like to make some typically visible attributes hidden on a given model instance, you may use the makeHidden method.

```
return $user->makeHidden('attribute')->toArray();
```

# **Appending Values To JSON**

Occasionally, when casting models to an array or JSON, you may wish to add attributes that do not have a corresponding column in your database. To do so, first define an <u>accessor</u> for the value:

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * Get the administrator flag for the user.
    *
    * @return bool
    */
    public function getIsAdminAttribute()
    {
        return $this->attributes['admin'] == 'yes';
    }
}
```

After creating the accessor, add the attribute name to the appends property on the model. Note that attribute names are typically referenced in "snake case", even though the accessor is defined using "camel case":

```
<?php
namespace App;
use Illuminate\Database\Eloquent\Model;
class User extends Model
{
    /**
    * The accessors to append to the model's array form.
    *
    @var array
    */
    protected $appends = ['is_admin'];</pre>
```

}

Once the attribute has been added to the appends list, it will be included in both the model's array and JSON representations. Attributes in the appends array will also respect the visible and hidden settings configured on the model.

## **Appending At Run Time**

You may instruct a single model instance to append attributes using the append method. Or, you may use the setAppends method to override the entire array of appended properties for a given model instance:

```
return $user->append('is_admin')->toArray();
return $user->setAppends(['is_admin'])->toArray();
```

## **Date Serialization**

## **Customizing The Date Format Per Attribute**

You may customize the serialization format of individual Eloquent date attributes by specifying the date format in the <u>cast declaration</u>:

```
protected $casts = [
   'birthday' => 'date:Y-m-d',
   'joined_at' => 'datetime:Y-m-d H:00',
];
```

#### **Global Customization Via Carbon**

Laravel extends the <u>Carbon</u> date library in order to provide convenient customization of Carbon's JSON serialization format. To customize how all Carbon dates throughout your application are serialized, use the Carbon::serializeUsing method. The serializeUsing method accepts a Closure which returns a string representation of the date for JSON serialization:

```
<?php
namespace App\Providers;
use Illuminate\Support\Carbon;
use Illuminate\Support\ServiceProvider;
{\tt class} \ {\tt AppServiceProvider} \ {\tt extends} \ {\tt ServiceProvider}
     ^{\star} Perform post-registration booting of services.
     * @return void
    public function boot()
         Carbon::serializeUsing(function ($carbon) {
             return $carbon->format('U');
    }
     * Register bindings in the container.
       @return void
    public function register()
    }
}
```

**Testing** 

# **Testing: Getting Started**

- Introduction
- Environment
- Creating & Running Tests

#### Introduction

Laravel is built with testing in mind. In fact, support for testing with PHPUnit is included out of the box and a phpunit.xml file is already set up for your application. The framework also ships with convenient helper methods that allow you to expressively test your applications.

By default, your application's tests directory contains two directories: Feature and Unit. Unit tests are tests that focus on a very small, isolated portion of your code. In fact, most unit tests probably focus on a single method. Feature tests may test a larger portion of your code, including how several objects interact with each other or even a full HTTP request to a JSON endpoint.

An ExampleTest.php file is provided in both the Feature and Unit test directories. After installing a new Laravel application, run phpunit on the command line to run your tests.

## **Environment**

When running tests via phpunit, Laravel will automatically set the configuration environment to testing because of the environment variables defined in the phpunit.xml file. Laravel also automatically configures the session and cache to the array driver while testing, meaning no session or cache data will be persisted while testing.

You are free to define other testing environment configuration values as necessary. The testing environment variables may be configured in the phpunit.xml file, but make sure to clear your configuration cache using the config:clear Artisan command before running your tests!

In addition, you may create a .env.testing file in the root of your project. This file will override the .env file when running PHPUnit tests or executing Artisan commands with the --env=testing option.

## **Creating & Running Tests**

To create a new test case, use the make: test Artisan command:

```
// Create a test in the Feature directory...
php artisan make:test UserTest
// Create a test in the Unit directory...
php artisan make:test UserTest --unit
```

Once the test has been generated, you may define test methods as you normally would using PHPUnit. To run your tests, execute the phpunit command from your terminal:

```
<?php
namespace Tests\Unit;
use Tests\TestCase;
use Illuminate\Foundation\Testing\RefreshDatabase;
class ExampleTest extends TestCase
{
    /**
    * A basic test example.
    *
    * @return void
    */
    public function testBasicTest()
    {
        $this->assertTrue(true);
    }
}
```

NOTE If you define your own setup method within a test class, be sure to call parent::setup().

#### **Testing**

# **HTTP Tests**

- Introduction
  - o Customizing Request Headers
- Session / Authentication
- Testing JSON APIs
- Testing File Uploads
- Available Assertions
  - Response Assertions
  - Authentication Assertions

## Introduction

Laravel provides a very fluent API for making HTTP requests to your application and examining the output. For example, take a look at the test defined below:

```
<?php
namespace Tests\Feature;
use Tests\TestCase;
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;

class ExampleTest extends TestCase
{
    /**
    * A basic test example.
    *
    * @return void
    */
    public function testBasicTest()
    {
        $response = $this->get('/');
        $response->assertStatus(200);
    }
}
```

The get method makes a GET request into the application, while the assertStatus method asserts that the returned response should have the given HTTP status code. In addition to this simple assertion, Laravel also contains a variety of assertions for inspecting the response headers, content, JSON structure, and more.

## **Customizing Request Headers**

You may use the withHeaders method to customize the request's headers before it is sent to the application. This allows you to add any custom headers you would like to the request:

TIP The CSRF middleware is automatically disabled when running tests.

## **Session / Authentication**

Laravel provides several helpers for working with the session during HTTP testing. First, you may set the session data to a given array using the withsession method. This is useful for loading the session with data before issuing a request to your application:

Of course, one common use of the session is for maintaining state for the authenticated user. The actingAs helper method provides a simple way to authenticate a given user as the current user. For example, we may use a <u>model factory</u> to generate and authenticate a user:

You may also specify which guard should be used to authenticate the given user by passing the guard name as the second argument to the actingAs method:

```
$this->actingAs($user, 'api')
```

# **Testing JSON APIs**

Laravel also provides several helpers for testing JSON APIs and their responses. For example, the json, get, post, put, patch, and delete methods may be used to issue requests with various HTTP verbs. You may also easily pass data and headers to these methods. To get started, let's write a test to make a POST request to /user and assert that the expected data was returned:

TIP The assertJson method converts the response to an array and utilizes PHPUnit::assertArraySubset to verify that the given array exists within the JSON response returned by the application. So, if there are other properties in the JSON response, this test will still pass as long as the given fragment is present.

### **Verifying An Exact JSON Match**

If you would like to verify that the given array is an **exact** match for the JSON returned by the application, you should use the assertExactJson method:

```
<?php
class ExampleTest extends TestCase
{
    /**
    * A basic functional test example.</pre>
```

# **Testing File Uploads**

The Illuminate\http\UploadedFile class provides a fake method which may be used to generate dummy files or images for testing. This, combined with the Storage facade's fake method greatly simplifies the testing of file uploads. For example, you may combine these two features to easily test an avatar upload form:

```
<?php
namespace Tests\Feature;
use Tests\TestCase;
use Illuminate\Http\UploadedFile;
use Illuminate\Support\Facades\Storage;
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;
class ExampleTest extends TestCase
    public function testAvatarUpload()
        Storage::fake('avatars');
        $file = UploadedFile::fake()->image('avatar.jpg');
        $response = $this->json('POST', '/avatar', [
             'avatar' => $file,
        // Assert the file was stored...
        Storage::disk('avatars')->assertExists($file->hashName());
        // Assert a file does not exist...
        Storage::disk('avatars')->assertMissing('missing.jpg');
    }
}
```

# **Fake File Customization**

When creating files using the fake method, you may specify the width, height, and size of the image in order to better test your validation rules:

```
\label{local-prop} {\tt UploadedFile::fake()->image('avatar.jpg', $width, $height)->size(100);}
```

In addition to creating images, you may create files of any other type using the create method:

```
UploadedFile::fake()->create('document.pdf', $sizeInKilobytes);
```

# **Available Assertions**

### **Response Assertions**

Laravel provides a variety of custom assertion methods for your <a href="PHPUnit">PHPUnit</a> tests. These assertions may be accessed on the response that is returned from the json, get, post, put, and delete test methods:

assertCookie assertCookieExpired assertCookieNotExpired assertCookieMissing assertDontSee assertDontSeeText assertExactJson assertForbidden assertHeader assertHeaderMissing assertJsonCount assertJsonFragment assertJsonMissing assertJsonMissingExact assertJsonMissingValidationErrors assertJsonStructure assertJsonValidationErrors assertLocation assertNotFound assertOk assertPlainCookie assertRedirect assertSee assertSeeInOrder assertSeeText assertSeeTextInOrder assertSessionHas assertSessionHasAll assertSessionHasErrors assertSessionHasErrorsIn assertSessionHasNoErrors assertSessionMissing assertStatus assertSuccessful assertViewHas assertViewHasAll assertViewBasasertViewMissing

### assertCookie

Assert that the response contains the given cookie:

```
$response->assertCookie($cookieName, $value = null);
```

### assert Cookie Expired

Assert that the response contains the given cookie and it is expired:

```
$response->assertCookieExpired($cookieName);
```

#### assertCookieNotExpired

Assert that the response contains the given cookie and it is not expired:

```
$response->assertCookieNotExpired($cookieName);
```

# assertCookieMissing

Assert that the response does not contains the given cookie:

```
$response->assertCookieMissing($cookieName);
```

#### assertDontSee

Assert that the given string is not contained within the response:

```
$response->assertDontSee($value);
```

#### assertDontSeeText

Assert that the given string is not contained within the response text:

```
$response->assertDontSeeText($value);
```

### assertExactJson

Assert that the response contains an exact match of the given JSON data:

```
$response->assertExactJson(array $data);
```

### assertForbidden

Assert that the response has a forbidden status code:

```
$response->assertForbidden();
```

### assertHeader

Assert that the given header is present on the response:

```
$response->assertHeader($headerName, $value = null);
```

### assertHeaderMissing

Assert that the given header is not present on the response:

```
$response->assertHeaderMissing($headerName);
```

### assertJson

Assert that the response contains the given JSON data:

```
$response->assertJson(array $data);
```

#### assertJsonCount

Assert that the response JSON has an array with the expected number of items at the given key:

```
$response->assertJsonCount($count, $key = null);
```

### assertJsonFragment

Assert that the response contains the given JSON fragment:

\$response->assertJsonFragment(array \$data);

### assertJsonMissing

Assert that the response does not contain the given JSON fragment:

\$response->assertJsonMissing(array \$data);

#### assertJsonMissingExact

Assert that the response does not contain the exact JSON fragment:

\$response->assertJsonMissingExact(array \$data);

### assertJsonMissingValidationErrors

Assert that the response has no JSON validation errors for the given keys:

\$response->assertJsonMissingValidationErrors(\$keys);

#### assertJsonStructure

Assert that the response has a given JSON structure:

\$response->assertJsonStructure(array \$structure);

### assert Js on Validation Errors

Assert that the response has the given JSON validation errors for the given keys:

\$response->assertJsonValidationErrors(\$keys);

#### assertLocation

Assert that the response has the given URI value in the  ${\tt Location}$  header:

\$response->assertLocation(\$uri);

#### assertNotFound

Assert that the response has a not found status code:

\$response->assertNotFound();

#### assertOk

Assert that the response has a 200 status code:

\$response->assert0k();

# assert Plain Cookie

Assert that the response contains the given cookie (unencrypted):

\$response->assertPlainCookie(\$cookieName, \$value = null);

# assertRedirect

Assert that the response is a redirect to a given URI:

\$response->assertRedirect(\$uri);

#### assertSee

Assert that the given string is contained within the response:

```
$response->assertSee($value);
```

#### assertSeeInOrder

Assert that the given strings are contained in order within the response:

```
$response->assertSeeInOrder(array $values);
```

#### assertSeeText

Assert that the given string is contained within the response text:

```
$response->assertSeeText($value);
```

#### assertSeeTextInOrder

Assert that the given strings are contained in order within the response text:

```
$response->assertSeeTextInOrder(array $values);
```

#### assertSessionHas

Assert that the session contains the given piece of data:

```
$response->assertSessionHas($key, $value = null);
```

### assertSessionHasAll

Assert that the session has a given list of values:

```
$response->assertSessionHasAll(array $data);
```

#### assert Session Has Errors

Assert that the session contains an error for the given field:

```
$response->assertSessionHasErrors(array $keys, $format = null, $errorBag = 'default');
```

### assert Session Has Errors In

Assert that the session has the given errors:

```
\ensuremath{\mbox{\tt \$response-}}\xspace = \ensuremath{\mbox{\tt assertSessionHasErrorsIn(\$errorBag, $keys = [], $format = null);}
```

#### assertSessionHasNoErrors

Assert that the session has no errors:

```
$response->assertSessionHasNoErrors();
```

# assertSessionMissing

Assert that the session does not contain the given key:

```
$response->assertSessionMissing($key);
```

# assert Status

Assert that the response has a given code:

```
$response->assertStatus($code);
```

# assertSuccessful

Assert that the response has a successful status code:

```
$response->assertSuccessful();
```

# assertViewHas

Assert that the response view was given a piece of data:

```
$response->assertViewHas($key, $value = null);
```

### assertViewHasAll

Assert that the response view has a given list of data:

```
$response->assertViewHasAll(array $data);
```

#### assertViewIs

Assert that the given view was returned by the route:

```
$response->assertViewIs($value);
```

# assertViewMissing

Assert that the response view is missing a piece of bound data:

```
$response->assertViewMissing($key);
```

#### **Authentication Assertions**

Laravel also provides a variety of authentication related assertions for your **PHPUnit** tests:

# Method Description

### **Testing**

# **Console Tests**

- Introduction
- Expecting Input / Output

# Introduction

In addition to simplifying HTTP testing, Laravel provides a simple API for testing console applications that ask for user input.

# **Expecting Input / Output**

Laravel allows you to easily "mock" user input for your console commands using the expectsQuestion method. In addition, you may specify the exit code and text that you expect to be output by the console command using the assertExitCode and expectsQutput methods. For example, consider the following console command:

You may test this command with the following test which utilizes the expectsQuestion, expectsOutput, and assertExitCode methods:

#### **Testing**

# **Browser Tests (Laravel Dusk)**

- Introduction
- Installation
  - o <u>Using Other Browsers</u>
- Getting Started
  - Generating Tests
  - Running Tests
  - Environment Handling
  - Creating Browsers
  - o Browser Macros
  - Authentication
  - o Database Migrations
- Interacting With Elements
  - Dusk Selectors
  - Clicking Links
  - o <u>Text, Values, & Attributes</u>
  - o Using Forms
  - Attaching Files
  - <u>Using The Keyboard</u>
  - Using The Mouse
  - <u>Scoping Selectors</u>
  - Waiting For Elements
  - o Making Vue Assertions
- Available Assertions
- Pages
  - Generating Pages
  - o Configuring Pages
  - o Navigating To Pages
  - Shorthand Selectors
  - Page Methods
- Components
  - Generating Components
  - Using Components
- Continuous Integration
  - <u>CircleCI</u>
  - Codeship
  - Heroku CI
  - Travis CI

# Introduction

Laravel Dusk provides an expressive, easy-to-use browser automation and testing API. By default, Dusk does not require you to install JDK or Selenium on your machine. Instead, Dusk uses a standalone <a href="https://chemple.com/ChromeDriver">ChromeDriver</a> installation. However, you are free to utilize any other Selenium compatible driver you wish.

### **Installation**

To get started, you should add the laravel/dusk Composer dependency to your project:

```
composer require --dev laravel/dusk
```

NOTE If you are manually registering Dusk's service provider, you should **never** register it in your production environment, as doing so could lead to arbitrary users being able to authenticate with your application.

After installing the Dusk package, run the dusk:install Artisan command:

php artisan dusk:install

A Browser directory will be created within your tests directory and will contain an example test. Next, set the APP\_URL environment variable in your .env file. This value should match the URL you use to access your application in a browser.

To run your tests, use the dusk Artisan command. The dusk command accepts any argument that is also accepted by the phpunit command:

php artisan dusk

If you had test failures the last time you ran the dusk command, you may save time by re-running the failing tests first using the dusk:fails command:

```
php artisan dusk:fails
```

NOTE Dusk requires its chromedriver binaries to be executable. If you're having problems running Dusk, you can ensure the binaries are executable using the following command: chmod -R 0755 vendor/laravel/dusk/bin.

# **Using Other Browsers**

By default, Dusk uses Google Chrome and a standalone <u>ChromeDriver</u> installation to run your browser tests. However, you may start your own Selenium server and run your tests against any browser you wish.

To get started, open your tests/DuskTestCase.php file, which is the base Dusk test case for your application. Within this file, you can remove the call to the startChromeDriver method. This will stop Dusk from automatically starting the ChromeDriver:

```
/**
  * Prepare for Dusk test execution.
  * @beforeClass
  * @return void
  */
public static function prepare()
{
    // static::startChromeDriver();
}
```

Next, you may modify the driver method to connect to the URL and port of your choice. In addition, you may modify the "desired capabilities" that should be passed to the WebDriver:

# **Getting Started**

# **Generating Tests**

To generate a Dusk test, use the dusk:make Artisan command. The generated test will be placed in the tests/Browser directory:

```
php artisan dusk:make LoginTest
```

### **Running Tests**

To run your browser tests, use the dusk Artisan command:

```
php artisan dusk
```

If you had test failures the last time you ran the dusk command, you may save time by re-running the failing tests first using the dusk:fails command:

```
php artisan dusk:fails
```

The dusk command accepts any argument that is normally accepted by the PHPUnit test runner, allowing you to only run the tests for a given group, etc:

```
php artisan dusk --group=foo
```

# **Manually Starting ChromeDriver**

By default, Dusk will automatically attempt to start ChromeDriver. If this does not work for your particular system, you may manually start ChromeDriver before running the dusk command. If you choose to start ChromeDriver manually, you should comment out the following line of your tests/DuskTestCase.php file:

```
/**

* Prepare for Dusk test execution.

*

* @beforeClass
```

```
* @return void
*/
public static function prepare()
{
    // static::startChromeDriver();
}
```

In addition, if you start ChromeDriver on a port other than 9515, you should modify the driver method of the same class:

# **Environment Handling**

To force Dusk to use its own environment file when running tests, create a .env.dusk.{environment} file in the root of your project. For example, if you will be initiating the dusk command from your local environment, you should create a .env.dusk.local file.

When running tests, Dusk will back-up your .env file and rename your Dusk environment to .env. Once the tests have completed, your .env file will be restored.

#### **Creating Browsers**

To get started, let's write a test that verifies we can log into our application. After generating a test, we can modify it to navigate to the login page, enter some credentials, and click the "Login" button. To create a browser instance, call the browse method:

```
namespace Tests\Browser:
use App\User;
use Tests\DuskTestCase;
use Laravel\Dusk\Chrome
\hbox{\tt use Illuminate} \\ \hbox{\tt Foundation} \\ \hbox{\tt Testing} \\ \hbox{\tt Database Migrations;}
class ExampleTest extends DuskTestCase
{
     use DatabaseMigrations;
      * A basic browser test example.
      * @return void
     public function testBasicExample()
          $user = factory(User::class)->create([
   'email' => 'taylor@laravel.com',
          $this->browse(function ($browser) use ($user) {
               $browser->visit('/login')
    ->type('email', $user->email)
                         ->type('password', 'secret')
                         ->press('Login')
                         ->assertPathIs('/home');
          });
     }
}
```

As you can see in the example above, the browse method accepts a callback. A browser instance will automatically be passed to this callback by Dusk and is the main object used to interact with and make assertions against your application.

TIP This test can be used to test the login screen generated by the make: auth Artisan command.

# **Creating Multiple Browsers**

Sometimes you may need multiple browsers in order to properly carry out a test. For example, multiple browsers may be needed to test a chat screen that interacts with websockets. To create multiple browsers, "ask" for more than one browser in the signature of the callback given to the browse method:

```
$this->browse(function ($first, $second) {
    $first->loginAs(User::find(1))
        ->visit('/home')
        ->waitForText('Message');

$second->loginAs(User::find(2))
        ->visit('/home')
        ->waitForText('Message')
        ->type('message', 'Hey Taylor')
        ->press('Send');

$first->waitForText('Hey Taylor')
        ->assertSee('Jeffrey Way');
});
```

#### **Resizing Browser Windows**

You may use the resize method to adjust the size of the browser window:

```
$browser->resize(1920, 1080);
```

The maximize method may be used to maximize the browser window:

```
$browser->maximize();
```

#### **Browser Macros**

If you would like to define a custom browser method that you can re-use in a variety of your tests, you may use the macro method on the Browser class. Typically, you should call this method from a <u>service provider's</u> boot method:

The macro function accepts a name as its first argument, and a Closure as its second. The macro's Closure will be executed when calling the macro as a method on a Browser implementation:

# Authentication

Often, you will be testing pages that require authentication. You can use Dusk's loginAs method in order to avoid interacting with the login screen during every test. The loginAs method accepts a user ID or user model instance:

NOTE After using the loginAs method, the user session will be maintained for all tests within the file.

### **Database Migrations**

When your test requires migrations, like the authentication example above, you should never use the RefreshDatabase trait. The RefreshDatabase trait leverages database transactions which will not be applicable across HTTP requests. Instead, use the DatabaseMigrations trait:

```
<?php
namespace Tests\Browser;
use App\User;
use Tests\Dusk\TestCase;
use Laravel\Dusk\Chrome;
use Illuminate\Foundation\Testing\DatabaseMigrations;
class ExampleTest extends DuskTestCase
{
    use DatabaseMigrations;
}</pre>
```

# **Interacting With Elements**

### **Dusk Selectors**

Choosing good CSS selectors for interacting with elements is one of the hardest parts of writing Dusk tests. Over time, frontend changes can cause CSS selectors like the following to break your tests:

```
// HTML...
<button>Login</button>
// Test...
$browser->click('.login-page .container div > button');
```

Dusk selectors allow you to focus on writing effective tests rather than remembering CSS selectors. To define a selector, add a dusk attribute to your HTML element. Then, prefix the selector with @ to manipulate the attached element within a Dusk test:

```
// HTML...
<button dusk="login-button">Login</button>
// Test...
$browser->click('@login-button');
```

# **Clicking Links**

To click a link, you may use the clickLink method on the browser instance. The clickLink method will click the link that has the given display text:

```
$browser->clickLink($linkText);
```

NOTE This method interacts with jQuery. If jQuery is not available on the page, Dusk will automatically inject it into the page so it is available for the test's duration.

# Text, Values, & Attributes

# **Retrieving & Setting Values**

Dusk provides several methods for interacting with the current display text, value, and attributes of elements on the page. For example, to get the "value" of an element that matches a given selector, use the value method:

```
// Retrieve the value...
$value = $browser->value('selector');
// Set the value...
$browser->value('selector', 'value');
```

# **Retrieving Text**

The text method may be used to retrieve the display text of an element that matches the given selector:

```
$text = $browser->text('selector');
```

### **Retrieving Attributes**

Finally, the attribute method may be used to retrieve an attribute of an element matching the given selector:

```
$attribute = $browser->attribute('selector', 'value');
```

### **Using Forms**

### **Typing Values**

Dusk provides a variety of methods for interacting with forms and input elements. First, let's take a look at an example of typing text into an input field:

```
$browser->type('email', 'taylor@laravel.com');
```

Note that, although the method accepts one if necessary, we are not required to pass a CSS selector into the type method. If a CSS selector is not provided, Dusk will search for an input field with the given name attribute. Finally, Dusk will attempt to find a textarea with the given name attribute.

To append text to a field without clearing its content, you may use the append method:

```
$browser->type('tags', 'foo')
    ->append('tags', ', bar, baz');
```

You may clear the value of an input using the clear method:

```
$browser->clear('email');
```

#### **Dropdowns**

To select a value in a dropdown selection box, you may use the select method. Like the type method, the select method does not require a full CSS selector. When passing a value to the select method, you should pass the underlying option value instead of the display text:

```
$browser->select('size', 'Large');
```

You may select a random option by omitting the second parameter:

```
$browser->select('size');
```

#### Checkboxes

To "check" a checkbox field, you may use the check method. Like many other input related methods, a full CSS selector is not required. If an exact selector match can't be found, Dusk will search for a checkbox with a matching name attribute:

```
$browser->check('terms');
$browser->uncheck('terms');
```

#### **Radio Buttons**

To "select" a radio button option, you may use the radio method. Like many other input related methods, a full CSS selector is not required. If an exact selector match can't be found, Dusk will search for a radio with matching name and value attributes:

```
$browser->radio('version', 'php7');
```

### **Attaching Files**

The attach method may be used to attach a file to a file input element. Like many other input related methods, a full CSS selector is not required. If an exact selector match can't be found, Dusk will search for a file input with matching name attribute:

```
$browser->attach('photo', __DIR__.'/photos/me.png');
```

NOTE The attach function requires the Zip PHP extension to be installed and enabled on your server.

#### **Using The Keyboard**

The keys method allows you to provide more complex input sequences to a given element than normally allowed by the type method. For example, you may hold modifier keys entering values. In this example, the shift key will be held while taylor is entered into the element matching the given selector. After taylor is typed, otwell will be typed without any modifier keys:

```
$browser->keys('selector', ['{shift}', 'taylor'], 'otwell');
```

You may even send a "hot key" to the primary CSS selector that contains your application:

```
$browser->keys('.app', ['{command}', 'j']);
```

TIP All modifier keys are wrapped in {} characters, and match the constants defined in the Facebook\WebDriver\WebDriverKeys class, which can be <u>found on GitHub</u>.

### **Using The Mouse**

#### **Clicking On Elements**

The click method may be used to "click" on an element matching the given selector:

```
$browser->click('.selector');
```

#### Mouseover

The mouseover method may be used when you need to move the mouse over an element matching the given selector:

```
$browser->mouseover('.selector');
```

#### Drag & Drop

The drag method may be used to drag an element matching the given selector to another element:

```
$browser->drag('.from-selector', '.to-selector');
```

Or, you may drag an element in a single direction:

```
$browser->dragLeft('.selector', 10);
$browser->dragRight('.selector', 10);
$browser->dragUp('.selector', 10);
$browser->dragDown('.selector', 10);
```

#### **Scoping Selectors**

Sometimes you may wish to perform several operations while scoping all of the operations within a given selector. For example, you may wish to assert that some text exists only within a table and then click a button within that table. You may use the with method to accomplish this. All operations performed within the callback given to the with method will be scoped to the original selector:

# **Waiting For Elements**

When testing applications that use JavaScript extensively, it often becomes necessary to "wait" for certain elements or data to be available before proceeding with a test. Dusk makes this a cinch. Using a variety of methods, you may wait for elements to be visible on the page or even wait until a given JavaScript expression evaluates to true.

### Waiting

If you need to pause the test for a given number of milliseconds, use the pause method:

```
$browser->pause(1000);
```

### **Waiting For Selectors**

The waitFor method may be used to pause the execution of the test until the element matching the given CSS selector is displayed on the page. By default, this will pause the test for a maximum of five seconds before throwing an exception. If necessary, you may pass a custom timeout threshold as the second argument to the method:

```
// Wait a maximum of five seconds for the selector...
$browser->waitFor('.selector');
// Wait a maximum of one second for the selector...
$browser->waitFor('.selector', 1);
```

You may also wait until the given selector is missing from the page:

```
$browser->waitUntilMissing('.selector');
$browser->waitUntilMissing('.selector', 1);
```

### **Scoping Selectors When Available**

Occasionally, you may wish to wait for a given selector and then interact with the element matching the selector. For example, you may wish to wait until a modal window is available and then press the "OK" button within the modal. The whenAvailable method may be used in this case. All element operations performed within the given callback will be scoped to the original selector:

### **Waiting For Text**

The waitForText method may be used to wait until the given text is displayed on the page:

```
// Wait a maximum of five seconds for the text...
$browser->waitForText('Hello World');
// Wait a maximum of one second for the text...
$browser->waitForText('Hello World', 1);
```

#### **Waiting For Links**

The waitForLink method may be used to wait until the given link text is displayed on the page:

```
// Wait a maximum of five seconds for the link...
$browser->waitForLink('Create');
// Wait a maximum of one second for the link...
$browser->waitForLink('Create', 1);
```

#### **Waiting On The Page Location**

When making a path assertion such as \$browser->assertPathIs('/home'), the assertion can fail if window.location.pathname is being updated asynchronously. You may use the waitForLocation method to wait for the location to be a given value:

```
$browser->waitForLocation('/secret');
```

You may also wait for a named route's location:

```
$browser->waitForRoute($routeName, $parameters);
```

#### **Waiting for Page Reloads**

If you need to make assertions after a page has been reloaded, use the waitForReload method:

```
$browser->click('.some-action')
    ->waitForReload()
    ->assertSee('something');
```

#### **Waiting On JavaScript Expressions**

Sometimes you may wish to pause the execution of a test until a given JavaScript expression evaluates to true. You may easily accomplish this using the waitUntil method. When passing an expression to this method, you do not need to include the return keyword or an ending semi-colon:

```
// Wait a maximum of five seconds for the expression to be true...
$browser->waitUntil('App.dataLoaded');

$browser->waitUntil('App.data.servers.length > 0');

// Wait a maximum of one second for the expression to be true...
$browser->waitUntil('App.data.servers.length > 0', 1);
```

# Waiting On Vue Expressions

The following methods may be used to wait until a given Vue component attribute has a given value:

```
// Wait until the component attribute contains the given value...
$browser->waitUntilVueIs('user.name', 'Taylor', '@user');
// Wait until the component attribute doesn't contain the given value...
$browser->waitUntilVueIsNot('user.name', null, '@user');
```

### Waiting With A Callback

Many of the "wait" methods in Dusk rely on the underlying waitUsing method. You may use this method directly to wait for a given callback to return true. The waitUsing method accepts the maximum number of seconds to wait, the interval at which the Closure should be evaluated, the Closure, and an optional failure message:

```
$browser->waitUsing(10, 1, function () use ($something) {
```

```
return $something->isReady();
}, "Something wasn't ready in time.");
```

# **Making Vue Assertions**

Dusk even allows you to make assertions on the state of <u>Vue</u> component data. For example, imagine your application contains the following Vue component:

```
// HTML...
<profile dusk="profile-component"></profile>
// Component Definition...

Vue.component('profile', {
    template: '<div>{{ user.name }}</div>',
    data: function () {
        return {
            user: {
                 name: 'Taylor'
            }
        };
    }
};
```

You may assert on the state of the Vue component like so:

# **Available Assertions**

Dusk provides a variety of assertions that you may make against your application. All of the available assertions are documented in the list below:

assertTitle assertTitleContains assertUrlIs assertSchemeIs assertSchemeIsNot assertHostIs assertHostIs assertPortIs
assertPortIsNot assertPathBeginsWith assertPathIs assertPathIsNot assertRouteIs assertQueryStringHas assertQueryStringMissing
assertFragmentIs assertFragmentBeginsWith assertFragmentIsNot assertHasCookie assertCookieMissing assertCookieValue
assertPlainCookieValue assertSee assertDontSee assertDontSeeIn assertSourceHas assertSourceMissing assertSeeLink
assertDontSeeLink assertInputValue assertInputValueIsNot assertChecked assertNotChecked assertRadioSelected
assertRadioNotSelected assertSelected assertSelectHasOptions assertSelectHasOptions
assertSelectHasOption assertValue assertVisible assertPresent assertMissing assertDialogOpened assertEnabled assertDisabled
assertFocused assertNotFocused assertVue assertVueIsNot assertVueContains assertVueDoesNotContain

# assertTitle

Assert that the page title matches the given text:

```
$browser->assertTitle($title);
```

# assertTitleContains

Assert that the page title contains the given text:

```
$browser->assertTitleContains($title);
```

### assertUrlIs

Assert that the current URL (without the query string) matches the given string:

```
$browser->assertUrlIs($url);
```

#### assertSchemeIs

Assert that the current URL scheme matches the given scheme:

```
$browser->assertSchemeIs($scheme);
```

#### assertSchemeIsNot

Assert that the current URL scheme does not match the given scheme:

```
$browser->assertSchemeIsNot($scheme);
```

#### assertHostIs

Assert that the current URL host matches the given host:

```
$browser->assertHostIs($host);
```

# assertHostIsNot

Assert that the current URL host does not match the given host:

```
$browser->assertHostIsNot($host);
```

#### assertPortIs

Assert that the current URL port matches the given port:

```
$browser->assertPortIs($port);
```

#### assertPortIsNot

Assert that the current URL port does not match the given port:

```
$browser->assertPortIsNot($port);
```

### assertPathBeginsWith

Assert that the current URL path begins with the given path:

```
$browser->assertPathBeginsWith($path);
```

### assertPathIs

Assert that the current path matches the given path:

```
$browser->assertPathIs('/home');
```

#### assertPathIsNot

Assert that the current path does not match the given path:

```
$browser->assertPathIsNot('/home');
```

### assertRouteIs

Assert that the current URL matches the given named route's URL:

```
$browser->assertRouteIs($name, $parameters);
```

# as sert Query String Has

Assert that the given query string parameter is present:

```
$browser->assertQueryStringHas($name);
```

Assert that the given query string parameter is present and has a given value:

```
$browser->assertQueryStringHas($name, $value);
```

# assertQueryStringMissing

Assert that the given query string parameter is missing:

```
$browser->assertQueryStringMissing($name);
```

#### assertFragmentIs

Assert that the current fragment matches the given fragment:

```
$browser->assertFragmentIs('anchor');
```

### assert Fragment Begins With

Assert that the current fragment begins with the given fragment:

```
$browser->assertFragmentBeginsWith('anchor');
```

#### assertFragmentIsNot

Assert that the current fragment does not match the given fragment:

```
$browser->assertFragmentIsNot('anchor');
```

#### assertHasCookie

Assert that the given cookie is present:

```
$browser->assertHasCookie($name);
```

### assertCookieMissing

Assert that the given cookie is not present:

```
$browser->assertCookieMissing($name);
```

# assertCookieValue

Assert that a cookie has a given value:

```
$browser->assertCookieValue($name, $value);
```

### assertPlainCookieValue

Assert that an unencrypted cookie has a given value:

```
$browser->assertPlainCookieValue($name, $value);
```

#### assertSee

Assert that the given text is present on the page:

```
$browser->assertSee($text);
```

### assertDontSee

Assert that the given text is not present on the page:

```
$browser->assertDontSee($text);
```

# assert See In

Assert that the given text is present within the selector:

```
$browser->assertSeeIn($selector, $text);
```

# assertDontSeeIn

Assert that the given text is not present within the selector:

```
$browser->assertDontSeeIn($selector, $text);
```

# assertSourceHas

Assert that the given source code is present on the page:

```
$browser->assertSourceHas($code);
```

### assertSourceMissing

Assert that the given source code is not present on the page:

```
$browser->assertSourceMissing($code);
```

#### assertSeeLink

Assert that the given link is present on the page:

```
$browser->assertSeeLink($linkText);
```

#### assertDontSeeLink

Assert that the given link is not present on the page:

```
$browser->assertDontSeeLink($linkText);
```

#### assertInputValue

Assert that the given input field has the given value:

```
$browser->assertInputValue($field, $value);
```

#### assertInputValueIsNot

Assert that the given input field does not have the given value:

```
$browser->assertInputValueIsNot($field, $value);
```

# assertChecked

Assert that the given checkbox is checked:

```
$browser->assertChecked($field);
```

### assertNotChecked

Assert that the given checkbox is not checked:

```
$browser->assertNotChecked($field);
```

### assertRadioSelected

Assert that the given radio field is selected:

```
$browser->assertRadioSelected($field, $value);
```

### assert Radio Not Selected

Assert that the given radio field is not selected:

```
$browser->assertRadioNotSelected($field, $value);
```

# assertSelected

Assert that the given dropdown has the given value selected:

```
$browser->assertSelected($field, $value);
```

### assertNotSelected

Assert that the given dropdown does not have the given value selected:

```
$browser->assertNotSelected($field, $value);
```

### assert Select Has Options

Assert that the given array of values are available to be selected:

```
$browser->assertSelectHasOptions($field, $values);
```

# assert Select Missing Options

Assert that the given array of values are not available to be selected:

```
$browser->assertSelectMissingOptions($field, $values);
```

#### assert Select Has Option

Assert that the given value is available to be selected on the given field:

```
$browser->assertSelectHasOption($field, $value);
```

#### assertValue

Assert that the element matching the given selector has the given value:

```
$browser->assertValue($selector, $value);
```

#### assertVisible

Assert that the element matching the given selector is visible:

```
$browser->assertVisible($selector);
```

#### assertPresent

Assert that the element matching the given selector is present:

```
$browser->assertPresent($selector);
```

#### assertMissing

Assert that the element matching the given selector is not visible:

```
$browser->assertMissing($selector);
```

# assertDialogOpened

Assert that a JavaScript dialog with the given message has been opened:

```
$browser->assertDialogOpened($message);
```

#### assertEnabled

Assert that the given field is enabled:

```
$browser->assertEnabled($field);
```

# assertDisabled

Assert that the given field is disabled:

```
$browser->assertDisabled($field);
```

# assertFocused

Assert that the given field is focused:

```
$browser->assertFocused($field);
```

### assertNotFocused

Assert that the given field is not focused:

```
$browser->assertNotFocused($field);
```

#### assertVue

Assert that a given Vue component data property matches the given value:

```
$browser->assertVue($property, $value, $componentSelector = null);
```

#### assertVueIsNot

Assert that a given Vue component data property does not match the given value:

```
$browser->assertVueIsNot($property, $value, $componentSelector = null);
```

#### assertVueContains

Assert that a given Vue component data property is an array and contains the given value:

```
$browser->assertVueContains($property, $value, $componentSelector = null);
```

#### assertVueDoesNotContain

Assert that a given Vue component data property is an array and does not contain the given value:

```
$browser->assertVueDoesNotContain($property, $value, $componentSelector = null);
```

# **Pages**

Sometimes, tests require several complicated actions to be performed in sequence. This can make your tests harder to read and understand. Pages allow you to define expressive actions that may then be performed on a given page using a single method. Pages also allow you to define short-cuts to common selectors for your application or a single page.

### **Generating Pages**

To generate a page object, use the dusk:page Artisan command. All page objects will be placed in the tests/Browser/Pages directory:

```
php artisan dusk:page Login
```

# **Configuring Pages**

By default, pages have three methods: url, assert, and elements. We will discuss the url and assert methods now. The elements method will be  $\frac{\text{discussed in more detail below}}{\text{discussed in more detail below}}$ .

# The url Method

The ur1 method should return the path of the URL that represents the page. Dusk will use this URL when navigating to the page in the browser:

```
/**

* Get the URL for the page.

* @return string

*/
public function url()
{
    return '/login';
}
```

### The assert Method

The assert method may make any assertions necessary to verify that the browser is actually on the given page. Completing this method is not necessary; however, you are free to make these assertions if you wish. These assertions will be run automatically when navigating to the page:

```
* Assert that the browser is on the page.

* @return void

*/
public function assert(Browser $browser)
{
$browser->assertPathIs($this->url());
```

}

### **Navigating To Pages**

Once a page has been configured, you may navigate to it using the visit method:

```
use Tests\Browser\Pages\Login;
$browser->visit(new Login);
```

Sometimes you may already be on a given page and need to "load" the page's selectors and methods into the current test context. This is common when pressing a button and being redirected to a given page without explicitly navigating to it. In this situation, you may use the on method to load the page:

### **Shorthand Selectors**

The elements method of pages allows you to define quick, easy-to-remember shortcuts for any CSS selector on your page. For example, let's define a shortcut for the "email" input field of the application's login page:

Now, you may use this shorthand selector anywhere you would use a full CSS selector:

```
$browser->type('@email', 'taylor@laravel.com');
```

# **Global Shorthand Selectors**

After installing Dusk, a base Page class will be placed in your tests/Browser/Pages directory. This class contains a siteElements method which may be used to define global shorthand selectors that should be available on every page throughout your application:

# **Page Methods**

In addition to the default methods defined on pages, you may define additional methods which may be used throughout your tests. For example, let's imagine we are building a music management application. A common action for one page of the application might be to create a playlist. Instead of re-writing the logic to create a playlist in each test, you may define a createPlaylist method on a page class:

```
<?php
namespace Tests\Browser\Pages;
use Laravel\Dusk\Browser;
class Dashboard extends Page
{
    // Other page methods...
    /**
    * Create a new playlist.</pre>
```

Once the method has been defined, you may use it within any test that utilizes the page. The browser instance will automatically be passed to the page method:

```
use Tests\Browser\Pages\Dashboard;
$browser->visit(new Dashboard)
    ->createPlaylist('My Playlist')
    ->assertSee('My Playlist');
```

# **Components**

Components are similar to Dusk's "page objects", but are intended for pieces of UI and functionality that are re-used throughout your application, such as a navigation bar or notification window. As such, components are not bound to specific URLs.

### **Generating Components**

To generate a component, use the dusk:component Artisan command. New components are placed in the test/Browser/Components directory:

```
php artisan dusk:component DatePicker
```

As shown above, a "date picker" is an example of a component that might exist throughout your application on a variety of pages. It can become cumbersome to manually write the browser automation logic to select a date in dozens of tests throughout your test suite. Instead, we can define a Dusk component to represent the date picker, allowing us to encapsulate that logic within the component:

```
<?php
namespace Tests\Browser\Components;
use Laravel\Dusk\Browser:
use Laravel\Dusk\Component as BaseComponent;
class DatePicker extends BaseComponent
     * Get the root selector for the component.
     * @return string
    public function selector()
        return '.date-picker';
    }
     ^{\star} Assert that the browser page contains the component.
       @param Browser $browser
       @return void
    public function assert(Browser $browser)
        $browser->assertVisible($this->selector());
    }
     \ensuremath{^{\star}} Get the element shortcuts for the component.
       @return array
    public function elements()
        return [
             ...<sub>[</sub>
'@date-field' => 'input.datepicker-input',
             '@month-list' => 'div > div.datepicker-months',
             '@day-list' => 'div > div.datepicker-days',
        ];
    }
```

# **Using Components**

Once the component has been defined, we can easily select a date within the date picker from any test. And, if the logic necessary to select a date changes, we only need to update the component:

```
<?php
namespace Tests\Browser;
use Tests\DuskTestCase;
use Laravel\Dusk\Browser;
use Tests\Browser\Components\DatePicker;
use Illuminate\Foundation\Testing\DatabaseMigrations;
class ExampleTest extends DuskTestCase
     * A basic component test example.
     * @return void
    public function testBasicExample()
        $this->browse(function (Browser $browser) {
            $browser->visit('/')
                    ->within(new DatePicker, function ($browser) {
                        $browser->selectDate(1, 2018);
                    ->assertSee('January');
       });
    }
```

# **Continuous Integration**

### **CircleCI**

If you are using CircleCI to run your Dusk tests, you may use this configuration file as a starting point. Like TravisCI, we will use the php artisan serve command to launch PHP's built-in web server:

```
version: 2
jobs:
   build:
        steps:
           - run: sudo apt-get install -y libsqlite3-dev
           - run: cp .env.testing .env
           - run: composer install -n --ignore-platform-reqs
           - run: npm install
           - run: npm run production
           - run: vendor/bin/phpunit
              name: Start Chrome Driver
              command: ./vendor/laravel/dusk/bin/chromedriver-linux
              background: true
           - run:
              name: Run Laravel Server
              command: php artisan serve
              background: true
              name: Run Laravel Dusk Tests
```

```
command: php artisan dusk
```

### **Codeship**

To run Dusk tests on <u>Codeship</u>, add the following commands to your Codeship project. Of course, these commands are a starting point and you are free to add additional commands as needed:

```
phpenv local 7.2
cp .env.testing .env
mkdir -p ./bootstrap/cache
composer install --no-interaction --prefer-dist
php artisan key:generate
nohup bash -c "php artisan serve 2>&1 &" && sleep 5
php artisan dusk
```

#### Heroku CI

To run Dusk tests on Heroku CI, add the following Google Chrome buildpack and scripts to your Heroku app. json file:

#### **Travis CI**

To run your Dusk tests on <u>Travis CI</u>, use the following .travis.yml configuration. Since Travis CI is not a graphical environment, we will need to take some extra steps in order to launch a Chrome browser. In addition, we will use php artisan serve to launch PHP's built-in web server:

#### **Testing**

# **Database Testing**

- Introduction
- Generating Factories
- Resetting The Database After Each Test
- Writing Factories
  - <u>Factory States</u>
  - Factory Callbacks
- Using Factories
  - Creating Models
  - o Persisting Models
  - Relationships
- Available Assertions

# Introduction

Laravel provides a variety of helpful tools to make it easier to test your database driven applications. First, you may use the assertDatabaseHas helper to assert that data exists in the database matching a given set of criteria. For example, if you would like to verify that there is a record in the users table with the email value of sally@example.com, you can do the following:

You can also use the assertDatabaseMissing helper to assert that data does not exist in the database.

Of course, the assertDatabaseHas method and other helpers like it are for convenience. You are free to use any of PHPUnit's built-in assertion methods to supplement your tests.

# **Generating Factories**

To create a factory, use the make: factory **Artisan command**:

```
php artisan make:factory PostFactory
```

The new factory will be placed in your database/factories directory.

The --model option may be used to indicate the name of the model created by the factory. This option will pre-fill the generated factory file with the given model:

```
php artisan make:factory PostFactory --model=Post
```

# **Resetting The Database After Each Test**

It is often useful to reset your database after each test so that data from a previous test does not interfere with subsequent tests. The RefreshDatabase trait takes the most optimal approach to migrating your test database depending on if you are using an inmemory database or a traditional database. Use the trait on your test class and everything will be handled for you:

```
<?php
namespace Tests\Feature;
use Tests\TestCase;
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;

class ExampleTest extends TestCase
{
    use RefreshDatabase;
    /**
    * A basic functional test example.
    *
        "ereturn void
        */
        public function testBasicExample()</pre>
```

# **Writing Factories**

When testing, you may need to insert a few records into your database before executing your test. Instead of manually specifying the value of each column when you create this test data, Laravel allows you to define a default set of attributes for each of your <a href="Eloquent models">Eloquent models</a> using model factories. To get started, take a look at the database/factories/UserFactory.php file in your application. Out of the box, this file contains one factory definition:

```
use Faker\Generator as Faker;

$factory->define(App\User::class, function (Faker $faker) {
    return [
         'name' => $faker->name,
         'email' => $faker->unique()->safeEmail,
         'email_verified_at' => now(),
         'password' => '$2y$10$TKh8H1.PfQx37YgCzwiKb.KjNyWgaHb9cbcoQgdIVFlYg7B77UdFm', // secret
         'remember_token' => str_random(10),
    ];
});
```

Within the Closure, which serves as the factory definition, you may return the default test values of all attributes on the model. The Closure will receive an instance of the <u>Faker PHP</u> library, which allows you to conveniently generate various kinds of random data for testing.

You may also create additional factory files for each model for better organization. For example, you could create UserFactory.php and CommentFactory.php files within your database/factories directory. All of the files within the factories directory will automatically be loaded by Laravel.

TIP You can set the Faker locale by adding a faker\_locale option to your config/app.php configuration file.

## **Factory States**

States allow you to define discrete modifications that can be applied to your model factories in any combination. For example, your user model might have a delinquent state that modifies one of its default attribute values. You may define your state transformations using the state method. For simple states, you may pass an array of attribute modifications:

```
$factory->state(App\User::class, 'delinquent', [
   'account_status' => 'delinquent',
]);
```

If your state requires calculation or a \$faker instance, you may use a Closure to calculate the state's attribute modifications:

```
$factory->state(App\User::class, 'address', function ($faker) {
    return [
         'address' => $faker->address,
    ];
});
```

# **Factory Callbacks**

Factory callbacks are registered using the afterMaking and afterCreating methods, and allow you to perform additional tasks after making or creating a model. For example, you may use callbacks to relate additional models to the created model:

```
$factory->afterMaking(App\User::class, function ($user, $faker) {
    // ...
});

$factory->afterCreating(App\User::class, function ($user, $faker) {
    $user->accounts()->save(factory(App\Account::class)->make());
});

You may also define callbacks for factory states:

$factory->afterMakingState(App\User::class, 'delinquent', function ($user, $faker) {
    // ...
});

$factory->afterCreatingState(App\User::class, 'delinquent', function ($user, $faker) {
    // ...
});
```

# **Using Factories**

# **Creating Models**

Once you have defined your factories, you may use the global factory function in your tests or seed files to generate model instances. So, let's take a look at a few examples of creating models. First, we'll use the make method to create models but not save them to the database:

```
public function testDatabase()
{
      $user = factory(App\User::class)->make();
      // Use model in tests...
}
```

You may also create a Collection of many models or create models of a given type:

```
// Create three App\User instances...
$users = factory(App\User::class, 3)->make();
```

#### **Applying States**

You may also apply any of your <u>states</u> to the models. If you would like to apply multiple state transformations to the models, you should specify the name of each state you would like to apply:

```
$users = factory(App\User::class, 5)->states('delinquent')->make();
$users = factory(App\User::class, 5)->states('premium', 'delinquent')->make();
```

#### **Overriding Attributes**

If you would like to override some of the default values of your models, you may pass an array of values to the make method. Only the specified values will be replaced while the rest of the values remain set to their default values as specified by the factory:

```
$user = factory(App\User::class)->make([
    'name' => 'Abigail',
]);
```

# **Persisting Models**

The create method not only creates the model instances but also saves them to the database using Eloquent's save method:

```
public function testDatabase()
{
    // Create a single App\User instance...
    $user = factory(App\User::class)->create();

    // Create three App\User instances...
    $users = factory(App\User::class, 3)->create();

    // Use model in tests...
}
```

You may override attributes on the model by passing an array to the create method:

```
$user = factory(App\User::class)->create([
    'name' => 'Abigail',
]);
```

#### Relationships

In this example, we'll attach a relation to some created models. When using the create method to create multiple models, an Eloquent collection instance is returned, allowing you to use any of the convenient functions provided by the collection, such as each:

### **Relations & Attribute Closures**

You may also attach relationships to models using Closure attributes in your factory definitions. For example, if you would like to create a new user instance when creating a Post, you may do the following:

```
$factory->define(App\Post::class, function ($faker) {
   return [
        'title' => $faker->title,
```

```
'content' => $faker->paragraph,
   'user_id' => function () {
          return factory(App\User::class)->create()->id;
    }
];
});
```

These Closures also receive the evaluated attribute array of the factory that defines them:

```
$factory->define(App\Post::class, function ($faker) {
   return [
        'title' => $faker->title,
        'content' => $faker->paragraph,
        'user_id' => function () {
            return factory(App\User::class)->create()->id;
        },
        'user_type' => function (array $post) {
            return App\User::find($post['user_id'])->type;
        }
    ];
});
```

# **Available Assertions**

Laravel provides several database assertions for your **PHPUnit** tests:

Method Description

\$this->assertDatabaseHas(\$table, array \$data); Assert that a table in the database contains the given data.
\$this->assertDatabaseMissing(\$table, array \$data); Assert that a table in the database does not contain the given data.
\$this->assertSoftDeleted(\$table, array \$data); Assert that the given record has been soft deleted.

#### **Testing**

# **Mocking**

- Introduction
- Bus Fake
- Event Fake
  - Scoped Event Fakes
- Mail Fake
- Notification Fake
- Queue Fake
- Storage Fake
- Facades

# Introduction

When testing Laravel applications, you may wish to "mock" certain aspects of your application so they are not actually executed during a given test. For example, when testing a controller that dispatches an event, you may wish to mock the event listeners so they are not actually executed during the test. This allows you to only test the controller's HTTP response without worrying about the execution of the event listeners, since the event listeners can be tested in their own test case.

Laravel provides helpers for mocking events, jobs, and facades out of the box. These helpers primarily provide a convenience layer over Mockery so you do not have to manually make complicated Mockery method calls. Of course, you are free to use Mockery or PHPUnit to create your own mocks or spies.

### **Bus Fake**

As an alternative to mocking, you may use the Bus facade's fake method to prevent jobs from being dispatched. When using fakes, assertions are made after the code under test is executed:

```
namespace Tests\Feature;
use Tests\TestCase;
use App\Jobs\ShipOrder;
use Illuminate\Support\Facades\Bus;
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;

class ExampleTest extends TestCase
{
    public function testOrderShipping()
    {
        Bus::fake();
        // Perform order shipping...

        Bus::assertDispatched(ShipOrder::class, function ($job) use ($order) {
            return $job->order->id === $order->id;
        });

        // Assert a job was not dispatched...
        Bus::assertNotDispatched(AnotherJob::class);
    }
}
```

# **Event Fake**

As an alternative to mocking, you may use the Event facade's fake method to prevent all event listeners from executing. You may then assert that events were dispatched and even inspect the data they received. When using fakes, assertions are made after the code under test is executed:

```
namespace Tests\Feature;
use Tests\TestCase;
use App\Events\OrderShipped;
use App\Events\OrderFailedToShip;
use Illuminate\Support\Facades\Event;
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;
class ExampleTest extends TestCase
```

```
{
    /**
    * Test order shipping.
    */
    public function testOrderShipping()
    {
        Event::fake();
        // Perform order shipping...
        Event::assertDispatched(OrderShipped::class, function ($e) use ($order) {
            return $e->order->id === $order->id;
        });
        // Assert an event was dispatched twice...
        Event::assertDispatched(OrderShipped::class, 2);
        // Assert an event was not dispatched...
        Event::assertNotDispatched(OrderFailedToShip::class);
}
```

NOTE After calling Event::fake(), no event listeners will be executed. So, if your tests use model factories that rely on events, such as creating a UUID during a model's creating event, you should call Event::fake() after using your factories.

#### **Faking A Subset Of Events**

If you only want to fake event listeners for a specific set of events, you may pass them to the fake or fakeFor method:

```
/**
  * Test order process.
  */
public function testOrderProcess()
{
    Event::fake([
          OrderCreated::class,
]);
    $order = factory(Order::class)->create();
    Event::assertDispatched(OrderCreated::class);
    // Other events are dispatched as normal...
    $order->update([...]);
}
```

### **Scoped Event Fakes**

If you only want to fake event listeners for a portion of your test, you may use the fakeFor method:

```
<?php
namespace Tests\Feature;
use App\Order;
use Tests\TestCase;
use App\Events\OrderCreated;
use Illuminate\Support\Facades\Event;
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;
class ExampleTest extends TestCase
    * Test order process.
    public function testOrderProcess()
        $order = Event::fakeFor(function () {
            $order = factory(Order::class)->create();
            Event::assertDispatched(OrderCreated::class);
            return $order;
        });
        // Events are dispatched as normal and observers will run ...
        $order->update([...]);
    }
}
```

# Mail Fake

You may use the Mail facade's fake method to prevent mail from being sent. You may then assert that mailables were sent to users and even inspect the data they received. When using fakes, assertions are made after the code under test is executed:

```
namespace Tests\Feature;
use Tests\TestCase;
use App\Mail\OrderShipped;
use Illuminate\Support\Facades\Mail;
use \ Illuminate \verb|\Foundation\Testing\RefreshDatabase|;
use \ Illuminate \verb|\Foundation\Testing\WithoutMiddleware;|
class ExampleTest extends TestCase
    public function testOrderShipping()
         Mail::fake();
         // Assert that no mailables were sent...
         Mail::assertNothingSent();
         // Perform order shipping...
         Mail::assertSent(OrderShipped::class, function ($mail) use ($order) {
             return $mail->order->id === $order->id;
         // Assert a message was sent to the given users...
         Mail::assertSent(OrderShipped::class, function ($mail) use ($user) { return $mail->hasTo($user->email) &&
                     $mail->hasCc('...') &&
$mail->hasBcc('...');
        });
         // Assert a mailable was sent twice...
         Mail::assertSent(OrderShipped::class, 2);
         // Assert a mailable was not sent.
         Mail::assertNotSent(AnotherMailable::class);
    }
}
```

If you are queueing mailables for delivery in the background, you should use the assertQueued method instead of assertSent:

```
Mail::assertQueued(...);
Mail::assertNotQueued(...);
```

# **Notification Fake**

<?php

You may use the Notification facade's fake method to prevent notifications from being sent. You may then assert that notifications were sent to users and even inspect the data they received. When using fakes, assertions are made after the code under test is executed:

```
namespace Tests\Feature;
use Tests\TestCase;
use App\Notifications\OrderShipped;
use Illuminate\Support\Facades\Notification;
use Illuminate\Notifications\AnonymousNotifiable:
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;
class ExampleTest extends TestCase
    public function testOrderShipping()
        Notification::fake();
        // Assert that no notifications were sent...
        Notification::assertNothingSent();
        // Perform order shipping...
        Notification::assertSentTo(
            OrderShipped::class.
            function ($notification, $channels) use ($order) {
                return $notification->order->id === $order->id;
        );
```

# **Queue Fake**

As an alternative to mocking, you may use the Queue facade's fake method to prevent jobs from being queued. You may then assert that jobs were pushed to the queue and even inspect the data they received. When using fakes, assertions are made after the code under test is executed:

```
<?php
namespace Tests\Feature;
use Tests\TestCase:
use App\Jobs\ShipOrder;
use Illuminate\Support\Facades\Queue;
use \ Illuminate \verb|\Foundation\Testing\RefreshDatabase|;
use Illuminate\Foundation\Testing\WithoutMiddleware;
{\tt class} \ {\tt ExampleTest} \ {\tt extends} \ {\tt TestCase}
    public function testOrderShipping()
        Queue::fake();
        // Assert that no jobs were pushed...
        Queue::assertNothingPushed();
        // Perform order shipping...
        Queue::assertPushed(ShipOrder::class, function ($job) use ($order) {
            return $job->order->id === $order->id;
        // Assert a job was pushed to a given queue..
        Queue::assertPushedOn('queue-name', ShipOrder::class);
         // Assert a job was pushed twice...
        Queue::assertPushed(ShipOrder::class, 2);
        // Assert a job was not pushed..
        Queue::assertNotPushed(AnotherJob::class);
         // Assert a job was pushed with a specific chain...
        Queue::assertPushedWithChain(ShipOrder::class, [
            AnotherJob::class,
            FinalJob::class
        ]);
    }
}
```

# **Storage Fake**

The Storage facade's fake method allows you to easily generate a fake disk that, combined with the file generation utilities of the UploadedFile class, greatly simplifies the testing of file uploads. For example:

```
<?php
namespace Tests\Feature;
use Tests\TestCase;
use Illuminate\Http\UploadedFile;
use Illuminate\Support\Facades\Storage;
use Illuminate\Foundation\Testing\RefreshDatabase;
use Illuminate\Foundation\Testing\WithoutMiddleware;
class ExampleTest extends TestCase
{
    public function testAvatarUpload()</pre>
```

TIP By default, the fake method will delete all files in its temporary directory. If you would like to keep these files, you may use the "persistentFake" method instead.

### **Facades**

Unlike traditional static method calls, <u>facades</u> may be mocked. This provides a great advantage over traditional static methods and grants you the same testability you would have if you were using dependency injection. When testing, you may often want to mock a call to a Laravel facade in one of your controllers. For example, consider the following controller action:

We can mock the call to the Cache facade by using the shouldReceive method, which will return an instance of a Mockery mock. Since facades are actually resolved and managed by the Laravel service container, they have much more testability than a typical static class. For example, let's mock our call to the Cache facade's get method:

NOTE You should not mock the Request facade. Instead, pass the input you desire into the HTTP helper methods such as get and post when running your test. Likewise, instead of mocking the <code>config</code> facade, call the <code>config::set</code> method in your tests.

#### Official Packages

# **Laravel Cashier**

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- Upgrading Cashier
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  - o Generating Invoice PDFs

# Introduction

Laravel Cashier provides an expressive, fluent interface to <u>Stripe's</u> and <u>Braintree's</u> subscription billing services. It handles almost all of the boilerplate subscription billing code you are dreading writing. In addition to basic subscription management, Cashier can handle coupons, swapping subscription, subscription "quantities", cancellation grace periods, and even generate invoice PDFs.

NOTE If you're only performing "one-off" charges and do not offer subscriptions, you should not use Cashier. Instead, use the Stripe and Braintree SDKs directly.

# **Upgrading Cashier**

When upgrading to a new major version of the Cashier, it's important that you carefully review the upgrade guide.

# Configuration

### Stripe

# Composer

First, add the Cashier package for Stripe to your dependencies:

composer require laravel/cashier

#### **Database Migrations**

Before using Cashier, we'll also need to prepare the database. We need to add several columns to your users table and create a new subscriptions table to hold all of our customer's subscriptions:

```
Schema::table('users', function ($table) {
    $table->string('stripe_id')->nullable()->collation('utf8mb4_bin');
    $table->string('card_brand')->nullable();
    $table->string('card_last_four', 4)->nullable();
    $table->timestamp('trial_ends_at')->nullable();
});

Schema::create('subscriptions', function ($table) {
    $table->increments('id');
    $table->unsignedInteger('user_id');
    $table->string('name');
    $table->string('stripe_id')->collation('utf8mb4_bin');
    $table->string('stripe_plan');
    $table->timestamp('trial_ends_at')->nullable();
    $table->timestamp('ends_at')->nullable();
    $table->timestamp('ends_at')->nullable();
});
```

Once the migrations have been created, run the migrate Artisan command.

#### Billable Model

Next, add the Billable trait to your model definition. This trait provides various methods to allow you to perform common billing tasks, such as creating subscriptions, applying coupons, and updating credit card information:

```
use Laravel\Cashier\Billable;
class User extends Authenticatable
{
    use Billable;
}
```

### **API Keys**

Finally, you should configure your Stripe key in your services.php configuration file. You can retrieve your Stripe API keys from the Stripe control panel:

```
'stripe' => [
  'model' => App\User::class,
  'key' => env('STRIPE_KEY'),
  'secret' => env('STRIPE_SECRET'),
],
```

### Braintree

# **Braintree Caveats**

For many operations, the Stripe and Braintree implementations of Cashier function the same. Both services provide subscription billing with credit cards but Braintree also supports payments via PayPal. However, Braintree also lacks some features that are supported by Stripe. You should keep the following in mind when deciding to use Stripe or Braintree:

- · Braintree supports PayPal while Stripe does not.
- Braintree does not support the increment and decrement methods on subscriptions. This is a Braintree limitation, not a
  Cashier limitation.
- Braintree does not support percentage based discounts. This is a Braintree limitation, not a Cashier limitation.

### Composer

First, add the Cashier package for Braintree to your dependencies:

```
composer require "laravel/cashier-braintree":"~2.0"
```

### **Plan Credit Coupon**

Before using Cashier with Braintree, you will need to define a plan-credit discount in your Braintree control panel. This discount will be used to properly prorate subscriptions that change from yearly to monthly billing, or from monthly to yearly billing.

The discount amount configured in the Braintree control panel can be any value you wish, as Cashier will override the defined amount with our own custom amount each time we apply the coupon. This coupon is needed since Braintree does not natively

support prorating subscriptions across subscription frequencies.

#### **Database Migrations**

Before using Cashier, we'll need to <u>prepare the database</u>. We need to add several columns to your users table and create a new subscriptions table to hold all of our customer's subscriptions:

```
Schema::table('users', function ($table) {
    $table->string('braintree_id')->nullable();
    $table->string('paypal_email')->nullable();
    $table->string('card_brand')->nullable();
    $table->string('card_last_four')->nullable();
    $table->timestamp('trial_ends_at')->nullable();
});

Schema::create('subscriptions', function ($table) {
    $table->increments('id');
    $table->string('name');
    $table->string('braintree_id');
    $table->string('braintree_jlan');
    $table->integer('quantity');
    $table->timestamp('trial_ends_at')->nullable();
    $table->timestamp('ends_at')->nullable();
    $table->timestamps();
});
```

Once the migrations have been created, run the migrate Artisan command.

#### Billable Model

Next, add the Billable trait to your model definition:

```
use Laravel\Cashier\Billable;
class User extends Authenticatable
{
    use Billable;
}
```

### **API Keys**

Next, you should configure the following options in your services.php file:

```
'braintree' => [
   'model' => App\User::class,
   'environment' => env('BRAINTREE_ENV'),
   'merchant_id' => env('BRAINTREE_MERCHANT_ID'),
   'public_key' => env('BRAINTREE_PUBLIC_KEY'),
   'private_key' => env('BRAINTREE_PRIVATE_KEY'),
],
```

Then you should add the following Braintree SDK calls to your AppServiceProvider service provider's boot method:

```
\Braintree_Configuration::environment(config('services.braintree.environment')); \Braintree_Configuration::merchantId(config('services.braintree.merchant_id')); \Braintree_Configuration::publicKey(config('services.braintree.public_key')); \Braintree_Configuration::privateKey(config('services.braintree.private_key'));
```

### **Currency Configuration**

The default Cashier currency is United States Dollars (USD). You can change the default currency by calling the Cashier::useCurrency method from within the boot method of one of your service providers. The useCurrency method accepts two string parameters: the currency and the currency's symbol:

```
use Laravel\Cashier\Cashier;
Cashier::useCurrency('eur', '€');
```

# **Subscriptions**

# **Creating Subscriptions**

To create a subscription, first retrieve an instance of your billable model, which typically will be an instance of App\User. Once you have retrieved the model instance, you may use the newSubscription method to create the model's subscription:

```
$user = User::find(1);
```

```
$user->newSubscription('main', 'premium')->create($stripeToken);
```

The first argument passed to the newSubscription method should be the name of the subscription. If your application only offers a single subscription, you might call this main or primary. The second argument is the specific Stripe / Braintree plan the user is subscribing to. This value should correspond to the plan's identifier in Stripe or Braintree.

The create method, which accepts a Stripe credit card / source token, will begin the subscription as well as update your database with the customer ID and other relevant billing information.

#### **Additional User Details**

If you would like to specify additional customer details, you may do so by passing them as the second argument to the create method:

```
$user->newSubscription('main', 'monthly')->create($stripeToken, [
    'email' => $email,
]);
```

To learn more about the additional fields supported by Stripe or Braintree, check out Stripe's <u>documentation on customer creation</u> or the corresponding <u>Braintree documentation</u>.

#### Coupons

If you would like to apply a coupon when creating the subscription, you may use the withCoupon method:

```
$user->newSubscription('main', 'monthly')
    ->withCoupon('code')
    ->create($stripeToken);
```

### **Checking Subscription Status**

Once a user is subscribed to your application, you may easily check their subscription status using a variety of convenient methods. First, the subscribed method returns true if the user has an active subscription, even if the subscription is currently within its trial period:

```
if ($user->subscribed('main')) {
    //
}
```

The subscribed method also makes a great candidate for a <u>route middleware</u>, allowing you to filter access to routes and controllers based on the user's subscription status:

```
public function handle($request, Closure $next)
{
    if ($request->user() && ! $request->user()->subscribed('main')) {
        // This user is not a paying customer...
        return redirect('billing');
    }
    return $next($request);
}
```

If you would like to determine if a user is still within their trial period, you may use the onTrial method. This method can be useful for displaying a warning to the user that they are still on their trial period:

```
if ($user->subscription('main')->onTrial()) {
    //
}
```

The subscribedToPlan method may be used to determine if the user is subscribed to a given plan based on a given Stripe / Braintree plan ID. In this example, we will determine if the user's main subscription is actively subscribed to the monthly plan:

```
if ($user->subscribedToPlan('monthly', 'main')) {
    //
}
```

#### **Cancelled Subscription Status**

To determine if the user was once an active subscriber, but has cancelled their subscription, you may use the cancelled method:

```
if ($user->subscription('main')->cancelled()) {
    //
}
```

You may also determine if a user has cancelled their subscription, but are still on their "grace period" until the subscription fully

expires. For example, if a user cancels a subscription on March 5th that was originally scheduled to expire on March 10th, the user is on their "grace period" until March 10th. Note that the subscribed method still returns true during this time:

```
if ($user->subscription('main')->onGracePeriod()) {
    //
}
```

### **Changing Plans**

After a user is subscribed to your application, they may occasionally want to change to a new subscription plan. To swap a user to a new subscription, pass the plan's identifier to the swap method:

```
$user = App\User::find(1);
$user->subscription('main')->swap('provider-plan-id');
```

If the user is on trial, the trial period will be maintained. Also, if a "quantity" exists for the subscription, that quantity will also be maintained.

If you would like to swap plans and cancel any trial period the user is currently on, you may use the skiptrial method:

### **Subscription Quantity**

NOTE Subscription quantities are only supported by the Stripe edition of Cashier. Braintree does not have a feature that corresponds to Stripe's "quantity".

Sometimes subscriptions are affected by "quantity". For example, your application might charge \$10 per month **per user** on an account. To easily increment or decrement your subscription quantity, use the incrementQuantity and decrementQuantity methods:

```
$user = User::find(1);
$user->subscription('main')->incrementQuantity();

// Add five to the subscription's current quantity...
$user->subscription('main')->incrementQuantity(5);
$user->subscription('main')->decrementQuantity();

// Subtract five to the subscription's current quantity...
$user->subscription('main')->decrementQuantity(5);
```

Alternatively, you may set a specific quantity using the updateQuantity method:

```
$user->subscription('main')->updateQuantity(10);
```

The noProrate method may be used to update the subscription's quantity without pro-rating the charges:

```
$user->subscription('main')->noProrate()->updateQuantity(10);
```

For more information on subscription quantities, consult the **Stripe documentation**.

### **Subscription Taxes**

To specify the tax percentage a user pays on a subscription, implement the taxPercentage method on your billable model, and return a numeric value between 0 and 100, with no more than 2 decimal places.

```
public function taxPercentage() {
    return 20;
}
```

The taxPercentage method enables you to apply a tax rate on a model-by-model basis, which may be helpful for a user base that spans multiple countries and tax rates.

NOTE The taxPercentage method only applies to subscription charges. If you use Cashier to make "one off" charges, you will need to manually specify the tax rate at that time.

#### **Syncing Tax Percentages**

When changing the hard-coded value returned by the taxPercentage method, the tax settings on any existing subscriptions for the user will remain the same. If you wish to update the tax value for existing subscriptions with the returned taxPercentage value, you should call the syncTaxPercentage method on the user's subscription instance:

```
$user->subscription('main')->syncTaxPercentage();
```

### **Subscription Anchor Date**

NOTE Modifying the subscription anchor date is only supported by the Stripe edition of Cashier.

By default, the billing cycle anchor is the date the subscription was created, or if a trial period is used, the date that the trial ends. If you would like to modify the billing anchor date, you may use the anchorBillingCycleOn method:

For more information on managing subscription billing cycles, consult the Stripe billing cycle documentation

### **Cancelling Subscriptions**

To cancel a subscription, call the cancel method on the user's subscription:

```
$user->subscription('main')->cancel();
```

When a subscription is cancelled, Cashier will automatically set the ends\_at column in your database. This column is used to know when the subscribed method should begin returning false. For example, if a customer cancels a subscription on March 1st, but the subscription was not scheduled to end until March 5th, the subscribed method will continue to return true until March 5th.

You may determine if a user has cancelled their subscription but are still on their "grace period" using the onGracePeriod method:

```
if ($user->subscription('main')->onGracePeriod()) {
    //
}
```

If you wish to cancel a subscription immediately, call the cancelNow method on the user's subscription:

```
$user->subscription('main')->cancelNow();
```

### **Resuming Subscriptions**

If a user has cancelled their subscription and you wish to resume it, use the resume method. The user **must** still be on their grace period in order to resume a subscription:

```
$user->subscription('main')->resume();
```

If the user cancels a subscription and then resumes that subscription before the subscription has fully expired, they will not be billed immediately. Instead, their subscription will be re-activated, and they will be billed on the original billing cycle.

# **Subscription Trials**

# With Credit Card Up Front

If you would like to offer trial periods to your customers while still collecting payment method information up front, you should use the trialDays method when creating your subscriptions:

This method will set the trial period ending date on the subscription record within the database, as well as instruct Stripe / Braintree to not begin billing the customer until after this date.

NOTE If the customer's subscription is not cancelled before the trial ending date they will be charged as soon as the trial expires, so you should be sure to notify your users of their trial ending date.

The trialUntil method allows you to provide a DateTime instance to specify when the trial period should end:

```
use Carbon\Carbon;
```

You may determine if the user is within their trial period using either the onTrial method of the user instance, or the onTrial method of the subscription instance. The two examples below are identical:

```
if ($user->onTrial('main')) {
     //
}

if ($user->subscription('main')->onTrial()) {
     //
}
```

### Without Credit Card Up Front

If you would like to offer trial periods without collecting the user's payment method information up front, you may set the trial\_ends\_at column on the user record to your desired trial ending date. This is typically done during user registration:

```
$user = User::create([
    // Populate other user properties...
    'trial_ends_at' => now()->addDays(10),
]);
```

NOTE Be sure to add a date mutator for trial\_ends\_at to your model definition.

Cashier refers to this type of trial as a "generic trial", since it is not attached to any existing subscription. The onTrial method on the User instance will return true if the current date is not past the value of trial\_ends\_at:

```
if ($user->onTrial()) {
    // User is within their trial period...
}
```

You may also use the ongenericTrial method if you wish to know specifically that the user is within their "generic" trial period and has not created an actual subscription yet:

```
if ($user->onGenericTrial()) {
    // User is within their "generic" trial period...
}
```

Once you are ready to create an actual subscription for the user, you may use the newSubscription method as usual:

```
$user = User::find(1);
$user->newSubscription('main', 'monthly')->create($stripeToken);
```

#### Customers

### **Creating Customers**

Occasionally, you may wish to create a Stripe customer without beginning a subscription. You may accomplish this using the createAsStripeCustomer method:

```
$user->createAsStripeCustomer();
```

Of course, once the customer has been created in Stripe, you may begin a subscription at a later date.

 $TIP\ The\ Braintree\ equivalent\ of\ this\ method\ is\ the\ \texttt{createAsBraintreeCustomer}\ method.$ 

#### Cards

### **Retrieving Credit Cards**

The cards method on the billable model instance returns a collection of Laravel\Cashier\Card instances:

```
$cards = $user->cards();
```

To retrieve the default card, the defaultCard method may be used;

```
$card = $user->defaultCard();
```

### **Determining If A Card Is On File**

You may check if a customer has a credit card attached to their account using the hasCardOnFile method:

```
if ($user->hasCardOnFile()) {
    //
}
```

### **Updating Credit Cards**

The updateCard method may be used to update a customer's credit card information. This method accepts a Stripe token and will assign the new credit card as the default billing source:

```
$user->updateCard($stripeToken);
```

To sync your card information with the customer's default card information in Stripe, you may use the updateCardFromStripe method:

```
$user->updateCardFromStripe();
```

### **Deleting Credit Cards**

To delete a card, you should first retrieve the customer's cards with the cards method. Then, you may call the delete method on the card instance you wish to delete:

```
foreach ($user->cards() as $card) {
    $card->delete();
}
```

NOTE If you delete the default card, please make sure that you sync the new default card with your database using the updateCardFromStripe method.

The deleteCards method will delete all of the card information stored by your application:

```
$user->deleteCards();
```

NOTE If the user has an active subscription, you should consider preventing them from deleting the last remaining payment source.

# **Handling Stripe Webhooks**

Both Stripe and Braintree can notify your application of a variety of events via webhooks. To handle Stripe webhooks, define a route that points to Cashier's webhook controller. This controller will handle all incoming webhook requests and dispatch them to the proper controller method:

```
Route::post(
   'stripe/webhook',
   '\Laravel\Cashier\Http\Controllers\WebhookController@handleWebhook'
);
```

NOTE Once you have registered your route, be sure to configure the webhook URL in your Stripe control panel settings.

By default, this controller will automatically handle cancelling subscriptions that have too many failed charges (as defined by your Stripe settings), customer updates, customer deletions, subscription updates, and credit card changes; however, as we'll soon discover, you can extend this controller to handle any webhook event you like.

NOTE Make sure you protect incoming requests with Cashier's included webhook signature verification middleware.

#### Webhooks & CSRF Protection

Since Stripe webhooks need to bypass Laravel's <u>CSRF protection</u>, be sure to list the URI as an exception in your <code>VerifyCsrfToken</code> middleware or list the route outside of the web middleware group:

```
protected $except = [
    'stripe/*',
1:
```

#### **Defining Webhook Event Handlers**

Cashier automatically handles subscription cancellation on failed charges, but if you have additional Stripe webhook events you would like to handle, extend the Webhook controller. Your method names should correspond to Cashier's expected convention, specifically, methods should be prefixed with handle and the "camel case" name of the Stripe webhook you wish to handle. For example, if you wish to handle the invoice.payment\_succeeded webhook, you should add a handleInvoicePaymentSucceeded method to the controller:

```
<?php
namespace App\Http\Controllers;</pre>
```

use Laravel\Cashier\Http\Controllers\WebhookController as CashierController;

```
class WebhookController extends CashierController
{
    /**
    * Handle invoice payment succeeded.
    * @param array $payload
    * @return \Symfony\Component\HttpFoundation\Response
    */
    public function handleInvoicePaymentSucceeded($payload)
    {
            // Handle The Event
    }
}
```

Next, define a route to your Cashier controller within your routes/web.php file:

```
Route::post(
   'stripe/webhook',
   '\App\Http\Controllers\WebhookController@handleWebhook');
```

### **Failed Subscriptions**

What if a customer's credit card expires? No worries - Cashier includes a Webhook controller that can easily cancel the customer's subscription for you. As noted above, all you need to do is point a route to the controller:

```
Route::post(
   'stripe/webhook',
   '\Laravel\Cashier\Http\Controllers\WebhookController@handleWebhook'
);
```

That's it! Failed payments will be captured and handled by the controller. The controller will cancel the customer's subscription when Stripe determines the subscription has failed (normally after three failed payment attempts).

### **Verifying Webhook Signatures**

To secure your webhooks, you may use <u>Stripe's webhook signatures</u>. For convenience, Cashier automatically includes a middleware which validates that the incoming Stripe webhook request is valid.

To enable webhook verification, ensure that the stripe.webhook.secret configuration value is set in your services configuration file. The webhook secret may be retrieved from your Stripe account dashboard.

# **Handling Braintree Webhooks**

Both Stripe and Braintree can notify your application of a variety of events via webhooks. To handle Braintree webhooks, define a route that points to Cashier's webhook controller. This controller will handle all incoming webhook requests and dispatch them to the proper controller method:

```
Route::post(
   'braintree/webhook',
   '\Laravel\Cashier\Http\Controllers\WebhookController@handleWebhook'
);
```

NOTE Once you have registered your route, be sure to configure the webhook URL in your Braintree control panel settings.

By default, this controller will automatically handle cancelling subscriptions that have too many failed charges (as defined by your Braintree settings); however, as we'll soon discover, you can extend this controller to handle any webhook event you like.

#### Webhooks & CSRF Protection

Since Braintree webhooks need to bypass Laravel's <u>CSRF protection</u>, be sure to list the URI as an exception in your VerifyCsrfToken middleware or list the route outside of the web middleware group:

```
protected $except = [
    'braintree/*',
```

# **Defining Webhook Event Handlers**

Cashier automatically handles subscription cancellation on failed charges, but if you have additional Braintree webhook events you would like to handle, extend the Webhook controller. Your method names should correspond to Cashier's expected convention, specifically, methods should be prefixed with handle and the "camel case" name of the Braintree webhook you wish to handle. For example, if you wish to handle the dispute\_opened webhook, you should add a handleDisputeOpened method to the

```
controller:
```

```
<?php
namespace App\Http\Controllers;
use Braintree\WebhookNotification;
use Laravel\Cashier\Http\Controllers\WebhookController as CashierController;

class WebhookController extends CashierController
{
    /**
    * Handle a new dispute.
    *
    * @param \Braintree\WebhookNotification $webhook
    * @return \Symfony\Component\HttpFoundation\Responses
    */
    public function handleDisputeOpened(WebhookNotification $webhook)
    {
        // Handle The Webhook...
    }
}</pre>
```

### **Failed Subscriptions**

What if a customer's credit card expires? No worries - Cashier includes a Webhook controller that can easily cancel the customer's subscription for you. Just point a route to the controller:

```
Route::post(
   'braintree/webhook',
   '\Laravel\Cashier\Http\Controllers\WebhookController@handleWebhook'):
```

That's it! Failed payments will be captured and handled by the controller. The controller will cancel the customer's subscription when Braintree determines the subscription has failed (normally after three failed payment attempts). Don't forget: you will need to configure the webhook URI in your Braintree control panel settings.

# **Single Charges**

### **Simple Charge**

NOTE When using Stripe, the charge method accepts the amount you would like to charge in the **lowest denominator of the currency used by your application**. However, when using Braintree, you should pass the full dollar amount to the charge method:

If you would like to make a "one off" charge against a subscribed customer's credit card, you may use the charge method on a billable model instance.

```
// Stripe Accepts Charges In Cents...
$stripeCharge = $user->charge(100);
// Braintree Accepts Charges In Dollars...
$user->charge(1);
```

The charge method accepts an array as its second argument, allowing you to pass any options you wish to the underlying Stripe / Braintree charge creation. Consult the Stripe or Braintree documentation regarding the options available to you when creating charges:

```
$user->charge(100, [
    'custom_option' => $value,
]);
```

The charge method will throw an exception if the charge fails. If the charge is successful, the full Stripe / Braintree response will be returned from the method:

# **Charge With Invoice**

Sometimes you may need to make a one-time charge but also generate an invoice for the charge so that you may offer a PDF receipt to your customer. The invoiceFor method lets you do just that. For example, let's invoice the customer \$5.00 for a "One Time Fee":

```
// Stripe Accepts Charges In Cents...
```

```
$user->invoiceFor('One Time Fee', 500);
// Braintree Accepts Charges In Dollars...
$user->invoiceFor('One Time Fee', 5);
```

The invoice will be charged immediately against the user's credit card. The invoiceFor method also accepts an array as its third argument. This array contains the billing options for the invoice item. The fourth argument accepted by the method is also an array. This final argument accepts the billing options for the invoice itself:

```
$user->invoiceFor('Stickers', 500, [
    'quantity' => 50,
], [
    'tax_percent' => 21,
]);
```

If you are using Braintree as your billing provider, you must include a description option when calling the invoiceFor method:

```
$user->invoiceFor('One Time Fee', 500, [
   'description' => 'your invoice description here',
]);
```

NOTE The invoiceFor method will create a Stripe invoice which will retry failed billing attempts. If you do not want invoices to retry failed charges, you will need to close them using the Stripe API after the first failed charge.

# **Refunding Charges**

If you need to refund a Stripe charge, you may use the refund method. This method accepts the Stripe charge ID as its only argument:

```
$stripeCharge = $user->charge(100);
$user->refund($stripeCharge->id);
```

### **Invoices**

You may easily retrieve an array of a billable model's invoices using the invoices method:

```
$invoices = $user->invoices();
// Include pending invoices in the results...
$invoices = $user->invoicesIncludingPending();
```

When listing the invoices for the customer, you may use the invoice's helper methods to display the relevant invoice information. For example, you may wish to list every invoice in a table, allowing the user to easily download any of them:

### **Generating Invoice PDFs**

From within a route or controller, use the downloadInvoice method to generate a PDF download of the invoice. This method will automatically generate the proper HTTP response to send the download to the browser:

```
use Illuminate\Http\Request;
Route::get('user/invoice/{invoice}', function (Request $request, $invoiceId) {
    return $request->user()->downloadInvoice($invoiceId, [
         'vendor' => 'Your Company',
         'product' => 'Your Product',
    ]);
});
```

#### Official Packages

# **Browser Tests (Laravel Dusk)**

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### Introduction

Laravel Dusk provides an expressive, easy-to-use browser automation and testing API. By default, Dusk does not require you to install JDK or Selenium on your machine. Instead, Dusk uses a standalone <a href="https://chemportor.org/length/">ChromeDriver</a> installation. However, you are free to utilize any other Selenium compatible driver you wish.

# Installation

To get started, you should add the laravel/dusk Composer dependency to your project:

composer require --dev laravel/dusk

NOTE If you are manually registering Dusk's service provider, you should **never** register it in your production environment, as doing so could lead to arbitrary users being able to authenticate with your application.

After installing the Dusk package, run the dusk:install Artisan command:

php artisan dusk:install

A Browser directory will be created within your tests directory and will contain an example test. Next, set the APP\_URL environment variable in your .env file. This value should match the URL you use to access your application in a browser.

To run your tests, use the dusk Artisan command. The dusk command accepts any argument that is also accepted by the phpunit command:

php artisan dusk

If you had test failures the last time you ran the dusk command, you may save time by re-running the failing tests first using the dusk:fails command:

```
php artisan dusk:fails
```

NOTE Dusk requires its chromedriver binaries to be executable. If you're having problems running Dusk, you can ensure the binaries are executable using the following command: chmod -R 0755 vendor/laravel/dusk/bin.

### **Using Other Browsers**

By default, Dusk uses Google Chrome and a standalone <u>ChromeDriver</u> installation to run your browser tests. However, you may start your own Selenium server and run your tests against any browser you wish.

To get started, open your tests/DuskTestCase.php file, which is the base Dusk test case for your application. Within this file, you can remove the call to the startChromeDriver method. This will stop Dusk from automatically starting the ChromeDriver:

```
/**
  * Prepare for Dusk test execution.
  * @beforeClass
  * @return void
  */
public static function prepare()
{
    // static::startChromeDriver();
}
```

Next, you may modify the driver method to connect to the URL and port of your choice. In addition, you may modify the "desired capabilities" that should be passed to the WebDriver:

# **Getting Started**

# **Generating Tests**

To generate a Dusk test, use the dusk:make Artisan command. The generated test will be placed in the tests/Browser directory:

```
php artisan dusk:make LoginTest
```

### **Running Tests**

To run your browser tests, use the dusk Artisan command:

```
php artisan dusk
```

If you had test failures the last time you ran the dusk command, you may save time by re-running the failing tests first using the dusk:fails command:

```
php artisan dusk:fails
```

The dusk command accepts any argument that is normally accepted by the PHPUnit test runner, allowing you to only run the tests for a given group, etc:

```
php artisan dusk --group=foo
```

### **Manually Starting ChromeDriver**

By default, Dusk will automatically attempt to start ChromeDriver. If this does not work for your particular system, you may manually start ChromeDriver before running the dusk command. If you choose to start ChromeDriver manually, you should comment out the following line of your tests/DuskTestCase.php file:

```
/**
 * Prepare for Dusk test execution.
 *
 * @beforeClass
```

```
* @return void
*/
public static function prepare()
{
    // static::startChromeDriver();
}
```

In addition, if you start ChromeDriver on a port other than 9515, you should modify the driver method of the same class:

### **Environment Handling**

To force Dusk to use its own environment file when running tests, create a .env.dusk.{environment} file in the root of your project. For example, if you will be initiating the dusk command from your local environment, you should create a .env.dusk.local file.

When running tests, Dusk will back-up your .env file and rename your Dusk environment to .env. Once the tests have completed, your .env file will be restored.

### **Creating Browsers**

To get started, let's write a test that verifies we can log into our application. After generating a test, we can modify it to navigate to the login page, enter some credentials, and click the "Login" button. To create a browser instance, call the browse method:

```
namespace Tests\Browser:
use App\User;
use Tests\DuskTestCase;
use Laravel\Dusk\Chrome
\hbox{\tt use Illuminate} \\ \hbox{\tt Foundation} \\ \hbox{\tt Testing} \\ \hbox{\tt Database Migrations;}
class ExampleTest extends DuskTestCase
{
     use DatabaseMigrations;
      * A basic browser test example.
      * @return void
     public function testBasicExample()
          $user = factory(User::class)->create([
   'email' => 'taylor@laravel.com',
          $this->browse(function ($browser) use ($user) {
               $browser->visit('/login')
    ->type('email', $user->email)
                         ->type('password', 'secret')
                         ->press('Login')
                         ->assertPathIs('/home');
          });
     }
}
```

As you can see in the example above, the browse method accepts a callback. A browser instance will automatically be passed to this callback by Dusk and is the main object used to interact with and make assertions against your application.

TIP This test can be used to test the login screen generated by the make: auth Artisan command.

### **Creating Multiple Browsers**

Sometimes you may need multiple browsers in order to properly carry out a test. For example, multiple browsers may be needed to test a chat screen that interacts with websockets. To create multiple browsers, "ask" for more than one browser in the signature of the callback given to the browse method:

```
$this->browse(function ($first, $second) {
    $first->loginAs(User::find(1))
        ->visit('/home')
        ->waitForText('Message');

$second->loginAs(User::find(2))
        ->visit('/home')
        ->waitForText('Message')
        ->type('message', 'Hey Taylor')
        ->press('Send');

$first->waitForText('Hey Taylor')
        ->assertSee('Jeffrey Way');
});
```

#### **Resizing Browser Windows**

You may use the resize method to adjust the size of the browser window:

```
$browser->resize(1920, 1080);
```

The maximize method may be used to maximize the browser window:

```
$browser->maximize();
```

#### **Browser Macros**

If you would like to define a custom browser method that you can re-use in a variety of your tests, you may use the macro method on the Browser class. Typically, you should call this method from a <u>service provider's</u> boot method:

The macro function accepts a name as its first argument, and a Closure as its second. The macro's Closure will be executed when calling the macro as a method on a Browser implementation:

### Authentication

Often, you will be testing pages that require authentication. You can use Dusk's loginAs method in order to avoid interacting with the login screen during every test. The loginAs method accepts a user ID or user model instance:

NOTE After using the loginAs method, the user session will be maintained for all tests within the file.

# **Database Migrations**

When your test requires migrations, like the authentication example above, you should never use the RefreshDatabase trait. The RefreshDatabase trait leverages database transactions which will not be applicable across HTTP requests. Instead, use the DatabaseMigrations trait:

```
<?php
namespace Tests\Browser;
use App\User;
use Tests\DuskTestCase;
use Laravel\Dusk\Chrome;
use Illuminate\Foundation\Testing\DatabaseMigrations;
class ExampleTest extends DuskTestCase
{
    use DatabaseMigrations;
}</pre>
```

# **Interacting With Elements**

### **Dusk Selectors**

Choosing good CSS selectors for interacting with elements is one of the hardest parts of writing Dusk tests. Over time, frontend changes can cause CSS selectors like the following to break your tests:

```
// HTML...
<button>Login</button>
// Test...
$browser->click('.login-page .container div > button');
```

Dusk selectors allow you to focus on writing effective tests rather than remembering CSS selectors. To define a selector, add a dusk attribute to your HTML element. Then, prefix the selector with @ to manipulate the attached element within a Dusk test:

```
// HTML...
<button dusk="login-button">Login</button>
// Test...
$browser->click('@login-button');
```

### **Clicking Links**

To click a link, you may use the clickLink method on the browser instance. The clickLink method will click the link that has the given display text:

```
$browser->clickLink($linkText);
```

NOTE This method interacts with jQuery. If jQuery is not available on the page, Dusk will automatically inject it into the page so it is available for the test's duration.

# Text, Values, & Attributes

### **Retrieving & Setting Values**

Dusk provides several methods for interacting with the current display text, value, and attributes of elements on the page. For example, to get the "value" of an element that matches a given selector, use the value method:

```
// Retrieve the value...
$value = $browser->value('selector');
// Set the value...
$browser->value('selector', 'value');
```

### **Retrieving Text**

The text method may be used to retrieve the display text of an element that matches the given selector:

```
$text = $browser->text('selector');
```

#### **Retrieving Attributes**

Finally, the attribute method may be used to retrieve an attribute of an element matching the given selector:

```
$attribute = $browser->attribute('selector', 'value');
```

#### **Using Forms**

#### **Typing Values**

Dusk provides a variety of methods for interacting with forms and input elements. First, let's take a look at an example of typing text into an input field:

```
$browser->type('email', 'taylor@laravel.com');
```

Note that, although the method accepts one if necessary, we are not required to pass a CSS selector into the type method. If a CSS selector is not provided, Dusk will search for an input field with the given name attribute. Finally, Dusk will attempt to find a textarea with the given name attribute.

To append text to a field without clearing its content, you may use the append method:

You may clear the value of an input using the clear method:

```
$browser->clear('email');
```

#### **Dropdowns**

To select a value in a dropdown selection box, you may use the select method. Like the type method, the select method does not require a full CSS selector. When passing a value to the select method, you should pass the underlying option value instead of the display text:

```
$browser->select('size', 'Large');
```

You may select a random option by omitting the second parameter:

```
$browser->select('size');
```

#### Checkboxes

To "check" a checkbox field, you may use the check method. Like many other input related methods, a full CSS selector is not required. If an exact selector match can't be found, Dusk will search for a checkbox with a matching name attribute:

```
$browser->check('terms');
$browser->uncheck('terms');
```

#### **Radio Buttons**

To "select" a radio button option, you may use the radio method. Like many other input related methods, a full CSS selector is not required. If an exact selector match can't be found, Dusk will search for a radio with matching name and value attributes:

```
$browser->radio('version', 'php7');
```

#### **Attaching Files**

The attach method may be used to attach a file to a file input element. Like many other input related methods, a full CSS selector is not required. If an exact selector match can't be found, Dusk will search for a file input with matching name attribute:

```
$browser->attach('photo', __DIR__.'/photos/me.png');
```

NOTE The attach function requires the Zip PHP extension to be installed and enabled on your server.

#### **Using The Keyboard**

The keys method allows you to provide more complex input sequences to a given element than normally allowed by the type method. For example, you may hold modifier keys entering values. In this example, the shift key will be held while taylor is entered into the element matching the given selector. After taylor is typed, otwell will be typed without any modifier keys:

```
$browser->keys('selector', ['{shift}', 'taylor'], 'otwell');
```

You may even send a "hot key" to the primary CSS selector that contains your application:

```
$browser->keys('.app', ['{command}', 'j']);
```

TIP All modifier keys are wrapped in {} characters, and match the constants defined in the Facebook\WebDriver\WebDriverKeys class, which can be <u>found on GitHub</u>.

#### **Using The Mouse**

#### **Clicking On Elements**

The click method may be used to "click" on an element matching the given selector:

```
$browser->click('.selector');
```

#### Mouseover

The mouseover method may be used when you need to move the mouse over an element matching the given selector:

```
$browser->mouseover('.selector');
```

#### Drag & Drop

The drag method may be used to drag an element matching the given selector to another element:

```
$browser->drag('.from-selector', '.to-selector');
```

Or, you may drag an element in a single direction:

```
$browser->dragLeft('.selector', 10);
$browser->dragRight('.selector', 10);
$browser->dragUp('.selector', 10);
$browser->dragDown('.selector', 10);
```

#### **Scoping Selectors**

Sometimes you may wish to perform several operations while scoping all of the operations within a given selector. For example, you may wish to assert that some text exists only within a table and then click a button within that table. You may use the with method to accomplish this. All operations performed within the callback given to the with method will be scoped to the original selector:

# **Waiting For Elements**

When testing applications that use JavaScript extensively, it often becomes necessary to "wait" for certain elements or data to be available before proceeding with a test. Dusk makes this a cinch. Using a variety of methods, you may wait for elements to be visible on the page or even wait until a given JavaScript expression evaluates to true.

#### Waiting

If you need to pause the test for a given number of milliseconds, use the pause method:

```
$browser->pause(1000);
```

### **Waiting For Selectors**

The waitFor method may be used to pause the execution of the test until the element matching the given CSS selector is displayed on the page. By default, this will pause the test for a maximum of five seconds before throwing an exception. If necessary, you may pass a custom timeout threshold as the second argument to the method:

```
// Wait a maximum of five seconds for the selector...
$browser->waitFor('.selector');
// Wait a maximum of one second for the selector...
$browser->waitFor('.selector', 1);
```

You may also wait until the given selector is missing from the page:

```
$browser->waitUntilMissing('.selector');
$browser->waitUntilMissing('.selector', 1);
```

#### **Scoping Selectors When Available**

Occasionally, you may wish to wait for a given selector and then interact with the element matching the selector. For example, you may wish to wait until a modal window is available and then press the "OK" button within the modal. The whenAvailable method may be used in this case. All element operations performed within the given callback will be scoped to the original selector:

#### **Waiting For Text**

The waitForText method may be used to wait until the given text is displayed on the page:

```
// Wait a maximum of five seconds for the text...
$browser->waitForText('Hello World');
// Wait a maximum of one second for the text...
$browser->waitForText('Hello World', 1);
```

#### **Waiting For Links**

The waitForLink method may be used to wait until the given link text is displayed on the page:

```
// Wait a maximum of five seconds for the link...
$browser->waitForLink('Create');
// Wait a maximum of one second for the link...
$browser->waitForLink('Create', 1);
```

#### **Waiting On The Page Location**

When making a path assertion such as \$browser->assertPathIs('/home'), the assertion can fail if window.location.pathname is being updated asynchronously. You may use the waitForLocation method to wait for the location to be a given value:

```
$browser->waitForLocation('/secret');
```

You may also wait for a named route's location:

```
$browser->waitForRoute($routeName, $parameters);
```

#### **Waiting for Page Reloads**

If you need to make assertions after a page has been reloaded, use the waitForReload method:

```
$browser->click('.some-action')
    ->waitForReload()
    ->assertSee('something');
```

#### **Waiting On JavaScript Expressions**

Sometimes you may wish to pause the execution of a test until a given JavaScript expression evaluates to true. You may easily accomplish this using the waitUntil method. When passing an expression to this method, you do not need to include the return keyword or an ending semi-colon:

```
// Wait a maximum of five seconds for the expression to be true...
$browser->waitUntil('App.dataLoaded');

$browser->waitUntil('App.data.servers.length > 0');

// Wait a maximum of one second for the expression to be true...
$browser->waitUntil('App.data.servers.length > 0', 1);
```

### **Waiting On Vue Expressions**

The following methods may be used to wait until a given Vue component attribute has a given value:

```
// Wait until the component attribute contains the given value...
$browser->waitUntilVueIs('user.name', 'Taylor', '@user');
// Wait until the component attribute doesn't contain the given value...
$browser->waitUntilVueIsNot('user.name', null, '@user');
```

#### Waiting With A Callback

Many of the "wait" methods in Dusk rely on the underlying waitUsing method. You may use this method directly to wait for a given callback to return true. The waitUsing method accepts the maximum number of seconds to wait, the interval at which the Closure should be evaluated, the Closure, and an optional failure message:

```
$browser->waitUsing(10, 1, function () use ($something) {
```

```
return $something->isReady();
}, "Something wasn't ready in time.");
```

### **Making Vue Assertions**

Dusk even allows you to make assertions on the state of <u>Vue</u> component data. For example, imagine your application contains the following Vue component:

```
// HTML...
<profile dusk="profile-component"></profile>
// Component Definition...

Vue.component('profile', {
    template: '<div>{{ user.name }}</div>',
    data: function () {
        return {
            user: {
                 name: 'Taylor'
            }
        };
    }
};
```

You may assert on the state of the Vue component like so:

### **Available Assertions**

Dusk provides a variety of assertions that you may make against your application. All of the available assertions are documented in the list below:

assertTitle assertTitleContains assertUrlIs assertSchemeIs assertSchemeIsNot assertHostIs assertHostIs assertPortIs
assertPortIsNot assertPathBeginsWith assertPathIs assertPathIsNot assertRouteIs assertQueryStringHas assertQueryStringMissing
assertFragmentIs assertFragmentBeginsWith assertFragmentIsNot assertHasCookie assertCookieMissing assertCookieValue
assertPlainCookieValue assertSee assertDontSee assertSeeIn assertDontSeeIn assertSourceHas assertSourceMissing assertSeeLink
assertDontSeeLink assertInputValue assertInputValueIsNot assertChecked assertNotChecked assertRadioSelected
assertRadioNotSelected assertSelected assertSeeted assertSeeted assertSeeted assertSeeted
assertSelectHasOption assertValue assertVisible assertPresent assertMissing assertDialogOpened assertEnabled assertDisabled
assertFocused assertNotFocused assertVue assertVueIsNot assertVueContains assertVueDoesNotContain

### assertTitle

Assert that the page title matches the given text:

```
$browser->assertTitle($title);
```

# assertTitleContains

Assert that the page title contains the given text:

```
$browser->assertTitleContains($title);
```

#### assertUrlIs

Assert that the current URL (without the query string) matches the given string:

```
$browser->assertUrlIs($url);
```

#### assertSchemeIs

Assert that the current URL scheme matches the given scheme:

```
$browser->assertSchemeIs($scheme);
```

#### assertSchemeIsNot

Assert that the current URL scheme does not match the given scheme:

```
$browser->assertSchemeIsNot($scheme);
```

#### assertHostIs

Assert that the current URL host matches the given host:

```
$browser->assertHostIs($host);
```

### assertHostIsNot

Assert that the current URL host does not match the given host:

```
$browser->assertHostIsNot($host);
```

#### assertPortIs

Assert that the current URL port matches the given port:

```
$browser->assertPortIs($port);
```

#### assertPortIsNot

Assert that the current URL port does not match the given port:

```
$browser->assertPortIsNot($port);
```

### assertPathBeginsWith

Assert that the current URL path begins with the given path:

```
$browser->assertPathBeginsWith($path);
```

### assertPathIs

Assert that the current path matches the given path:

```
$browser->assertPathIs('/home');
```

#### assertPathIsNot

Assert that the current path does not match the given path:

```
$browser->assertPathIsNot('/home');
```

### assertRouteIs

Assert that the current URL matches the given named route's URL:

```
$browser->assertRouteIs($name, $parameters);
```

### as sert Query String Has

Assert that the given query string parameter is present:

```
$browser->assertQueryStringHas($name);
```

Assert that the given query string parameter is present and has a given value:

```
$browser->assertQueryStringHas($name, $value);
```

# assert Query String Missing

Assert that the given query string parameter is missing:

```
$browser->assertQueryStringMissing($name);
```

#### assertFragmentIs

Assert that the current fragment matches the given fragment:

```
$browser->assertFragmentIs('anchor');
```

### assert Fragment Begins With

Assert that the current fragment begins with the given fragment:

```
$browser->assertFragmentBeginsWith('anchor');
```

#### assertFragmentIsNot

Assert that the current fragment does not match the given fragment:

```
$browser->assertFragmentIsNot('anchor');
```

#### assertHasCookie

Assert that the given cookie is present:

```
$browser->assertHasCookie($name);
```

### assertCookieMissing

Assert that the given cookie is not present:

```
$browser->assertCookieMissing($name);
```

#### assertCookieValue

Assert that a cookie has a given value:

```
$browser->assertCookieValue($name, $value);
```

### assertPlainCookieValue

Assert that an unencrypted cookie has a given value:

```
$browser->assertPlainCookieValue($name, $value);
```

#### assertSee

Assert that the given text is present on the page:

```
$browser->assertSee($text);
```

### assertDontSee

Assert that the given text is not present on the page:

```
$browser->assertDontSee($text);
```

### assert See In

Assert that the given text is present within the selector:

```
$browser->assertSeeIn($selector, $text);
```

### assertDontSeeIn

Assert that the given text is not present within the selector:

```
$browser->assertDontSeeIn($selector, $text);
```

### assertSourceHas

Assert that the given source code is present on the page:

```
$browser->assertSourceHas($code);
```

### assertSourceMissing

Assert that the given source code is not present on the page:

```
$browser->assertSourceMissing($code);
```

#### assertSeeLink

Assert that the given link is present on the page:

```
$browser->assertSeeLink($linkText);
```

#### assertDontSeeLink

Assert that the given link is not present on the page:

```
$browser->assertDontSeeLink($linkText);
```

#### assertInputValue

Assert that the given input field has the given value:

```
$browser->assertInputValue($field, $value);
```

#### assertInputValueIsNot

Assert that the given input field does not have the given value:

```
$browser->assertInputValueIsNot($field, $value);
```

### assertChecked

Assert that the given checkbox is checked:

```
$browser->assertChecked($field);
```

#### assertNotChecked

Assert that the given checkbox is not checked:

```
$browser->assertNotChecked($field);
```

#### assertRadioSelected

Assert that the given radio field is selected:

```
\verb| \$browser-> assertRadioSelected(\$field, \$value); \\
```

#### assert Radio Not Selected

Assert that the given radio field is not selected:

```
$browser->assertRadioNotSelected($field, $value);
```

### assertSelected

Assert that the given dropdown has the given value selected:

```
$browser->assertSelected($field, $value);
```

#### assertNotSelected

Assert that the given dropdown does not have the given value selected:

```
$browser->assertNotSelected($field, $value);
```

### assert Select Has Options

Assert that the given array of values are available to be selected:

```
$browser->assertSelectHasOptions($field, $values);
```

### assert Select Missing Options

Assert that the given array of values are not available to be selected:

```
$browser->assertSelectMissingOptions($field, $values);
```

#### assert Select Has Option

Assert that the given value is available to be selected on the given field:

```
$browser->assertSelectHasOption($field, $value);
```

#### assertValue

Assert that the element matching the given selector has the given value:

```
$browser->assertValue($selector, $value);
```

#### assertVisible

Assert that the element matching the given selector is visible:

```
$browser->assertVisible($selector);
```

#### assertPresent

Assert that the element matching the given selector is present:

```
$browser->assertPresent($selector);
```

#### assertMissing

Assert that the element matching the given selector is not visible:

```
$browser->assertMissing($selector);
```

### assertDialogOpened

Assert that a JavaScript dialog with the given message has been opened:

```
$browser->assertDialogOpened($message);
```

#### assertEnabled

Assert that the given field is enabled:

```
$browser->assertEnabled($field);
```

### as sert Disable d

Assert that the given field is disabled:

```
$browser->assertDisabled($field);
```

### assertFocused

Assert that the given field is focused:

```
$browser->assertFocused($field);
```

### assertNotFocused

Assert that the given field is not focused:

```
$browser->assertNotFocused($field);
```

#### assertVue

Assert that a given Vue component data property matches the given value:

```
$browser->assertVue($property, $value, $componentSelector = null);
```

#### assertVueIsNot

Assert that a given Vue component data property does not match the given value:

```
$browser->assertVueIsNot($property, $value, $componentSelector = null);
```

#### assertVueContains

Assert that a given Vue component data property is an array and contains the given value:

```
$browser->assertVueContains($property, $value, $componentSelector = null);
```

#### assertVueDoesNotContain

Assert that a given Vue component data property is an array and does not contain the given value:

```
$browser->assertVueDoesNotContain($property, $value, $componentSelector = null);
```

### **Pages**

Sometimes, tests require several complicated actions to be performed in sequence. This can make your tests harder to read and understand. Pages allow you to define expressive actions that may then be performed on a given page using a single method. Pages also allow you to define short-cuts to common selectors for your application or a single page.

### **Generating Pages**

To generate a page object, use the dusk:page Artisan command. All page objects will be placed in the tests/Browser/Pages directory:

```
php artisan dusk:page Login
```

# **Configuring Pages**

By default, pages have three methods: url, assert, and elements. We will discuss the url and assert methods now. The elements method will be <u>discussed in more detail below</u>.

### The url Method

The ur1 method should return the path of the URL that represents the page. Dusk will use this URL when navigating to the page in the browser:

```
/**
    * Get the URL for the page.
    * @return string
    */
public function url()
{
    return '/login';
}
```

#### The assert Method

The assert method may make any assertions necessary to verify that the browser is actually on the given page. Completing this method is not necessary; however, you are free to make these assertions if you wish. These assertions will be run automatically when navigating to the page:

```
* Assert that the browser is on the page.

* @return void

*/
public function assert(Browser $browser)
{

$browser->assertPathIs($this->url());
```

}

### **Navigating To Pages**

Once a page has been configured, you may navigate to it using the visit method:

```
use Tests\Browser\Pages\Login;
$browser->visit(new Login);
```

Sometimes you may already be on a given page and need to "load" the page's selectors and methods into the current test context. This is common when pressing a button and being redirected to a given page without explicitly navigating to it. In this situation, you may use the on method to load the page:

### **Shorthand Selectors**

The elements method of pages allows you to define quick, easy-to-remember shortcuts for any CSS selector on your page. For example, let's define a shortcut for the "email" input field of the application's login page:

Now, you may use this shorthand selector anywhere you would use a full CSS selector:

```
$browser->type('@email', 'taylor@laravel.com');
```

### **Global Shorthand Selectors**

After installing Dusk, a base Page class will be placed in your tests/Browser/Pages directory. This class contains a siteElements method which may be used to define global shorthand selectors that should be available on every page throughout your application:

### **Page Methods**

In addition to the default methods defined on pages, you may define additional methods which may be used throughout your tests. For example, let's imagine we are building a music management application. A common action for one page of the application might be to create a playlist. Instead of re-writing the logic to create a playlist in each test, you may define a createPlaylist method on a page class:

```
<?php
namespace Tests\Browser\Pages;
use Laravel\Dusk\Browser;
class Dashboard extends Page
{
    // Other page methods...
    /**
    * Create a new playlist.</pre>
```

Once the method has been defined, you may use it within any test that utilizes the page. The browser instance will automatically be passed to the page method:

```
use Tests\Browser\Pages\Dashboard;
$browser->visit(new Dashboard)
    ->createPlaylist('My Playlist')
    ->assertSee('My Playlist');
```

### **Components**

Components are similar to Dusk's "page objects", but are intended for pieces of UI and functionality that are re-used throughout your application, such as a navigation bar or notification window. As such, components are not bound to specific URLs.

### **Generating Components**

To generate a component, use the dusk:component Artisan command. New components are placed in the test/Browser/Components directory:

```
php artisan dusk:component DatePicker
```

As shown above, a "date picker" is an example of a component that might exist throughout your application on a variety of pages. It can become cumbersome to manually write the browser automation logic to select a date in dozens of tests throughout your test suite. Instead, we can define a Dusk component to represent the date picker, allowing us to encapsulate that logic within the component:

```
<?php
namespace Tests\Browser\Components;
use Laravel\Dusk\Browser:
use Laravel\Dusk\Component as BaseComponent;
class DatePicker extends BaseComponent
     * Get the root selector for the component.
     * @return string
    public function selector()
        return '.date-picker';
    }
     ^{\star} Assert that the browser page contains the component.
       @param Browser $browser
       @return void
    public function assert(Browser $browser)
        $browser->assertVisible($this->selector());
    }
     \ensuremath{^{\star}} Get the element shortcuts for the component.
       @return array
    public function elements()
        return [
             ...<sub>[</sub>
'@date-field' => 'input.datepicker-input',
             '@month-list' => 'div > div.datepicker-months',
             '@day-list' => 'div > div.datepicker-days',
        ];
    }
```

### **Using Components**

Once the component has been defined, we can easily select a date within the date picker from any test. And, if the logic necessary to select a date changes, we only need to update the component:

```
<?php
namespace Tests\Browser;
use Tests\DuskTestCase;
use Laravel\Dusk\Browser;
use Tests\Browser\Components\DatePicker;
use \  \, \textbf{Illuminate} \\ \textbf{Foundation} \\ \textbf{Testing} \\ \textbf{DatabaseMigrations}; \\
class ExampleTest extends DuskTestCase
     * A basic component test example.
     * @return void
    public function testBasicExample()
         $this->browse(function (Browser $browser) {
             $browser->visit('/')
                      ->within(new DatePicker, function ($browser) {
                           $browser->selectDate(1, 2018);
                       ->assertSee('January');
        });
    }
```

# **Continuous Integration**

#### **CircleCI**

If you are using CircleCI to run your Dusk tests, you may use this configuration file as a starting point. Like TravisCI, we will use the php artisan serve command to launch PHP's built-in web server:

```
version: 2
jobs:
   build:
        steps:
           - run: sudo apt-get install -y libsqlite3-dev
           - run: cp .env.testing .env
           - run: composer install -n --ignore-platform-reqs
           - run: npm install
           - run: npm run production
           - run: vendor/bin/phpunit
              name: Start Chrome Driver
              command: ./vendor/laravel/dusk/bin/chromedriver-linux
              background: true
           - run:
              name: Run Laravel Server
              command: php artisan serve
              background: true
              name: Run Laravel Dusk Tests
```

```
command: php artisan dusk
```

### **Codeship**

To run Dusk tests on <u>Codeship</u>, add the following commands to your Codeship project. Of course, these commands are a starting point and you are free to add additional commands as needed:

```
phpenv local 7.2
cp .env.testing .env
mkdir -p ./bootstrap/cache
composer install --no-interaction --prefer-dist
php artisan key:generate
nohup bash -c "php artisan serve 2>&1 &" && sleep 5
php artisan dusk
```

#### Heroku CI

To run Dusk tests on Heroku CI, add the following Google Chrome buildpack and scripts to your Heroku app. json file:

#### **Travis CI**

To run your Dusk tests on <u>Travis CI</u>, use the following .travis.yml configuration. Since Travis CI is not a graphical environment, we will need to take some extra steps in order to launch a Chrome browser. In addition, we will use php artisan serve to launch PHP's built-in web server:

#### Official Packages

# **Envoy Task Runner**

- Introduction
  - o <u>Installation</u>
- Writing Tasks
  - Setup
  - <u>Variables</u>
  - Stories
  - Multiple Servers
- Running Tasks
  - o Confirming Task Execution
- Notifications
  - Slack

### Introduction

<u>Laravel Envoy</u> provides a clean, minimal syntax for defining common tasks you run on your remote servers. Using Blade style syntax, you can easily setup tasks for deployment, Artisan commands, and more. Currently, Envoy only supports the Mac and Linux operating systems.

### Installation

First, install Envoy using the Composer global require command:

```
composer global require laravel/envoy
```

Since global Composer libraries can sometimes cause package version conflicts, you may wish to consider using cgr, which is a drop-in replacement for the composer global require command. The cgr library's installation instructions can be <u>found on GitHub</u>.

NOTE Make sure to place the ~/.composer/vendor/bin directory in your PATH so the envoy executable is found when running the envoy command in your terminal.

### **Updating Envoy**

You may also use Composer to keep your Envoy installation up to date. Issuing the composer global update command will update all of your globally installed Composer packages:

```
composer global update
```

### Writing Tasks

All of your Envoy tasks should be defined in an Envoy.blade.php file in the root of your project. Here's an example to get you started:

```
@servers(['web' => ['user@192.168.1.1']])
@task('foo', ['on' => 'web'])
    ls -la
@endtask
```

As you can see, an array of @servers is defined at the top of the file, allowing you to reference these servers in the on option of your task declarations. Within your @task declarations, you should place the Bash code that should run on your server when the task is executed.

You can force a script to run locally by specifying the server's IP address as 127.0.0.1:

```
@servers(['localhost' => '127.0.0.1'])
```

#### Setup

Sometimes, you may need to execute some PHP code before executing your Envoy tasks. You may use the `@setup` directive to declare variables and do other general PHP work before any of your other tasks are executed:

```
@setup
    $now = new DateTime();

$environment = isset($env) ? $env : "testing";
```

@endsetup

If you need to require other PHP files before your task is executed, you may use the @include directive at the top of your Envoy.blade.php file:

```
@include('vendor/autoload.php')
@task('foo')
# ...
@endtask
```

#### **Variables**

If needed, you may pass option values into Envoy tasks using the command line:

```
envoy run deploy --branch=master
```

You may access the options in your tasks via Blade's "echo" syntax. Of course, you may also use if statements and loops within your tasks. For example, let's verify the presence of the <code>\$branch</code> variable before executing the <code>git pull</code> command:

```
@servers(['web' => '192.168.1.1'])
@task('deploy', ['on' => 'web'])
    cd site
    @if ($branch)
        git pull origin {{ $branch }}
    @endif
    php artisan migrate
@endtask
```

#### **Stories**

Stories group a set of tasks under a single, convenient name, allowing you to group small, focused tasks into large tasks. For instance, a deploy story may run the git and composer tasks by listing the task names within its definition:

```
@servers(['web' => '192.168.1.1'])
@story('deploy')
    git
    composer
@endstory
@task('git')
    git pull origin master
@endtask
@task('composer')
    composer install
@endtask
```

Once the story has been written, you may run it just like a typical task:

```
envoy run deploy
```

### **Multiple Servers**

Envoy allows you to easily run a task across multiple servers. First, add additional servers to your @servers declaration. Each server should be assigned a unique name. Once you have defined your additional servers, list each of the servers in the task's on array:

```
@servers(['web-1' => '192.168.1.1', 'web-2' => '192.168.1.2'])
@task('deploy', ['on' => ['web-1', 'web-2']])
    cd site
    git pull origin {{ $branch }}
    php artisan migrate
@endtask
```

### Parallel Execution

By default, tasks will be executed on each server serially. In other words, a task will finish running on the first server before proceeding to execute on the second server. If you would like to run a task across multiple servers in parallel, add the parallel option to your task declaration:

```
@servers(['web-1' => '192.168.1.1', 'web-2' => '192.168.1.2'])
@task('deploy', ['on' => ['web-1', 'web-2'], 'parallel' => true])
```

```
cd site
  git pull origin {{ $branch }}
  php artisan migrate
@endtask
```

# **Running Tasks**

To run a task or story that is defined in your Envoy.blade.php file, execute Envoy's run command, passing the name of the task or story you would like to execute. Envoy will run the task and display the output from the servers as the task is running:

```
envoy run task
```

### **Confirming Task Execution**

If you would like to be prompted for confirmation before running a given task on your servers, you should add the confirm directive to your task declaration. This option is particularly useful for destructive operations:

```
@task('deploy', ['on' => 'web', 'confirm' => true])
  cd site
  git pull origin {{ $branch }}
  php artisan migrate
@endtask
```

### **Notifications**

### Slack

Envoy also supports sending notifications to Slack after each task is executed. The @slack directive accepts a Slack hook URL and a channel name. You may retrieve your webhook URL by creating an "Incoming WebHooks" integration in your Slack control panel. You should pass the entire webhook URL into the @slack directive:

```
@finished
    @slack('webhook-url', '#bots')
@endfinished
```

You may provide one of the following as the channel argument:

- To send the notification to a channel: #channel
- To send the notification to a user: @user

### **Official Packages**

# **Laravel Horizon**

- Introduction
- Installation
  - Configuration
  - o Dashboard Authorization
- Running Horizon
  - Deploying Horizon
- Tags
- Notifications
- Metrics

# Introduction

Horizon provides a beautiful dashboard and code-driven configuration for your Laravel powered Redis queues. Horizon allows you to easily monitor key metrics of your queue system such as job throughput, runtime, and job failures.

All of your worker configuration is stored in a single, simple configuration file, allowing your configuration to stay in source control where your entire team can collaborate.



### **Installation**

NOTE You should ensure that your queue driver is set to redis in your queue configuration file.

You may use Composer to install Horizon into your Laravel project:

composer require laravel/horizon

After installing Horizon, publish its assets using the horizon:install Artisan command:

php artisan horizon:install

You should also create the failed\_jobs table which Laravel will use to store any failed queue jobs:

```
php artisan queue:failed-table
php artisan migrate
```

#### Configuration

After publishing Horizon's assets, its primary configuration file will be located at <code>config/horizon.php</code>. This configuration file allows you to configure your worker options and each configuration option includes a description of its purpose, so be sure to thoroughly explore this file.

### **Balance Options**

Horizon allows you to choose from three balancing strategies: simple, auto, and false. The simple strategy, which is the default, splits incoming jobs evenly between processes:

```
'balance' => 'simple',
```

The auto strategy adjusts the number of worker processes per queue based on the current workload of the queue. For example, if your notifications queue has 1,000 waiting jobs while your render queue is empty, Horizon will allocate more workers to your notifications queue until it is empty. When the balance option is set to false, the default Laravel behavior will be used, which processes queues in the order they are listed in your configuration.

#### **Job Trimming**

The horizon configuration file allows you to configure how long recent and failed jobs should be persisted (in minutes). By default, recent jobs are kept for one hour while failed jobs are kept for a week:

```
'trim' => [
    'recent' => 60,
    'failed' => 10080,
],
```

#### **Dashboard Authorization**

Horizon exposes a dashboard at /horizon. By default, you will only be able to access this dashboard in the local environment. Within your app/Providers/HorizonServiceProvider.php file, there is a gate method. This authorization gate controls access to Horizon in **non-local** environments. You are free to modify this gate as needed to restrict access to your Horizon installation:

# **Running Horizon**

Once you have configured your workers in the config/horizon.php configuration file, you may start Horizon using the horizon Artisan command. This single command will start all of your configured workers:

```
php artisan horizon
```

You may pause the Horizon process and instruct it to continue processing jobs using the horizon:pause and horizon:continue Artisan commands:

```
php artisan horizon:pause
php artisan horizon:continue
```

You may gracefully terminate the master Horizon process on your machine using the horizon:terminate Artisan command. Any jobs that Horizon is currently processing will be completed and then Horizon will exit:

```
php artisan horizon:terminate
```

### **Deploying Horizon**

If you are deploying Horizon to a live server, you should configure a process monitor to monitor the php artisan horizon command and restart it if it quits unexpectedly. When deploying fresh code to your server, you will need to instruct the master Horizon process to terminate so it can be restarted by your process monitor and receive your code changes.

#### **Supervisor Configuration**

If you are using the Supervisor process monitor to manage your horizon process, the following configuration file should suffice:

```
[program:horizon]
process_name=%(program_name)s
command=php /home/forge/app.com/artisan horizon
autostart=true
autorestart=true
user=forge
redirect_stderr=true
stdout_logfile=/home/forge/app.com/horizon.log
```

TIP If you are uncomfortable managing your own servers, consider using <u>Laravel Forge</u>. Forge provisions PHP 7+ servers with everything you need to run modern, robust Laravel applications with Horizon.

### **Tags**

Horizon allows you to assign "tags" to jobs, including mailables, event broadcasts, notifications, and queued event listeners. In fact, Horizon will intelligently and automatically tag most jobs depending on the Eloquent models that are attached to the job. For example, take a look at the following job:

```
<?php
namespace App\Jobs:
use App\Video;
use Illuminate\Bus\Queueable;
use Illuminate\Queue\SerializesModels;
use Illuminate\Oueue\InteractsWithOueue:
use Illuminate\Contracts\Queue\ShouldQueue;
use Illuminate\Foundation\Bus\Dispatchable;
class RenderVideo implements ShouldQueue
    use Dispatchable, InteractsWithQueue, Queueable, SerializesModels;
    * The video instance.
      @var \App\Video
    public $video;
    * Create a new job instance.
     * @param \App\Video $video
       @return void
    public function __construct(Video $video)
        $this->video = $video:
    }
     * Execute the job.
       @return void
    public function handle()
        //
    }
}
```

If this job is queued with an App\video instance that has an id of 1, it will automatically receive the tag App\video:1. This is because Horizon will examine the job's properties for any Eloquent models. If Eloquent models are found, Horizon will intelligently tag the job using the model's class name and primary key:

```
$video = App\Video::find(1);
App\Jobs\RenderVideo::dispatch($video);
```

#### **Manually Tagging**

If you would like to manually define the tags for one of your queueable objects, you may define a tags method on the class:

```
class RenderVideo implements ShouldQueue
{
    /**
    * Get the tags that should be assigned to the job.
    *
    * @return array
    */
    public function tags()
    {
        return ['render', 'video:'.$this->video->id];
    }
}
```

### **Notifications**

**Note:** Before using notifications, you should add the guzzlehttp/guzzle Composer package to your project. When configuring Horizon to send SMS notifications, you should also review the <u>prerequisites for the Nexmo notification driver</u>.

If you would like to be notified when one of your queues has a long wait time, you may use the Horizon::routeMailNotificationsTo, Horizon::routeSlackNotificationsTo, and Horizon::routeSmsNotificationsTo methods. You may call these methods from your application's HorizonServiceProvider:

```
Horizon::routeMailNotificationsTo('example@example.com');
Horizon::routeSlackNotificationsTo('slack-webhook-url', '#channel');
Horizon::routeSmsNotificationsTo('15556667777');
```

#### **Configuring Notification Wait Time Thresholds**

You may configure how many seconds are considered a "long wait" within your config/horizon.php configuration file. The waits configuration option within this file allows you to control the long wait threshold for each connection / queue combination:

```
'waits' => [
    'redis:default' => 60,
],
```

### **Metrics**

Horizon includes a metrics dashboard which provides information on your job and queue wait times and throughput. In order to populate this dashboard, you should configure Horizon's snapshot Artisan command to run every five minutes via your application's scheduler:

```
/**
  * Define the application's command schedule.
  * @param \Illuminate\Console\Scheduling\Schedule $schedule
  * @return void
  */
protected function schedule(Schedule $schedule)
{
        $schedule->command('horizon:snapshot')->everyFiveMinutes();
}
```

#### Official Packages

# **API Authentication (Passport)**

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  - Frontend Quickstart
  - Deploying Passport
- Configuration
  - Token Lifetimes
  - o Overriding Default Models
- Issuing Access Tokens
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  - Requesting Tokens
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  - Requesting All Scopes
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  - o Managing Personal Access Tokens
- Protecting Routes
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  - o Passing The Access Token
- Token Scopes
  - <u>Defining Scopes</u>
  - Default Scope
  - Assigning Scopes To Tokens
  - Checking Scopes
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- Events
- Testing

# Introduction

Laravel already makes it easy to perform authentication via traditional login forms, but what about APIs? APIs typically use tokens to authenticate users and do not maintain session state between requests. Laravel makes API authentication a breeze using Laravel Passport, which provides a full OAuth2 server implementation for your Laravel application in a matter of minutes. Passport is built on top of the <u>League OAuth2 server</u> that is maintained by Andy Millington and Simon Hamp.

NOTE This documentation assumes you are already familiar with OAuth2. If you do not know anything about OAuth2, consider familiarizing yourself with the general <u>terminology</u> and features of OAuth2 before continuing.

### **Installation**

To get started, install Passport via the Composer package manager:

composer require laravel/passport

The Passport service provider registers its own database migration directory with the framework, so you should migrate your database after installing the package. The Passport migrations will create the tables your application needs to store clients and access tokens:

php artisan migrate

Next, you should run the passport:install command. This command will create the encryption keys needed to generate secure access tokens. In addition, the command will create "personal access" and "password grant" clients which will be used to generate access tokens:

php artisan passport:install

After running this command, add the Laravel\Passport\HasApiTokens trait to your App\User model. This trait will provide a few helper methods to your model which allow you to inspect the authenticated user's token and scopes:

<?php

```
namespace App;
use Laravel\Passport\HasApiTokens;
use Illuminate\Notifications\Notifiable;
use Illuminate\Foundation\Auth\User as Authenticatable;
class User extends Authenticatable
{
    use HasApiTokens, Notifiable;
}
```

Next, you should call the Passport::routes method within the boot method of your AuthServiceProvider. This method will register the routes necessary to issue access tokens and revoke access tokens, clients, and personal access tokens:

```
<?php
namespace App\Providers;
use Laravel\Passport\Passport;
use Illuminate\Support\Facades\Gate:
use Illuminate\Foundation\Support\Providers\AuthServiceProvider as ServiceProvider;
class AuthServiceProvider extends ServiceProvider
     * The policy mappings for the application.
       @var array
    protected $policies = [
   'App\Model' => 'App\Policies\ModelPolicy',
    1:
     ^{\star} Register any authentication / authorization services.
       @return void
    public function boot()
         $this->registerPolicies();
        Passport::routes();
    }
}
```

Finally, in your config/auth.php configuration file, you should set the driver option of the api authentication guard to passport. This will instruct your application to use Passport's TokenGuard when authenticating incoming API requests:

```
'guards' => [
    'web' => [
        'driver' => 'session',
        'provider' => 'users',
],

'api' => [
        'driver' => 'passport',
        'provider' => 'users',
],
],
```

### **Migration Customization**

If you are not going to use Passport's default migrations, you should call the Passport::ignoreMigrations method in the register method of your AppServiceProvider. You may export the default migrations using php artisan vendor:publish --tag=passport-migrations.

By default, Passport uses an integer column to store the user\_id. If your application uses a different column type to identify users (for example: UUIDs), you should modify the default Passport migrations after publishing them.

### **Frontend Quickstart**

NOTE In order to use the Passport Vue components, you must be using the <u>Vue</u> JavaScript framework. These components also use the Bootstrap CSS framework. However, even if you are not using these tools, the components serve as a valuable reference for your own frontend implementation.

Passport ships with a JSON API that you may use to allow your users to create clients and personal access tokens. However, it can be time consuming to code a frontend to interact with these APIs. So, Passport also includes pre-built <u>Vue</u> components you may use as an example implementation or starting point for your own implementation.

To publish the Passport Vue components, use the vendor:publish Artisan command:

```
php artisan vendor:publish --tag=passport-components
```

The published components will be placed in your resources/js/components directory. Once the components have been published, you should register them in your resources/js/app.js file:

```
Vue.component(
    'passport-clients',
    require('./components/passport/Clients.vue').default
);

Vue.component(
    'passport-authorized-clients',
    require('./components/passport/AuthorizedClients.vue').default
);

Vue.component(
    'passport-personal-access-tokens',
    require('./components/passport/PersonalAccessTokens.vue').default
);
```

NOTE Prior to Laravel v5.7.19, appending .default when registering components results in a console error. An explanation for this change can be found in the <u>Laravel Mix v4.0.0 release notes</u>.

After registering the components, make sure to run npm run dev to recompile your assets. Once you have recompiled your assets, you may drop the components into one of your application's templates to get started creating clients and personal access tokens:

```
<passport-clients></passport-authorized-clients>
<passport-authorized-clients></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens></passport-personal-access-tokens>
```

# **Deploying Passport**

When deploying Passport to your production servers for the first time, you will likely need to run the passport:keys command. This command generates the encryption keys Passport needs in order to generate access token. The generated keys are not typically kept in source control:

```
php artisan passport:keys
```

If necessary, you may define the path where Passport's keys should be loaded from. You may use the Passport::loadKeysFrom method to accomplish this:

```
/**
   * Register any authentication / authorization services.
   * @return void
   */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::loadKeysFrom('/secret-keys/oauth');
}
```

# Configuration

### **Token Lifetimes**

By default, Passport issues long-lived access tokens that expire after one year. If you would like to configure a longer / shorter token lifetime, you may use the tokensExpireIn and refreshTokensExpireIn methods. These methods should be called from the boot method of your AuthServiceProvider:

```
/**
  * Register any authentication / authorization services.
  * @return void
  */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::tokensExpireIn(now()->addDays(15));
    Passport::refreshTokensExpireIn(now()->addDays(30));
}
```

# **Overriding Default Models**

You are free to extend the models used internally by Passport. Then, you may instruct Passport to use your custom models via the Passport class:

```
use App\Models\Passport\Client;
use App\Models\Passport\AuthCode;
use App\Models\Passport\TokenModel;
use App\Models\Passport\TokenModel;
use App\Models\Passport\TokenModel;
use App\Models\Passport\PersonalAccessClient;

/**
    * Register any authentication / authorization services.
    *
    * @return void
    */
public function boot()
{
        $this->registerPolicies();
        Passport::routes();
        Passport::useClientModel(Client::class);
        Passport::useTokenModel(TokenModel::class);
        Passport::useAuthCodeModel(AuthCode::class);
        Passport::usePersonalAccessClientModel(PersonalAccessClient::class);
}
```

# **Issuing Access Tokens**

Using OAuth2 with authorization codes is how most developers are familiar with OAuth2. When using authorization codes, a client application will redirect a user to your server where they will either approve or deny the request to issue an access token to the client.

### **Managing Clients**

First, developers building applications that need to interact with your application's API will need to register their application with yours by creating a "client". Typically, this consists of providing the name of their application and a URL that your application can redirect to after users approve their request for authorization.

### The passport:client Command

The simplest way to create a client is using the passport:client Artisan command. This command may be used to create your own clients for testing your OAuth2 functionality. When you run the client command, Passport will prompt you for more information about your client and will provide you with a client ID and secret:

```
php artisan passport:client
```

### Redirect URLs

If you would like to whitelist multiple redirect URLs for your client, you may specify them using a comma-delimited list when prompted for the URL by the passport:client command:

```
http://example.com/callback,http://examplefoo.com/callback
```

NOTE Any URLs which contains commas must be encoded.

### JSON API

Since your users will not be able to utilize the client command, Passport provides a JSON API that you may use to create clients. This saves you the trouble of having to manually code controllers for creating, updating, and deleting clients.

However, you will need to pair Passport's JSON API with your own frontend to provide a dashboard for your users to manage their clients. Below, we'll review all of the API endpoints for managing clients. For convenience, we'll use <u>Axios</u> to demonstrate making HTTP requests to the endpoints.

The JSON API is guarded by the web and auth middleware; therefore, it may only be called from your own application. It is not able to be called from an external source.

TIP If you don't want to implement the entire client management frontend yourself, you can use the <u>frontend quickstart</u> to have a fully functional frontend in a matter of minutes.

### GET /oauth/clients

This route returns all of the clients for the authenticated user. This is primarily useful for listing all of the user's clients so that they

may edit or delete them:

```
axios.get('/oauth/clients')
   .then(response => {
      console.log(response.data);
   });
```

### POST /oauth/clients

This route is used to create new clients. It requires two pieces of data: the client's name and a redirect URL. The redirect URL is where the user will be redirected after approving or denying a request for authorization.

When a client is created, it will be issued a client ID and client secret. These values will be used when requesting access tokens from your application. The client creation route will return the new client instance:

```
const data = {
   name: 'Client Name',
   redirect: 'http://example.com/callback'
};

axios.post('/oauth/clients', data)
   .then(response => {
      console.log(response.data);
   })
   .catch (response => {
      // List errors on response...
   });
```

#### PUT /oauth/clients/{client-id}

This route is used to update clients. It requires two pieces of data: the client's name and a redirect URL. The redirect URL is where the user will be redirected after approving or denying a request for authorization. The route will return the updated client instance:

```
const data = {
   name: 'New Client Name',
   redirect: 'http://example.com/callback'
};

axios.put('/oauth/clients/' + clientId, data)
   .then(response => {
      console.log(response.data);
   })
   .catch (response => {
      // List errors on response...
   });
```

# DELETE /oauth/clients/{client-id}

This route is used to delete clients:

### **Requesting Tokens**

### **Redirecting For Authorization**

Once a client has been created, developers may use their client ID and secret to request an authorization code and access token from your application. First, the consuming application should make a redirect request to your application's /oauth/authorize route like so:

TIP Remember, the /oauth/authorize route is already defined by the Passport::routes method. You do not need to manually define this route.

### **Approving The Request**

When receiving authorization requests, Passport will automatically display a template to the user allowing them to approve or deny the authorization request. If they approve the request, they will be redirected back to the redirect\_uri that was specified by the consuming application. The redirect\_uri must match the redirect URL that was specified when the client was created.

If you would like to customize the authorization approval screen, you may publish Passport's views using the vendor:publish Artisan command. The published views will be placed in resources/views/vendor/passport:

```
php artisan vendor:publish --tag=passport-views
```

### **Converting Authorization Codes To Access Tokens**

If the user approves the authorization request, they will be redirected back to the consuming application. The consumer should then issue a POST request to your application to request an access token. The request should include the authorization code that was issued by your application when the user approved the authorization request. In this example, we'll use the Guzzle HTTP library to make the POST request:

This /oauth/token route will return a JSON response containing access\_token, refresh\_token, and expires\_in attributes. The expires\_in attribute contains the number of seconds until the access token expires.

TIP Like the /oauth/authorize route, the /oauth/token route is defined for you by the Passport::routes method. There is no need to manually define this route. By default, this route is throttled using the settings of the ThrottleRequests middleware.

### **Refreshing Tokens**

If your application issues short-lived access tokens, users will need to refresh their access tokens via the refresh token that was provided to them when the access token was issued. In this example, we'll use the Guzzle HTTP library to refresh the token:

```
$http = new GuzzleHttp\Client;
$response = $http->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'refresh_token',
        'refresh_token' => 'the-refresh-token',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'scope' => '',
    ],
]);
return json_decode((string) $response->getBody(), true);
```

This /oauth/token route will return a JSON response containing access\_token, refresh\_token, and expires\_in attributes. The expires\_in attribute contains the number of seconds until the access token expires.

### **Password Grant Tokens**

The OAuth2 password grant allows your other first-party clients, such as a mobile application, to obtain an access token using an e-mail address / username and password. This allows you to issue access tokens securely to your first-party clients without requiring your users to go through the entire OAuth2 authorization code redirect flow.

# **Creating A Password Grant Client**

Before your application can issue tokens via the password grant, you will need to create a password grant client. You may do this using the passport:client command with the --password option. If you have already run the passport:install command, you do not need to run this command:

```
php artisan passport:client --password
```

# **Requesting Tokens**

Once you have created a password grant client, you may request an access token by issuing a POST request to the /oauth/token route with the user's email address and password. Remember, this route is already registered by the Passport::routes method so there is no need to define it manually. If the request is successful, you will receive an access\_token and refresh\_token in the JSON response from the server:

```
$http = new GuzzleHttp\Client;

$response = $http->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'password',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'username' => 'taylor@laravel.com',
        'password' => 'my-password',
        'scope' => '',
    ],
]);

return json_decode((string) $response->getBody(), true);
```

TIP Remember, access tokens are long-lived by default. However, you are free to <u>configure your maximum access token</u> <u>lifetime</u> if needed.

### **Requesting All Scopes**

When using the password grant, you may wish to authorize the token for all of the scopes supported by your application. You can do this by requesting the \* scope. If you request the \* scope, the can method on the token instance will always return true. This scope may only be assigned to a token that is issued using the password grant:

```
$response = $http->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'password',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'username' => 'taylor@laravel.com',
        'password' => 'my-password',
        'scope' => '*',
],
]);
```

# **Implicit Grant Tokens**

The implicit grant is similar to the authorization code grant; however, the token is returned to the client without exchanging an authorization code. This grant is most commonly used for JavaScript or mobile applications where the client credentials can't be securely stored. To enable the grant, call the enableImplicitGrant method in your AuthServiceProvider:

```
/**
  * Register any authentication / authorization services.
  * @return void
  */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::enableImplicitGrant();
}
```

Once a grant has been enabled, developers may use their client ID to request an access token from your application. The consuming application should make a redirect request to your application's /oauth/authorize route like so:

TIP Remember, the /oauth/authorize route is already defined by the Passport::routes method. You do not need to manually define this route.

# **Client Credentials Grant Tokens**

The client credentials grant is suitable for machine-to-machine authentication. For example, you might use this grant in a scheduled job which is performing maintenance tasks over an API.

Before your application can issue tokens via the client credentials grant, you will need to create a client credentials grant client. You may do this using the --client option of the passport:client command:

```
php artisan passport:client --client
```

Next, to use this grant type, you need to add the CheckClientCredentials middleware to the \$routeMiddleware property of your app/Http/Kernel.php file:

```
use Laravel\Passport\Http\Middleware\CheckClientCredentials;
protected $routeMiddleware = [
    'client' => CheckClientCredentials::class,
];
Then, attach the middleware to a route:
Route::get('/orders', function (Request $request) {
    ...
})->middleware('client');
```

To restrict access to the route to specific scopes you may provide a comma-delimited list of the required scopes when attaching the client middleware to the route:

```
Route::get('/orders', function (Request $request) {
    ...
})->middleware('client:check-status,your-scope');
```

### **Retrieving Tokens**

To retrieve a token using this grant type, make a request to the oauth/token endpoint:

```
$guzzle = new GuzzleHttp\Client;

$response = $guzzle->post('http://your-app.com/oauth/token', [
    'form_params' => [
        'grant_type' => 'client_credentials',
        'client_id' => 'client-id',
        'client_secret' => 'client-secret',
        'scope' => 'your-scope',
    ],
]);

return json_decode((string) $response->getBody(), true)['access_token'];
```

# **Personal Access Tokens**

Sometimes, your users may want to issue access tokens to themselves without going through the typical authorization code redirect flow. Allowing users to issue tokens to themselves via your application's UI can be useful for allowing users to experiment with your API or may serve as a simpler approach to issuing access tokens in general.

NOTE Personal access tokens are always long-lived. Their lifetime is not modified when using the tokensExpireIn or refreshTokensExpireIn methods.

### Creating A Personal Access Client

Before your application can issue personal access tokens, you will need to create a personal access client. You may do this using the passport:client command with the --personal option. If you have already run the passport:install command, you do not need to run this command:

```
php artisan passport:client --personal
```

If you have already defined a personal access client, you may instruct Passport to use it using the personalAccessClientId method. Typically, this method should be called from the boot method of your AuthServiceProvider:

```
/**

* Register any authentication / authorization services.

* @return void

*/
public function boot()
{

$this->registerPolicies();
```

```
Passport::routes();

Passport::personalAccessClientId('client-id');
}
```

# **Managing Personal Access Tokens**

Once you have created a personal access client, you may issue tokens for a given user using the createToken method on the User model instance. The createToken method accepts the name of the token as its first argument and an optional array of <a href="scopes">scopes</a> as its second argument:

```
$user = App\User::find(1);

// Creating a token without scopes...
$token = $user->createToken('Token Name')->accessToken;

// Creating a token with scopes...
$token = $user->createToken('My Token', ['place-orders'])->accessToken;
```

### JSON API

Passport also includes a JSON API for managing personal access tokens. You may pair this with your own frontend to offer your users a dashboard for managing personal access tokens. Below, we'll review all of the API endpoints for managing personal access tokens. For convenience, we'll use <u>Axios</u> to demonstrate making HTTP requests to the endpoints.

The JSON API is guarded by the web and auth middleware; therefore, it may only be called from your own application. It is not able to be called from an external source.

TIP If you don't want to implement the personal access token frontend yourself, you can use the <u>frontend quickstart</u> to have a fully functional frontend in a matter of minutes.

#### **GET** /oauth/scopes

This route returns all of the <u>scopes</u> defined for your application. You may use this route to list the scopes a user may assign to a personal access token:

```
axios.get('/oauth/scopes')
   .then(response => {
      console.log(response.data);
}):
```

### GET /oauth/personal-access-tokens

This route returns all of the personal access tokens that the authenticated user has created. This is primarily useful for listing all of the user's tokens so that they may edit or delete them:

```
axios.get('/oauth/personal-access-tokens')
   .then(response => {
      console.log(response.data);
   });
```

### POST /oauth/personal-access-tokens

This route creates new personal access tokens. It requires two pieces of data: the token's name and the scopes that should be assigned to the token:

```
const data = {
   name: 'Token Name',
   scopes: []
};

axios.post('/oauth/personal-access-tokens', data)
   .then(response => {
      console.log(response.data.accessToken);
   })
   .catch (response => {
      // List errors on response...
   });
```

### DELETE /oauth/personal-access-tokens/{token-id}

This route may be used to delete personal access tokens:

```
{\tt axios.delete('/oauth/personal-access-tokens'' + tokenId);}\\
```

# **Protecting Routes**

### Via Middleware

Passport includes an <u>authentication guard</u> that will validate access tokens on incoming requests. Once you have configured the api guard to use the passport driver, you only need to specify the auth:api middleware on any routes that require a valid access token:

```
Route::get('/user', function () {
    //
})->middleware('auth:api');
```

### **Passing The Access Token**

When calling routes that are protected by Passport, your application's API consumers should specify their access token as a Bearer token in the Authorization header of their request. For example, when using the Guzzle HTTP library:

```
$response = $client->request('GET', '/api/user', [
    'headers' => [
        'Accept' => 'application/json',
        'Authorization' => 'Bearer '.$accessToken,
    ],
]);
```

# **Token Scopes**

Scopes allow your API clients to request a specific set of permissions when requesting authorization to access an account. For example, if you are building an e-commerce application, not all API consumers will need the ability to place orders. Instead, you may allow the consumers to only request authorization to access order shipment statuses. In other words, scopes allow your application's users to limit the actions a third-party application can perform on their behalf.

### **Defining Scopes**

You may define your API's scopes using the Passport::tokensCan method in the boot method of your AuthServiceProvider. The tokensCan method accepts an array of scope names and scope descriptions. The scope description may be anything you wish and will be displayed to users on the authorization approval screen:

```
use Laravel\Passport\Passport;

Passport::tokensCan([
   'place-orders' => 'Place orders',
   'check-status' => 'Check order status',
]);
```

# **Default Scope**

If a client does not request any specific scopes, you may configure your Passport server to attach a default scope to the token using the setDefaultScope method. Typically, you should call this method from the boot method of your AuthServiceProvider:

```
use Laravel\Passport\Passport;
Passport::setDefaultScope([
    'check-status',
    'place-orders',
]);
```

### **Assigning Scopes To Tokens**

### When Requesting Authorization Codes

When requesting an access token using the authorization code grant, consumers should specify their desired scopes as the scope query string parameter. The scope parameter should be a space-delimited list of scopes:

### When Issuing Personal Access Tokens

If you are issuing personal access tokens using the user model's createToken method, you may pass the array of desired scopes as the second argument to the method:

```
$token = $user->createToken('My Token', ['place-orders'])->accessToken;
```

### **Checking Scopes**

Passport includes two middleware that may be used to verify that an incoming request is authenticated with a token that has been granted a given scope. To get started, add the following middleware to the \$routeMiddleware property of your app/Http/Kernel.php file:

```
'scopes' => \Laravel\Passport\Http\Middleware\CheckScopes::class,
'scope' => \Laravel\Passport\Http\Middleware\CheckForAnyScope::class,
```

#### **Check For All Scopes**

The scopes middleware may be assigned to a route to verify that the incoming request's access token has *all* of the listed scopes:

```
Route::get('/orders', function () {
    // Access token has both "check-status" and "place-orders" scopes...
})->middleware('scopes:check-status,place-orders');
```

#### **Check For Any Scopes**

The scope middleware may be assigned to a route to verify that the incoming request's access token has *at least one* of the listed scopes:

```
Route::get('/orders', function () {
    // Access token has either "check-status" or "place-orders" scope...
})->middleware('scope:check-status,place-orders');
```

### **Checking Scopes On A Token Instance**

Once an access token authenticated request has entered your application, you may still check if the token has a given scope using the tokenCan method on the authenticated User instance:

```
use Illuminate\Http\Request;
Route::get('/orders', function (Request $request) {
    if ($request->user()->tokenCan('place-orders')) {
        //
    }
});
```

### **Additional Scope Methods**

The scopeIds method will be return an array of all defined IDs / names:

```
Laravel\Passport\Passport::scopeIds();
```

The scopes method will return an array of all defined scopes as instances of Laravel\Passport\Scope:

```
Laravel\Passport\Passport::scopes();
```

The scopesFor method will return an array of Laravel\Passport\Scope instances matching the given IDs / names:

```
Laravel\Passport\Passport::scopesFor(['place-orders', 'check-status']);
```

You may determine if a given scope has been defined using the hasScope method:

```
Laravel\Passport\Passport::hasScope('place-orders');
```

# **Consuming Your API With JavaScript**

When building an API, it can be extremely useful to be able to consume your own API from your JavaScript application. This approach to API development allows your own application to consume the same API that you are sharing with the world. The same API may be consumed by your web application, mobile applications, third-party applications, and any SDKs that you may publish on various package managers.

Typically, if you want to consume your API from your JavaScript application, you would need to manually send an access token to the application and pass it with each request to your application. However, Passport includes a middleware that can handle this

for you. All you need to do is add the CreateFreshApiToken middleware to your web middleware group in your app/Http/Kernel.php file:

```
'web' => [
    // Other middleware...
    \Laravel\Passport\Http\Middleware\CreateFreshApiToken::class,
],
```

NOTE You should ensure that the EncryptCookies middleware is listed prior to the CreateFreshApiToken middleware in your middleware stack.

This Passport middleware will attach a laravel\_token cookie to your outgoing responses. This cookie contains an encrypted JWT that Passport will use to authenticate API requests from your JavaScript application. Now, you may make requests to your application's API without explicitly passing an access token:

```
axios.get('/api/user')
   .then(response => {
      console.log(response.data);
   }):
```

### **Customizing The Cookie Name**

If needed, you can customize the laravel\_token cookie's name using the Passport::cookie method. Typically, this method should be called from the boot method of your AuthServiceProvider:

```
/**
    * Register any authentication / authorization services.
    * @return void
    */
public function boot()
{
    $this->registerPolicies();
    Passport::routes();
    Passport::cookie('custom_name');
}
```

### **CSRF Protection**

### **Events**

Passport raises events when issuing access tokens and refresh tokens. You may use these events to prune or revoke other access tokens in your database. You may attach listeners to these events in your application's EventServiceProvider:

```
/**
  * The event listener mappings for the application.
  *
  * @var array
  */
protected $listen = [
    'Laravel\Passport\Events\AccessTokenCreated' => [
        'App\Listeners\RevokeOldTokens',
    ],
    'Laravel\Passport\Events\RefreshTokenCreated' => [
        'App\Listeners\PruneOldTokens',
    ],
];
```

### **Testing**

Passport's actingAs method may be used to specify the currently authenticated user as well as its scopes. The first argument given to the actingAs method is the user instance and the second is an array of scopes that should be granted to the user's token:

```
use App\User;
```

```
use Laravel\Passport\Passport;
public function testServerCreation()
{
    Passport::actingAs(
        factory(User::class)->create(),
        ['create-servers']
    );
    $response = $this->post('/api/create-server');
    $response->assertStatus(201);
}
```

### Official Packages

# **Laravel Scout**

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# Introduction

Laravel Scout provides a simple, driver based solution for adding full-text search to your <u>Eloquent models</u>. Using model observers, Scout will automatically keep your search indexes in sync with your Eloquent records.

Currently, Scout ships with an Algolia driver; however, writing custom drivers is simple and you are free to extend Scout with your own search implementations.

### **Installation**

First, install Scout via the Composer package manager:

```
composer require laravel/scout
```

After installing Scout, you should publish the Scout configuration using the vendor:publish Artisan command. This command will publish the scout.php configuration file to your config directory:

```
php artisan vendor:publish --provider="Laravel\Scout\ScoutServiceProvider"
```

Finally, add the Laravel\Scout\Searchable trait to the model you would like to make searchable. This trait will register a model observer to keep the model in sync with your search driver:

```
<?php
namespace App;
use Laravel\Scout\Searchable;
use Illuminate\Database\Eloquent\Model;
class Post extends Model
{
    use Searchable;
}</pre>
```

## Queueing

While not strictly required to use Scout, you should strongly consider configuring a <u>queue driver</u> before using the library. Running a queue worker will allow Scout to queue all operations that sync your model information to your search indexes, providing much better response times for your application's web interface.

Once you have configured a queue driver, set the value of the queue option in your configuration file to true:

```
'queue' => true,
```

# **Driver Prerequisites**

### Algolia

When using the Algolia driver, you should configure your Algolia id and secret credentials in your config/scout.php configuration file. Once your credentials have been configured, you will also need to install the Algolia PHP SDK via the Composer package manager:

```
composer require algolia/algoliasearch-client-php:^1.27
```

# Configuration

# **Configuring Model Indexes**

Each Eloquent model is synced with a given search "index", which contains all of the searchable records for that model. In other words, you can think of each index like a MySQL table. By default, each model will be persisted to an index matching the model's typical "table" name. Typically, this is the plural form of the model name; however, you are free to customize the model's index by overriding the searchableAs method on the model:

# **Configuring Searchable Data**

By default, the entire toArray form of a given model will be persisted to its search index. If you would like to customize the data that is synchronized to the search index, you may override the toSearchableArray method on the model:

# **Configuring The Model ID**

By default, Scout will use the primary key of the model as the unique ID stored in the search index. If you need to customize this behavior, you may override the <code>getScoutKey</code> method on the model:

```
<?php
```

# **Indexing**

### **Batch Import**

If you are installing Scout into an existing project, you may already have database records you need to import into your search driver. Scout provides an import Artisan command that you may use to import all of your existing records into your search indexes:

```
php artisan scout:import "App\Post"
```

The flush command may be used to remove all of a model's records from your search indexes:

```
php artisan scout:flush "App\Post"
```

### **Adding Records**

Once you have added the Laravel\Scout\Searchable trait to a model, all you need to do is save a model instance and it will automatically be added to your search index. If you have configured Scout to use queues this operation will be performed in the background by your queue worker:

```
$order = new App\Order;
// ...
$order->save();
```

# Adding Via Query

If you would like to add a collection of models to your search index via an Eloquent query, you may chain the searchable method onto an Eloquent query. The searchable method will <a href="chunk the results">chunk the results</a> of the query and add the records to your search index. Again, if you have configured Scout to use queues, all of the chunks will be added in the background by your queue workers:

```
// Adding via Eloquent query...
App\Order::where('price', '>', 100)->searchable();
// You may also add records via relationships...
$user->orders()->searchable();
// You may also add records via collections...
$orders->searchable();
```

The searchable method can be considered an "upsert" operation. In other words, if the model record is already in your index, it will be updated. If it does not exist in the search index, it will be added to the index.

# **Updating Records**

To update a searchable model, you only need to update the model instance's properties and save the model to your database. Scout will automatically persist the changes to your search index:

```
$order = App\Order::find(1);
// Update the order...
$order->save();
```

You may also use the searchable method on an Eloquent query to update a collection of models. If the models do not exist in your search index, they will be created:

```
// Updating via Eloquent query...
App\Order::where('price', '>', 100)->searchable();
// You may also update via relationships...
$user->orders()->searchable();
// You may also update via collections...
$orders->searchable();
```

### **Removing Records**

To remove a record from your index, delete the model from the database. This form of removal is even compatible with <u>soft</u> deleted models:

```
$order = App\Order::find(1);
$order->delete();
```

If you do not want to retrieve the model before deleting the record, you may use the unsearchable method on an Eloquent query instance or collection:

```
// Removing via Eloquent query...
App\Order::where('price', '>', 100)->unsearchable();
// You may also remove via relationships...
$user->orders()->unsearchable();
// You may also remove via collections...
$orders->unsearchable();
```

# **Pausing Indexing**

Sometimes you may need to perform a batch of Eloquent operations on a model without syncing the model data to your search index. You may do this using the withoutsyncingToSearch method. This method accepts a single callback which will be immediately executed. Any model operations that occur within the callback will not be synced to the model's index:

```
App\Order::withoutSyncingToSearch(function () {
    // Perform model actions...
});
```

# **Conditionally Searchable Model Instances**

Sometimes you may need to only make a model searchable under certain conditions. For example, imagine you have App\Post model that may be in one of two states: "draft" and "published". You may only want to allow "published" posts to be searchable. To accomplish this, you may define a shouldbeSearchable method on your model:

```
public function shouldBeSearchable()
{
    return $this->isPublished();
}
```

The shouldbeSearchable method is only applied when manipulating models through the save method, queries, or relationships. Directly making models or collections searchable using the searchable method will override the result of the shouldbeSearchable method:

```
// will respect "shouldBeSearchable"...
App\Order::where('price', '>', 100)->searchable();
$user->orders()->searchable();
$order->save();
// Will override "shouldBeSearchable"...
$orders->searchable();
$order->searchable();
```

# Searching

You may begin searching a model using the search method. The search method accepts a single string that will be used to search your models. You should then chain the get method onto the search query to retrieve the Eloquent models that match the given search query:

```
$orders = App\Order::search('Star Trek')->get();
```

Since Scout searches return a collection of Eloquent models, you may even return the results directly from a route or controller and they will automatically be converted to JSON:

```
use Illuminate\Http\Request;
Route::get('/search', function (Request $request) {
    return App\Order::search($request->search)->get();
});
```

If you would like to get the raw results before they are converted to Eloquent models, you should use the raw method:

```
$orders = App\Order::search('Star Trek')->raw();
```

Search queries will typically be performed on the index specified by the model's searchableAs method. However, you may use the within method to specify a custom index that should be searched instead:

```
$orders = App\Order::search('Star Trek')
   ->within('tv_shows_popularity_desc')
   ->get();
```

### Where Clauses

Scout allows you to add simple "where" clauses to your search queries. Currently, these clauses only support basic numeric equality checks, and are primarily useful for scoping search queries by a tenant ID. Since a search index is not a relational database, more advanced "where" clauses are not currently supported:

```
$orders = App\Order::search('Star Trek')->where('user_id', 1)->get();
```

### **Pagination**

In addition to retrieving a collection of models, you may paginate your search results using the paginate method. This method will return a Paginator instance just as if you had <u>paginated a traditional Eloquent query</u>:

```
$orders = App\Order::search('Star Trek')->paginate();
```

You may specify how many models to retrieve per page by passing the amount as the first argument to the paginate method:

```
$orders = App\Order::search('Star Trek')->paginate(15);
```

Once you have retrieved the results, you may display the results and render the page links using <u>Blade</u> just as if you had paginated a traditional Eloquent query:

```
<div class="container">
    @foreach ($orders as $order)
         {{ $order->price }}
    @endforeach
</div>
{{ $orders->links() }}
```

### **Soft Deleting**

If your indexed models are <u>soft deleting</u> and you need to search your soft deleted models, set the <u>soft\_delete</u> option of the config/scout.php configuration file to true:

```
'soft_delete' => true,
```

When this configuration option is true, Scout will not remove soft deleted models from the search index. Instead, it will set a hidden \_\_soft\_deleted attribute on the indexed record. Then, you may use the withTrashed or onlyTrashed methods to retrieve the soft deleted records when searching:

```
// Include trashed records when retrieving results...
$orders = App\Order::withTrashed()->search('Star Trek')->get();
// Only include trashed records when retrieving results...
$orders = App\Order::onlyTrashed()->search('Star Trek')->get();
```

TIP When a soft deleted model is permanently deleted using forceDelete, Scout will remove it from the search index automatically.

# **Customizing Engine Searches**

If you need to customize the search behavior of an engine you may pass a callback as the second argument to the search method. For example, you could use this callback to add geo-location data to your search options before the search query is passed to Algolia:

```
'distance' => '1000km',
    'location' => ['lat' => 36, 'lon' => 111],
];

return $algolia->search($query, $options);
})->get();
```

# **Custom Engines**

### **Writing The Engine**

If one of the built-in Scout search engines doesn't fit your needs, you may write your own custom engine and register it with Scout. Your engine should extend the Laravel\Scout\Engines\Engine abstract class. This abstract class contains seven methods your custom engine must implement:

```
use Laravel\Scout\Builder;

abstract public function update($models);
abstract public function delete($models);
abstract public function search(Builder $builder);
abstract public function paginate(Builder $builder, $perPage, $page);
abstract public function mapIds($results);
abstract public function map($results), $model);
abstract public function getTotalCount($results);
```

You may find it helpful to review the implementations of these methods on the Laravel\Scout\Engines\AlgoliaEngine class. This class will provide you with a good starting point for learning how to implement each of these methods in your own engine.

### **Registering The Engine**

Once you have written your custom engine, you may register it with Scout using the extend method of the Scout engine manager. You should call the extend method from the boot method of your AppServiceProvider or any other service provider used by your application. For example, if you have written a MySqlSearchEngine, you may register it like so:

```
use Laravel\Scout\EngineManager;

/**
    * Bootstrap any application services.
    *
    * @return void
    */
public function boot()
{
       resolve(EngineManager::class)->extend('mysql', function () {
            return new MySqlSearchEngine;
       });
}
```

Once your engine has been registered, you may specify it as your default Scout driver in your config/scout.php configuration file:

```
'driver' => 'mysql',
```

### **Builder Macros**

If you would like to define a custom builder method, you may use the macro method on the Laravel\Scout\Builder class. Typically, "macros" should be defined within a <u>service provider's</u> boot method:

```
});
}
```

The macro function accepts a name as its first argument, and a Closure as its second. The macro's Closure will be executed when calling the macro name from a Laravel\Scout\Builder implementation:

```
App\Order::search('Star Trek')->count();
```

### **Official Packages**

# **Laravel Telescope**

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# Introduction

Laravel Telescope is an elegant debug assistant for the Laravel framework. Telescope provides insight into the requests coming into your application, exceptions, log entries, database queries, queued jobs, mail, notifications, cache operations, scheduled tasks, variable dumps and more. Telescope makes a wonderful companion to your local Laravel development environment.



# **Installation**

NOTE Telescope requires Laravel 5.7.7+.

You may use Composer to install Telescope into your Laravel project:

```
composer require laravel/telescope
```

After installing Telescope, publish its assets using the telescope:install Artisan command. After installing Telescope, you should also run the migrate command:

```
php artisan telescope:install
php artisan migrate
```

### **Updating Telescope**

When updating Telescope, you should re-publish Telescope's assets:

```
php artisan telescope:publish
```

### **Installing Only In Specific Environments**

If you plan to only use Telescope to assist your local development. You may install Telescope using the --dev flag:

```
composer require laravel/telescope --dev
```

After running telescope:install, you should remove the TelescopeServiceProvider service provider registration from your app configuration file. Instead, manually register the service provider in the register method of your AppServiceProvider:

use Laravel\Telescope\TelescopeServiceProvider;

```
/**
   * Register any application services.
   * @return void
   */
public function register()
{
    if ($this->app->isLocal()) {
        $this->app->register(TelescopeServiceProvider::class);
    }
}
```

### **Migration Customization**

If you are not going to use Telescope's default migrations, you should call the Telescope::ignoreMigrations method in the register method of your AppServiceProvider. You may export the default migrations using the php artisan vendor:publish --tag=telescope-migrations command.

### Configuration

After publishing Telescope's assets, its primary configuration file will be located at config/telescope.php. This configuration file allows you to configure your watcher options and each configuration option includes a description of its purpose, so be sure to thoroughly explore this file.

If desired, you may disable Telescope's data collection entirely using the enabled configuration option:

```
'enabled' => env('TELESCOPE_ENABLED', true),
```

# **Data Pruning**

Without pruning, the telescope\_entries table can accumulate records very quickly. To mitigate this, you should schedule the telescope:prune Artisan command to run daily:

```
$schedule->command('telescope:prune')->daily();
```

By default, all entries older than 24 hours will be pruned. You may use the hours option when calling the command to determine how long to retain Telescope data. For example, the following command will delete all records created over 48 hours ago:

```
$schedule->command('telescope:prune --hours=48')->daily();
```

# **Dashboard Authorization**

Telescope exposes a dashboard at /telescope. By default, you will only be able to access this dashboard in the local environment. Within your app/Providers/TelescopeServiceProvider.php file, there is a gate method. This authorization gate controls access to Telescope in **non-local** environments. You are free to modify this gate as needed to restrict access to your Telescope installation:

```
/**
 * Register the Telescope gate.
```

# **Filtering**

### **Entries**

You may filter the data that is recorded by Telescope via the filter callback that is registered in your TelescopeServiceProvider. By default, this callback records all data in the local environment and exceptions, failed jobs, scheduled tasks, and data with monitored tags in all other environments:

```
/**
 * Register any application services.
 *
 * @return void
 */
public function register()
{
    $this->hideSensitiveRequestDetails();

    Telescope::filter(function (IncomingEntry $entry) {
        if ($this->app->isLocal()) {
            return true;
        }

        return $entry->isReportableException() ||
            $entry->isScheduledTask() ||
            $entry->hasMonitoredTag();
    });
}
```

### **Batches**

While the filter callback filters data for individual entries, you may use the filterBatch method to register a callback that filters all data for a given request or console command. If the callback returns true, all of the entries are recorded by Telescope:

```
use Illuminate\Support\Collection;
 ^{\star} Register any application services.
   @return void
public function register()
    $this->hideSensitiveRequestDetails();
    Telescope::filterBatch(function (Collection $entries) {
        if ($this->app->isLocal()) {
            return true;
        return $entries->contains(function ($entry) {
            return $entry->isReportableException() ||
                $entry->isFailedJob() ||
                $entry->isScheduledTask() ||
                $entry->hasMonitoredTag();
            });
    });
}
```

# **Available Watchers**

Telescope watchers gather application data when a request or console command is executed. You may customize the list of watchers that you would like to enable within your config/telescope.php configuration file:

```
'watchers' => [
   Watchers\CacheWatcher::class => true,
   Watchers\CommandWatcher::class => true,
   ...
```

],

Some watchers also allow you to provide additional customization options:

### **Cache Watcher**

The cache watcher records data when a cache key is hit, missed, updated and forgotten.

### **Command Watcher**

The command watcher records the arguments, options, exit code, and output whenever an Artisan command is executed. If you would like to exclude certain commands from being recorded by the watcher, you may specify the command in the ignore option in your config/telescope.php file:

```
'watchers' => [
    Watchers\CommandWatcher::class => [
        'enabled' => env('TELESCOPE_COMMAND_WATCHER', true),
        'ignore' => ['key:generate'],
        ...
],
```

# **Dump Watcher**

The dump watcher records and displays your variable dumps in Telescope. When using Laravel, variables may be dumped using the global dump function. The dump watcher tab must be open in a browser for the recording to occur, otherwise the dumps will be ignored by the watcher.

### **Event Watcher**

The event watcher records the payload, listeners, and broadcast data for any events dispatched by your application. The Laravel framework's internal events are ignored by the Event watcher.

# **Exception Watcher**

The exception watcher records the data and stack trace for any reportable Exceptions that are thrown by your application.

### **Gate Watcher**

The gate watcher records the data and result of gate and policy checks by your application. If you would like to exclude certain abilities from being recorded by the watcher, you may specify those in the <code>ignore\_abilities</code> option in your <code>config/telescope.php</code> file:

### Job Watcher

The job watcher records the data and status of any jobs dispatched by your application.

### Log Watcher

The log watcher records the log data for any logs written by your application.

### **Mail Watcher**

The mail watcher allows you to view an in-browser preview of the emails along with their associated data. You may also download the email as an .em1 file.

# **Model Watcher**

The model watcher records model changes whenever an Eloquent created, updated, restored, or deleted event is dispatched. You may specify which model events should be recorded via the watcher's events option:

```
'watchers' => [
    Watchers\ModelWatcher::class => [
         'enabled' => env('TELESCOPE_MODEL_WATCHER', true),
         'events' => ['eloquent.created*', 'eloquent.updated*'],
         ...
],
```

### **Notification Watcher**

The notification watcher records all notifications sent by your application. If the notification triggers an email and you have the mail watcher enabled, the email will also be available for preview on the mail watcher screen.

### **Query Watcher**

The query watcher records the raw SQL, bindings, and execution time for all queries that are executed by your application. The watcher also tags any queries slower than 100ms as slow. You may customize the slow query threshold using the watcher's slow option:

### **Redis Watcher**

NOTE Redis events must be enabled for the Redis watcher to function. You may enable Redis events by calling Redis::enableEvents() in the boot method of your app/Providers/AppServiceProvider.php file.

The Redis watcher records all Redis commands executed by your application. If you are using Redis for caching, cache commands will also be recorded by the Redis Watcher.

### **Request Watcher**

The request watcher records the request, headers, session, and response data associated with any requests handled by the application. You may limit your response data via the size\_limit (in KB) option:

```
'watchers' => [
    Watchers\RequestWatcher::class => [
         'enabled' => env('TELESCOPE_REQUEST_WATCHER', true),
         'size_limit' => env('TELESCOPE_RESPONSE_SIZE_LIMIT', 64),
         ...
],
```

# **Schedule Watcher**

The schedule watcher records the command and output of any scheduled tasks run by your application.