Theme Development with Sage

Build well organized & easily maintained WordPress themes using a modern web development workflow

by Ben Word

Second edition
December 2015

https://roots.io
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Thanks for purchasing a copy of the book. I plan to release updates as the Sage starter theme goes through changes. Please write to ben@benword.com with any corrections or feedback!

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Acknowledgement & thank you

Much 💙 to the Roots team — Scott Walkinshaw, Nick Fox, Chris Carr, Austin Pray, Craig, Julien Melissas, Kalen Johnson, Phil Nelson, and Michael Silber.

Thank you to everyone who has contributed to Roots in any way — committing code, opening issues, helping others on the forum, and by spreading the word.

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What is Sage?

Sage was originally called Roots and initially released in early 2011. The theme has evolved a lot over the years and has gone through several major changes. I originally created Roots when I was working at a website factory and had to pump out several new themes every day. I've worked with several agencies and created countless WordPress sites.

Sage is not a theme framework, it is a starter theme. You should rarely need to update it and you shouldn't create child themes from it. Being a starter theme, Sage is meant to be used as a starting point on a new project.

The Roots team and community sustain the development of the theme. Contributions are welcome from everyone.

Sage can be implemented on any sort of WordPress installation independent of Bedrock or Trellis (our other major projects) since it is just a theme. Sage combines:

- Asset/dependency management
- Optimization
- Template inheritance

Why Sage?

Professionally maintained

At the time of writing, the Sage starter theme has over 6,400 stars on GitHub. In the last two weeks there were over 1,100 unique cloners. Issues are squashed extremely fast. The project maintainers communicate daily and are generally very accepting of feedback and improvements.

Perfect amount of boilerplate

Sage helps you get started then gets out of the way. The different features are loosely coupled. Don't want to use Bootstrap? You can quickly remove it, or even replace it with a different front-end framework of your choice.

A modern build process

By using the Sage build process and asset management, you will see orders of magnitude of difference in page load time compared to non-optimized assets.

The Sage build process implements a bunch of best-practices. A few of which are:

- Eliminating unnecessary downloads
- Optimizing encoding and transfer size of text-based assets
- Image optimization

The theme wrapper

Outside of WordPress land, most templating engines like Twig and Jade implement the concept of template inheritance.

With template inheritance, a base layout template defines blocks containing the common website elements, which are inherited by child templates. It is more flexible than alternative techniques, such as including common page elements (like header and footer files) because each block can be overridden within a child.

The Sage theme wrapper is a compromise between a full templating engine like Twig, and the default WordPress templating structure.

Template inheritance is a good idea for WordPress specifically because it:

- Keeps things DRY — don't repeat yourself.

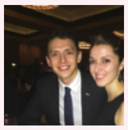
- Supports the presentation and scaling of different content types while still maintaining a consistent user experience. One modification will cascade across multiple templates.

- Facilitates the separation of application logic and presentation without requiring complex conditional statements to differentiate post types and such – just define separate template partials for each.

The theme wrapper code originally comes from Cristi “scribu” Burcă, a developer who used to contribute to WordPress core.

My primary wheelhouse over the years has been building web applications utilizing whatever modern framework or set of technologies is appropriate for the job. Consequently: I have run the gamut of modern templating engines. One thing is clear: they all implement the concept of template inheritance. Nobody likes repeating themselves.

Sage has always been my go-to WordPress starter theme. The fact that Sage goes against “the WordPress way” means it is far more ergonomic for someone like me who does most of his work outside of the WordPress bubble. What’s more, I never even noticed that the Sage “wrapper” was there for the longest time. I just assumed that’s how WordPress templating worked. After inheriting my first Underscores based project, I realized how wrong I was. To my horror, I immediately found entire blocks of boilerplate markup copied between templates. My appreciation for Sage shot up tenfold after that.



Austin Pray

Sage helps you become a better developer

Roots has helped me understand Gulp on a much deeper level than if I'd just ventured into that world on my own. It's even forced me to actually utilize the modularity of Bootstrap more effectively. I used to discount frameworks as being unnecessary overhead, but I didn't really get them until I started using Bootstrap as it's included in Roots.

Vincent Magilone

I've been back and forth between Bones and Sage for my work, but it's Roots that has had the biggest impact on my learning, my efficiency and the quality of my work. The various Roots projects have always pushed me to learn new things (even when I wasn't comfortable with them) over the last 3 or so years. Less, Sass, Grunt, Gulp, Bower and Yeoman all come immediately to mind as technologies I dove into as a direct result of using Sage.

Jimmy Smutek

Starting a project

Requirements (before you start)

- WordPress (latest version)
- PHP >= 5.4.x
- Git
- Node.js 0.12.x

This book assumes that you already have a local development environment with a working WordPress installation running at least PHP 5.4.

We recommend using our Trellis project for setting up a LEMP stack for WordPress. Trellis will get you set up with a local development environment using Vagrant. You can take a look at the roots-example-project.com GitHub repo (and relevant blog post) to see a working example of a project using Trellis, Bedrock, and Sage all together.

You do not need Trellis or Bedrock to use Sage, but we *do* recommend using Trellis over tools such as MAMP or VVV in order to have proper parity between environments. You want to avoid any sort of situation where your theme breaks on production but it's working on your local development setup.

You'll be using the terminal (or Git Bash command prompt) throughout the development of the theme to perform tasks such as:

- Changing directories — `cd`
- Copying files — `cp`
- Creating empty files — `touch`
- Using WP-CLI to manage your WordPress installation — `wp`

Wes Bos has a great free video series for learning a modern command line workflow that's worth checking out. I also use iTerm2 along with oh-my-zsh on my machine.

Throughout the book you'll notice "app" in file paths. "app" is the same as "wp-content" for Bedrock based installations. If you're on a normal WordPress installation, ignore "app" and assume "wp-content".

Installing the Sage starter theme

From your WordPress themes directory, clone the git repo to a new folder named after your theme.

TERMINAL

```
➜ ~  cd Sites/example.dev/site/web/app/themes/
➜ themes  git clone https://github.com/roots/sage.git theme-name
```

Now that you've got the latest version of Sage, you're going to want to open up `style.css` and update the theme meta information. At the very least, you'll want to update the "Theme Name".

You won't be placing any CSS in this file, it's only used to provide WordPress with information that's displayed in the admin.

After updating the theme meta information, go ahead and activate your theme from either the WordPress admin or via WP-CLI.

Installing Node.js, gulp, and Bower

Sage uses a modern front-end development workflow that requires gulp and Bower. Before you touch any stylesheets, JavaScript, images, or fonts, you'll need to install the required tools.

Install the latest Node.js and then pull up the command line. We recommend using nvm for managing Node versions.

First, install gulp and Bower globally (you only need to do this once on your machine):

```
TERMINAL

➜ theme-name  npm install -g gulp bower
```

Now install the Node dependencies that are required by Sage:

```
TERMINAL

➜ theme-name  npm install
```

And then install the Bower dependencies:

```
TERMINAL

➜ theme-name  bower install
```

You now have all the necessary dependencies to run the build process. At this point, you don't have a `dist/` directory in your theme folder. Running `gulp` will compile and optimize the files in the `assets/` directory for the first time:

```
TERMINAL

➜ theme-name  gulp
```

Once completed, gulp will have created a `dist/` directory with all of the compiled assets. Don't ever manually edit the contents of the `dist/` directory — always edit the source from the `assets/` directory.

Visit your WordPress site to view what your starting point is now that the initial front-end assets are built. We'll talk about customizing the front-end later on.

Planning out the theme

Content precedes design. Design in the absence of content is not design, it's decoration.

Jeffrey Zeldman via Twitter

Before touching the theme code or doing anything in the WordPress admin, come up with a game plan for your project.

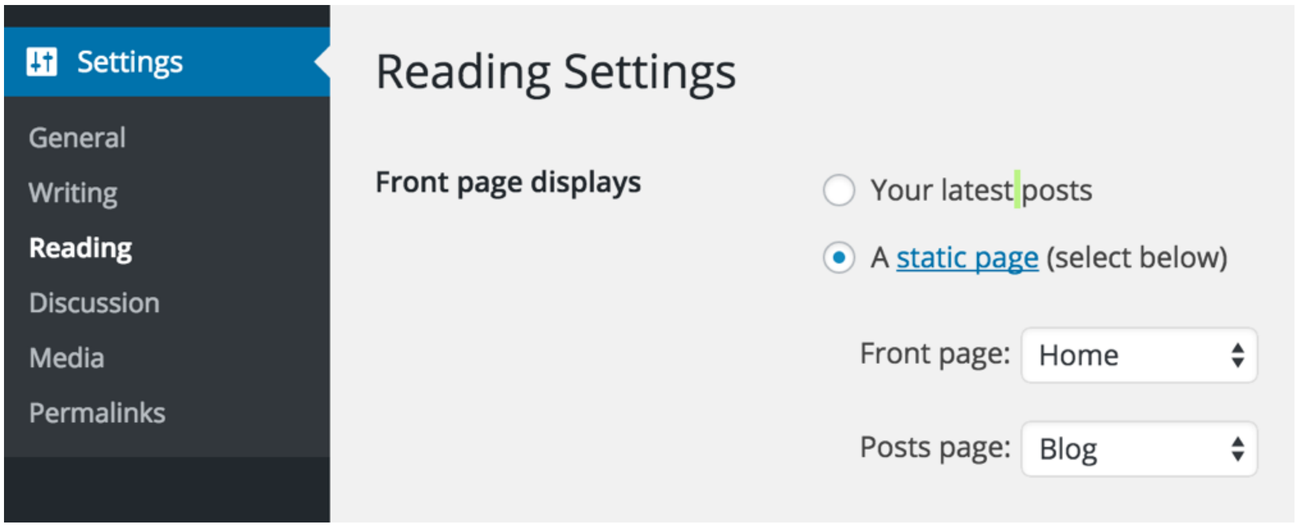
Site map

Your site map doesn't need to be completely figured out in order to start working on your theme, but you'll want to know what's going to be in your navigation menus — especially the primary navigation. An example primary navigation would be:

- Home
- Product
- Pricing
- Resources
- Blog
- About
- Contact Us

Once you've got your primary navigation roughly figured out, go ahead and create the appropriate pages for them.

You'll also want to update your Reading Settings in the WordPress admin to reflect having a static front page that isn't a blog:



Reading Settings

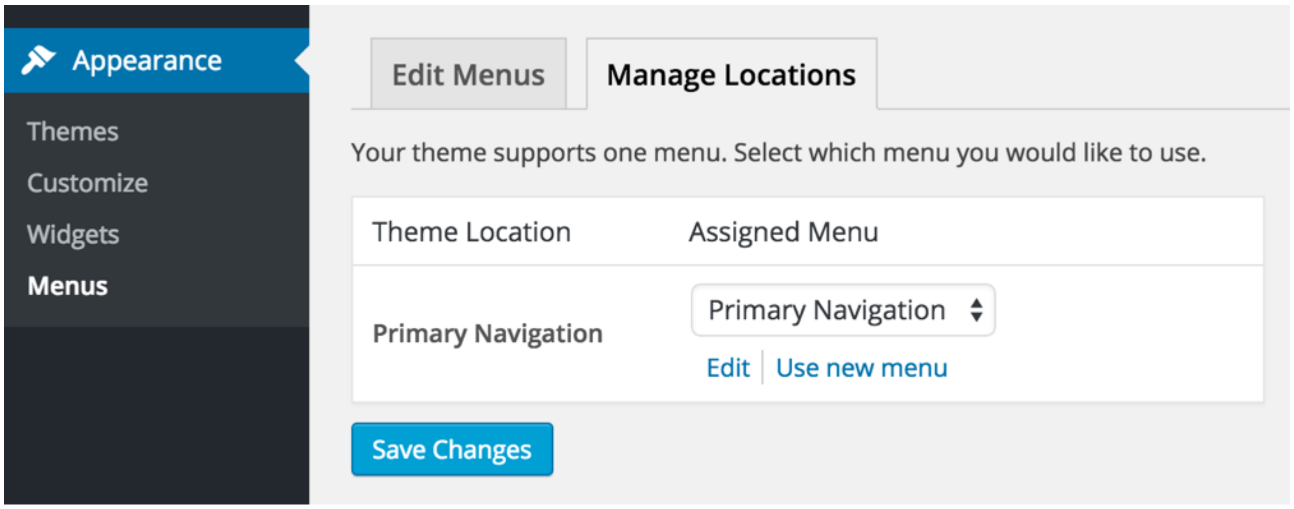
Front page displays

Your latest posts [✓ A static page (select below)]

Front page: Home

Posts page: Blog

Now is also a good time to go ahead and build out the primary navigation menu, along with setting its location:



Your theme supports one menu. Select which menu you would like to use.

Theme Location	Assigned Menu
Primary Navigation	Primary Navigation Edit | Use new menu

Content and meta data checklist

Do you have what you need to get started on your theme? It's not necessary to have all of your content ready to go, but it's a good idea to make a list of the various pages, sections, and components that will make up your site.

For example, if you're going to be selling products on your website, you'll want to have the product data and pictures ready so that you'll be prepared when it comes to the point where you need to make your product templates.

If you're building a portfolio site, you'll want to have items with details prepared so that you can properly write your templates to account for the content that will be displayed.

Keep site functionality outside of the theme

Make sure that you're not registering any custom post types or taxonomies in your theme. Restrict the code in your theme to presentation and create site functionality plugins (or mu-plugins) for things such as:

- Custom post types
- Taxonomies
- Shortcodes
- Widgets

- Admin tweaks (CSS & JS)
- Miscellaneous functions not related to your theme

Theme setup

Sage uses `lib/setup.php` to enable theme features and define which pages shouldn't have a sidebar. If you install and activate the Soil plugin, Sage will automatically enable additional features including:

- Cleaner WordPress markup
- Load jQuery from the Google CDN
- Cleaner walker for navigation menus
- Nice search
- Root relative URLs

The `lib/setup.php` file is also used to register navigation menus, sidebars, and define theme support for WordPress core functionality.

Navigation menus

If you plan on having additional navigation menus that aren't the same as your primary navigation, add them in the `register_nav_menus` array. Here we're adding utility navigation and footer navigation menus to the array:

```
register_nav_menus([
  'primary_navigation' => __('Primary Navigation', 'sage'),
  'utility_navigation' => __('Utility Navigation', 'sage'),
  'footer_navigation' => __('Footer Navigation', 'sage')
]);
```

After your new navigation menu locations are registered, you can create new menus in the WordPress admin and then assign them to the appropriate location. Better yet, you could use WP-CLI to do it:

```
TERMINAL

➜ theme-name  wp menu create "Footer Navigation"
Success: Created menu 3.
➜ theme-name  wp menu location assign 3 footer_navigation
Success: Assigned location to menu.
```

Custom image sizes

In `lib/setup.php` you'll find this line:

```
add_theme_support('post-thumbnails');
```

Below this line is where you're going to want to define your custom image sizes. Whenever an image is uploaded through the WordPress admin, additional copies of the image are saved based on the registered image sizes.

Responsive images and retina friendly image sizes should be considered here. In the past I've registered image sizes with names such as `category-thumb`, but lately I've been rolling with names that reflect the sizes of the images. This makes it easier to understand exactly what sizes you're working with when setting up responsive images in your templates.

```
add_theme_support('post-thumbnails');
add_image_size('w800', 800, 9999);
add_image_size('w640', 640, 9999);
add_image_size('w360', 360, 9999);
```

Defining sidebars

Sage includes two sidebar areas by default: primary sidebar & footer. The registered sidebars are shown in the WordPress admin where widgets are customized — both in the theme customizer as well as the widgets page.

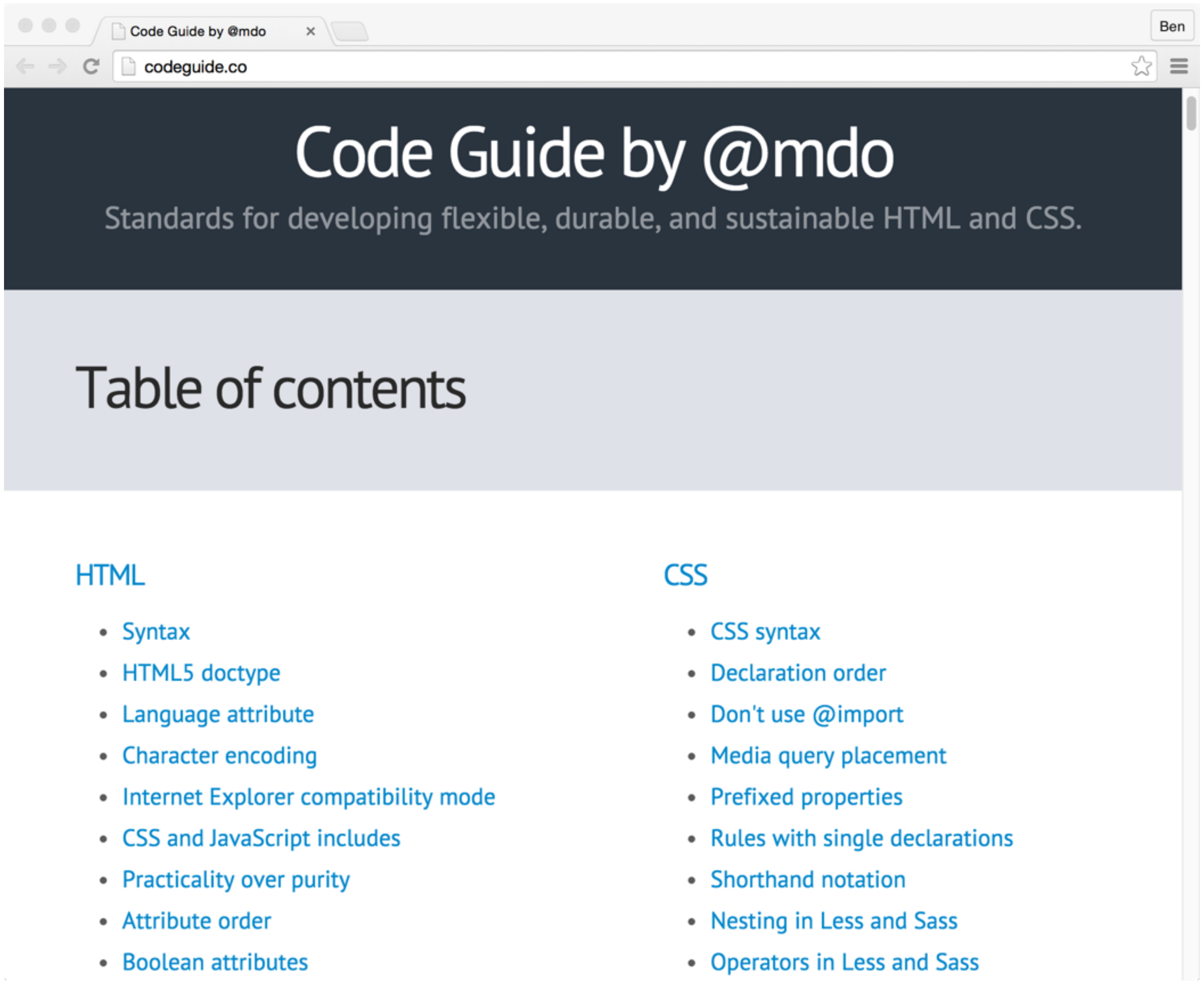
Whenever you want an area to be managed by WordPress widgets, create additional sidebars. Here we're adding a new sidebar for the Blog page by copying the register code from one of the existing sidebars:

```
register_sidebar([
  'name'          => __('Blog', 'sage'),
  'id'            => 'sidebar-blog',
  'before_widget' => '<section class="widget %1$s %2$s">',
  'after_widget'  => '</section>',
  'before_title'  => '<h3>',
  'after_title'   => '</h3>'
]);
```

Customizing templates

Before diving into making changes that involve writing HTML, CSS, and JS, go and take a look at some coding style guides.

Mark Otto, the creator of Bootstrap, has a well-documented code guide for front-end developers at http://codeguide.co/.



Code Guide by @mdo

Standards for developing flexible, durable, and sustainable HTML and CSS.

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- Shorthand notation
- Nesting in Less and Sass
- Operators in Less and Sass

The code examples in this book follows these guidelines, including:

- Avoid superfluous parent elements when writing HTML
- Keep classes lowercase and use dashes for class names
- Keep classes as short and succinct as possible
- Use meaningful names; use structural or purposeful names over presentational
- Prefix classes based on the closest parent or base class
- Use soft-tabs set to two spaces

Theme wrapper & template hierarchy

In your typical wrapperless WordPress theme, every page template will look something like the following:

```
<?php get_header(); ?>
  <div class="wrap">
    <div class="content">
      <?php // Our page specific markup and loop goes here ?>
    </div>
    <?php get_sidebar(); ?>
  </div>
<?php get_footer(); ?>
```

Even though we know that every template will take this base format and render the header, footer, sidebar calls each time, we still need to continuously repeat the code to keep WordPress happy; it's laborious and unnecessary.

The goal of the theme wrapper is to remove any repeated markup from individual templates and put it into a single file. This file, `base.php`, becomes the base layout file. By doing this we can put the focus entirely on the page specific markup and loop, simplifying our templates to look like this:

```
<?php // Our page specific markup and loop goes here ?>
```

It's neat. It's tidy. You never need to make calls to `get_header()`, `get_footer()`, or `get_sidebar()` again. You can also refactor the base layout of your site by editing `base.php`.

The theme wrapper starts and finishes with the standard WordPress template hierarchy. This means that all of the standard WordPress templates will work as intended.

The only change is that the templates will not need to call the header, sidebar and footer because the base layout file does this for them.

The WordPress templates go in the theme root, as they would with any other theme.

You can create new `base.php` files for templates as long as the template files exist. For example, `base-page-contact.php` is not going to work if `page-contact.php` doesn't already exist. This is also applicable to regular templates, not just custom page templates. `base-front-page.php` is used as the wrapper if `front-page.php` exists.

Try to avoid creating new wrapper files whenever possible. Remember that you don't want to repeat yourself — use conditional statements in the default `base.php` layout file whenever possible.

There are times where creating new wrapper files is warranted. Here's a few examples:

- Landing pages — some pages might not want a header/footer or might just have a design that differs quite significantly from the rest of the site
- Your blog might have a different design from your eCommerce store
- Serve a more accessible/screenreader version of the site
- Output JSON or XML instead of HTML

WRAPPER TIPS

- Get the Roots Wrapper Override plugin to override templates from the WordPress dashboard

- Get the Roots Wrapper Toolbar plugin to quickly see which templates are being used on your site. There's also an addon for Query Monitor for the theme wrapper.

Page templates

Remember that there's nothing different about the normal WordPress template hierarchy in Sage. Until you get the hang of the naming conventions, keep a template hierarchy reference close by.

Home page template

Sage doesn't include a specific page template for a static front page. The first thing you need to do is copy `page.php` to `front-page.php`. During your initial template development it's completely okay to put content in your template files. Further down the line while developing your theme, you'll want to revisit your hardcoded template files and update them to be managed by custom fields or the theme customizer.

Blog template

Sage doesn’t include a specific page template for the main blog page. The first thing you need to do is copy `index.php`, the default archive template, to `home.php`.

Page templates

Use `template-custom.php` as a guide to create your own custom page templates. Custom page templates are similar to a normal `page.php` but with the template name defined in a PHP comment.

Avoid creating templates with names that are based on the slug, such as `page-<slug>.php`. Page templates based on the slug automatically load, don’t require the template name in a PHP comment, and don’t require you to manually select the page template. That might be convenient at first, but the template would stop working if the page slug were to be changed. Instead, create templates based on `template-custom.php`

To create a custom page template for the Contact page:

TERMINAL

```
➜ theme-name  cp template-custom.php template-contact.php
```

Then open up `template-contact.php` and update the comment at the top of the file to reflect the template name:

```
/**
 * Template Name: Contact Us
 */
```

Other templates

Copy existing templates to new files when necessary to fit your needs. Follow the WordPress template hierarchy to find out the appropriate file names to use.

Building template partials

A partial is a template snippet which can be inserted into templates, or even other partials. They help to keep templates uncluttered and easy to read.

Are you going to be using any forms on your site that appear in different areas or templates? Create a partial template for the markup. For a newsletter signup form, you would start off by adding a new file to the `templates/` directory:

```
TERMINAL

➜ theme-name  touch templates/form-newsletter.php
```

And then populate the contents of `form-newsletter.php`:

```
<form action="https://example.com/subscribe" method="post">
  <input type="email" value="" name="email" placeholder="Your email
address">
  <button type="submit">Sign me up!</button>
</form>
```

Now you can include your newsletter partial in other templates:

```
<?php get_template_part('templates', 'form-newsletter'); ?>
```

Other examples of partials you can create:

- Social network links
- Author biographies (use on single post template as well as author archive templates)
- Modals
- Call to actions

Customizing the front-end

Default CSS and JS

`lib/setup.php` handles enqueuing the CSS and JS for the theme at the bottom of the file.

One stylesheet is loaded by default: `dist/styles/main.css`
One script is loaded by default: `dist/scripts/main.js`

These files are created based off what's in your `assets/manifest.json` file.

The JSON based manifest file is used by asset-builder to assemble your front-end files. Open up `assets/manifest.json` and note the default files that will be created: `main.js`, `customizer.js`, and `main.css`.

`main.js` consists of two sources:

- Your primary JavaScript — `assets/scripts/main.js`
- JS from Bower packages

`main.css` consists of two sources:

- Your primary stylesheet — `assets/styles/main.scss`
- CSS from Bower packages

If you have any Bower dependencies that contain Sass stylesheets, a tool called wiredep automatically injects the assets with `@import`'s at the top of `assets/styles/main.scss`.

gulp watch and BrowserSync

When you run `gulp watch` from the terminal, gulp will watch for changes made to your front-end assets and automatically re-compile them as necessary.

Before you run `gulp watch` from the terminal you'll need to tell BrowserSync the URL of your WordPress installation. BrowserSync keeps multiple browsers and devices synchronized while developing, along with injecting updated CSS and JS. Update `devUrl` at the bottom of `assets/manifest.json` to reflect your local development hostname.

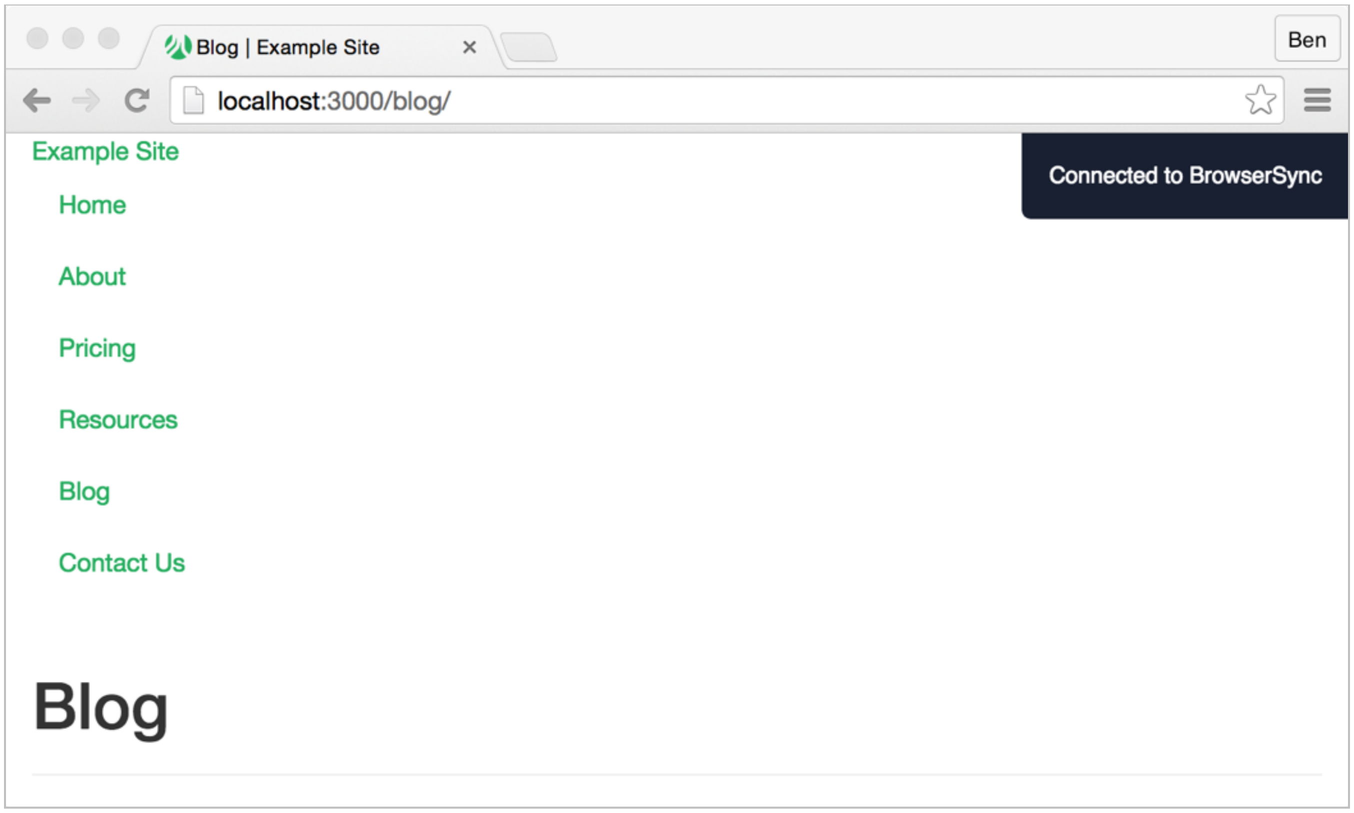
For example, if your local development URL is `http://project-name.dev` you would update the file to read:

```
…
  "config": {
    "devUrl": "http://project-name.dev"
  }
…
```

If your local development URL looks like `http://localhost:8888/project-name/` you would update the file to read:

```
…
  "config": {
    "devUrl": "http://localhost:8888/project-name/"
  }
…
```

Now run `gulp watch` from the terminal — momentarily a new tab will open up on your default web browser that's pointed to the BrowserSync session.



gulp and BrowserSync will work together and inject the latest assets into your browser as you work on your theme:

```
TERMINAL

➜ theme-name  gulp watch
[BS] Watching files...
[15:01:18] Starting 'styles'...
[BS] 2 files changed (main.css, editor-style.css)
[15:01:20] Finished 'styles'
```

Bower packages

If you're going to be adding any third-party JavaScript or jQuery plugins to your theme, it's best to do so with Bower whenever possible. Most jQuery plugins and JS libs are available as Bower packages.

If you open up `bower.json`, you'll notice Modernizr and Bootstrap are both listed as dependencies. asset-builder uses a project called main-bower-files to read your `bower.json` file and automatically collect CSS and JS from files defined in the `main` property from your included Bower packages.

Override Bower packages

You can override the main files from Bower packages with the `overrides` property.

We manually override the main Bower files for Bootstrap. Bootstrap doesn't actually need any overrides to work out of the box, but in `bower.json` we've added a list of files as a boilerplate for you to modify. This way you could quickly remove any JavaScript components, or the fonts, if you're not using them.

If you want to remove the styles for Bootstrap components, you'll need to replace the single reference to `_bootstrap.scss` with a list of the Sass files you want to include.

Reference this Gist for a bower.json file that has the full list of Sass files from Bootstrap in the overrides.

Installing Bower packages

Install Bower packages with `bower install --save <package-name>`. Using the `--save` flag will add the package into your project's `bower.json` dependencies. You can also manually define packages but it's easier to use the above command to avoid writing JSON by hand.

As long as the Bower package you've installed has defined the files you want loaded in its `bower.json` file, you won't need to add any overrides. You should inspect the `bower.json` of each package you install so that you are aware of exactly what is going to be included in your theme assets.

Let's take a look at the `bower.json` file from Font Awesome:

```
{
  "name": "font-awesome",
  "main": [
    "less/font-awesome.less",
    "scss/font-awesome.scss"
  ]
}
```

The `main` property defines a stylesheet but it doesn't list the files in the fonts directory. If you were to add Font Awesome to your Bower dependencies, your theme CSS would have the contents of `font-awesome.scss`, but your fonts folder won't have the same fonts from

Font Awesome's fonts directory. In order to grab the fonts, we need to add the fonts directory to the overrides in the theme's `bower.json` file:

```
"fontawesome": {
  "main": [
    "./scss/font-awesome.scss",
    "./fonts/*"
  ]
},
```

Enqueuing additional CSS and JS

You can use the JSON manifest to define how new CSS and JS files are created. Open up `assets/manifest.json` along with the asset-builder spec.

The asset-builder spec is very flexible when it comes to piecing your assets together. You can create new JS files that load specific Bower dependencies that you might not want to include by default in your primary theme JavaScript file.

If you wanted to enqueue a new `homepage.js` file that was built from `assets/scripts/homepage.js` you would first add the following to the JSON manifest:

```
{
  "dependencies": {
    "homepage.js": {
      "files": [
        "scripts/homepage.js"
      ]
    },
…
```

The next step would be to enqueue the new `homepage.js` file from `lib/setup.php`.

Find where the enqueues are at the bottom of `lib/setup.php` and add a new enqueue for our new file:

```
wp_enqueue_script('theme_homepage', asset_path('scripts/
homepage.js'), ['jquery'], null, true);
```

Make sure you use a conditional `if` statement to only enqueue the file on the home page as well.

You can even include assets from WordPress plugins and add them to your theme assets. If you do this, make sure you dequeue the plugin assets. You should add the dequeues to `lib/setup.php`.

A more extensive `manifest.json` file would look like:

```json
{
  "dependencies": {
    "main.js": {
      "files": [
        "scripts/main.js"
      ],
      "vendor": [
        "../../plugins/example-plugin/assets/plugin.js"
      ],
      "main": true
    },
    "main.css": {
      "files": "styles/main.scss",
      "vendor": [
        "../../plugins/example-plugin/assets/style.css"
      ],
      "main": true
    },
    "homepage.js": {
      "files": [
        "custom-dir/homepage.js"
      ],
      "external": true,
      "bower": ["slick-carousel"]
    },
    "modernizr.js": {
      "bower": ["modernizr"]
    },
  },
  "config": {
    "devUrl": "example.dev"
  }
}
```

- The `main.js` dependency is pulling in a vendor file from a directory outside the project directory.

- The `homepage.js` dependency has specified an `external` as `true`. This means it will expect to find `custom-dir/homepage.js` and not `assets/custom-dir/homepage.js`.

- `homepage.js` has also specified that it requires `slick-carousel` as a Bower dependency. In this case, `slick-carousel` will be excluded from being automatically included in `main.js` and will be included in `homepage.js`.

- The `main.css` dependency is pulling in a vendor file from a directory outside the project directory.

CSS setup and organization

The `assets/styles/` directory contains barebones partials that are imported from the primary stylesheet to help get your styling started.

If you open up `assets/styles/main.scss`, you'll see the breakdown and order of stylesheets:

1. `common/_variables` — Use this file to define your Sass variables that you can reference from other stylesheets

2. Bower dependencies injected via wiredep — Make sure you don't ever edit this block manually, as your changes will be removed whenever your styles are built again. Any `.scss` files that are defined in the `main` property of a Bower package you've

installed will be added here.

3. `common/_global` — Use this file to define generic global styles & helper classes. Here's some examples of helper classes:

```
// Add/remove floats
.float-right {
  float: right;
}
.float-left {
  float: left;
}
.float-none {
  float: none;
}
.clear {
  clear: both;
}

// Text alignment
.text-left {
  text-align: left;
}
.text-center {
  text-align: center;
}
.text-right {
  text-align: right;
}

// Apply capital case to an element
.caps {
  text-transform: uppercase;
}
```

4. `components/_buttons` — Use this file to define your own buttons. You could use Bootstrap mixins to create your own button

variants:

```
.btn-outline {
  @include button-variant($text-color, transparent, $text-color);
}
```

5. `components/_comments` — This file contains some basic styling for the default WordPress comments. If you use Disqus, Facebook, Google+, or another commenting system, you can remove this file. When removing files, make sure to also delete the relevant import line in `main.scss`.

6. `components/_forms` — Place form specific styles in this file. If you wanted to override Bootstrap's `.form-control` styling, this is the place to do it.

```
// Remove the extra shadow on input focus
.form-control {
  &:focus {
    box-shadow: inset 0 1px 1px rgba(0,0,0,.075);
  }
}
```

7. `components/_grid` — This file is used to apply Bootstrap's grid to the main content area and the sidebar.

8. `components/_wp-classes` — WordPress uses specific classes when dealing with media items. Sage applies some mobile-first styles to these classes to make sure left and right aligned images don't start floating until the small device breakpoint.

9. `layouts/_header` — Place your site header styles in this file
10. `layouts/_sidebar` — Place your sidebar styles in this file
11. `layouts/_footer` — Place your site footer styles in this file
12. `layouts/_pages` — Place page styles in this file
13. `layouts/_posts` — Place post styles in this file
14. `layouts/_tinymce` — Styles specific to the TinyMCE/Visual editor

When adding new styles to your site, follow the existing directory structure and names. Make sure to also add import's for the new stylesheets in `main.scss`.

Potential new stylesheets for the `styles/components/` directory:

- `components/_blockquotes` — blockquote and testimonial styling
- `components/_modals` — styling for modals
- `components/_gallery` — styling for WordPress galleries

You can also extend the `styles/layouts/` directory. Create a new subfolder called `styles/layouts/pages/`:

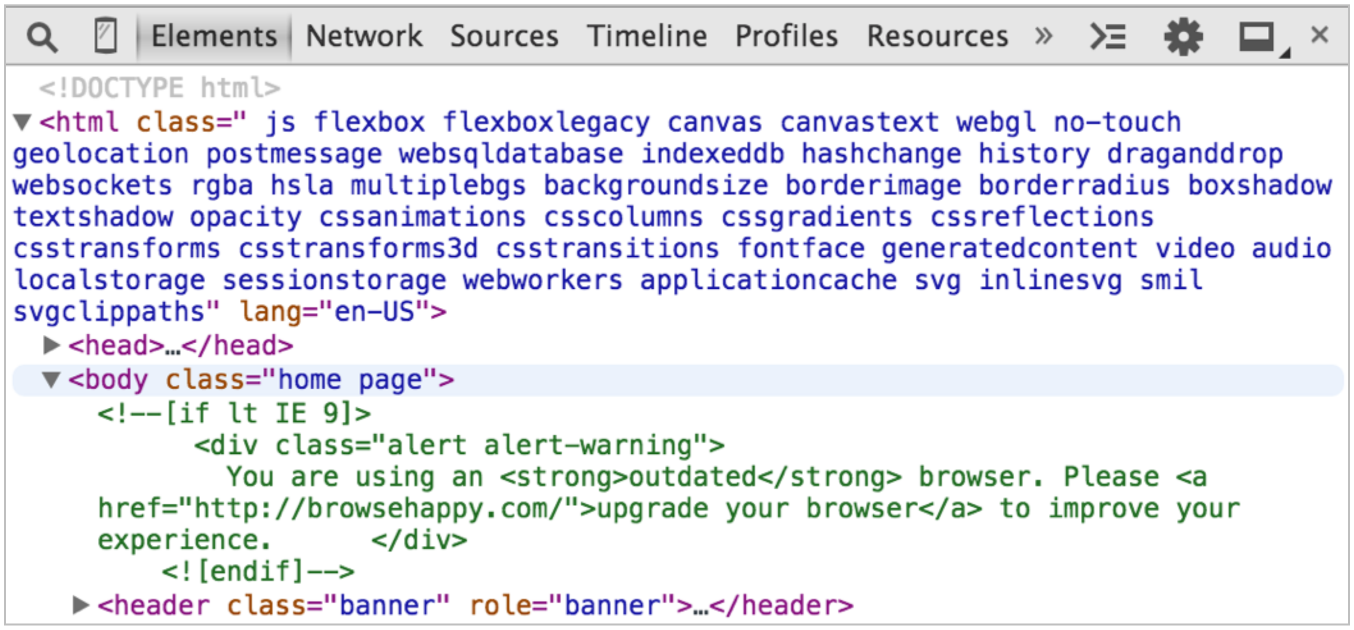
- `layouts/pages/_home` — home page styling
- `layouts/pages/_contact` — contact page styling

JS and DOM-based routing

The primary theme JavaScript file located at `assets/scripts/main.js` contains a DOM-based routing boilerplate. DOM-based routing lets you conditionally execute JS on certain pages based on the page's body classes.

Any code placed within `'common'`'s init function will fire on all pages on the site.

The `'home'` and `'about_us'` names are placeholders. Keep in mind that the names must be based on body classes.



```
  <!DOCTYPE html>
▼<html class=" js flexbox flexboxlegacy canvas canvastext webgl no-touch
geolocation postmessage websqldatabase indexeddb hashchange history draganddrop
websockets rgba hsla multiplebgs backgroundsize borderimage borderradius boxshadow
textshadow opacity cssanimations csscolumns cssgradients cssreflections
csstransforms csstransforms3d csstransitions fontface generatedcontent video audio
localstorage sessionstorage webworkers applicationcache svg inlinesvg smil
svgclippaths" lang="en-US">
  ▶<head>…</head>
  ▼<body class="home page">
     <!--[if lt IE 9]>
           <div class="alert alert-warning">
             You are using an <strong>outdated</strong> browser. Please <a
     href="http://browsehappy.com/">upgrade your browser</a> to improve your
     experience.      </div>
         <![endif]-->
    ▶<header class="banner" role="banner">…</header>
```

Remember that when you're working with a body class that

contains a dash, such as `contact-us`, you'll need to replace the dash with an underscore — `contact_us`.
Here's a better example:

```
var Sage = {
  // All pages
  'common': {
    init: function() {
      // Run FitVids on the main content area
      $('.main').fitVids();
    }
  },
  // Home page
  'home': {
    init: function() {
      // Run Skrollr
      var s = skrollr.init();
    }
  },
  // Contact Us page
  'contact_us': {
    init: function() {
      // gmaps.js
      new GMaps({
        div: '#map',
        lat: -12.043333,
        lng: -77.028333
      });
    }
  }
};
```

Sage includes a function in `lib/extras.php` for modifying the WordPress body class. Feel free to update the function to reflect any body class modifications you'd want to make. For example, on the

Roots site we add a "product" body class if you're viewing a single post from multiple custom post types. Before the `return` in the `body_class` function found in `lib/extras.php`:

```
if (is_singular(['book', 'screencast', 'plugin'])) {
  $classes[] = 'product';
}
```

Referencing assets in CSS and templates

The folder structure of `assets/` and `dist/` are the same. Images that are in `assets/images/` get optimized and copied over to the `dist/images/` folder. Subdirectories are kept intact, too.

If you're in a stylesheet and you'd like to reference an image, `assets/images/logo.svg`, you would write:

```
.brand {
  background: url(../images/logo.svg);
}
```

If you're in a template and you'd like to reference the same image, you would write:

```
<img src="<?= get_template_directory_uri() . '/dist/images/
logo.svg'; ?>">
```

Theme functionality

Sage keeps theme functionality in the `lib/` folder. The contents of the `lib/` folder get loaded from `functions.php`.

Namespaces

By now you've probably already noticed the namespaces at the top of most PHP files in Sage:

```
namespace Roots\Sage\Extras;
```

Namespacing is the correct way to keep your functions and classes organized and free of naming collisions. If you primarily work with WordPress and haven't had a chance to look at modern PHP projects, this might be your first encounter with real namespaces.

The WordPress way:

```
function sage_say_hello() {
  echo 'Howdy!';
}
```

There's no need to to prefix function names when you're within a namespace:

You'll need to use a constant, `__NAMESPACE__`, when referencing a function that's in a namespaced file. Here we're defining a custom function, and correctly passing the namespaced function name to the WordPress hook:

```php
/**
 * Custom archive titles
 */
function custom_archive_titles($title) {
  if (is_post_type_archive('book')) {
    $title = 'Books';
  }
  return $title;
}
add_filter('get_the_archive_title', __NAMESPACE__ . '\
\custom_archive_titles');
```

Notice the double backslashes in the string of the function name. This is required as we are passing the full namespaced function name, and we need to escape the backslash.

To use a function from a namespaced file from another PHP file, you need to use the `use` keyword at the beginning of the file. If you open up `templates/page-header.php`, you'll see how the `title()` function from `lib/titles.php` is called:

```
<?php use Roots\Sage\Titles; ?>

<div class="page-header">
  <h1>
    <?= Titles\title(); ?>
  </h1>
</div>
```

If you're within a namespaced file, any classes you call will be expected to be in the same namespace. That means if you wanted to use `WP_Query()` in a namespaced function or class, you would need to make sure you are using the top level namespace. You can do this by adding a backslash to the beginning of the name:

```
$query = new \WP_Query();
```

Take advantage of newer PHP features

Did you know that PHP 5.3 was deprecated back in August 2014? Sage requires PHP 5.4, so you should be taking advantage of:

- Short array syntax
- Short echo syntax
- Anonymous functions

These are very small changes that help improve the readability of your code.

The short array syntax is as simple as replacing `array()` with `[]`.

If you're familiar with JavaScript, it uses the same array syntax. I find this especially beneficial if the array is short enough to be on one line, it looks even cleaner when only using brackets rather than the entire array word.

Kalen Johnson via Upping PHP Requirements in Your WordPress Themes and Plugins

The short echo syntax is as simple as replacing `<?php echo` with `<?=`. Instead of writing out `<?php echo get_template_directory_uri()`, you would just write: `<?= get_template_directory_uri()`

Where to put custom code

Sage comes with a `lib/extras.php` file that you can use to throw some custom snippets in. Before you start adding code in the theme, make sure that you've determined that the theme is the appropriate place for the code. Remember that you don't want to put site functionality in your theme, such as custom post types.

You can also organize your custom code into new files within the `lib/` directory, just make sure you add them to the loader in `functions.php`.

Theme customizations

As of April 2015, WordPress.org is requiring theme authors to use the Customizer API for theme options.

The Customizer API is very useful for creating custom theme settings, but there's still a place for tools such as Advanced Custom Fields.

WordPress Customizer API

The WordPress Theme Handbook says, "The Customizer is the canonical way to add options to your theme."

It's a good idea to leverage the Customizer API when adding theme options. To use the Customizer API in a Sage based theme, start with the `lib/customizer.php` and `assets/scripts/customizer.js` files that were introduced in Sage 8.4.0.

Use `lib/customizer.php` to add sections, settings, and controls to the theme customizer. When adding settings, make sure to define postMessage support in order to enable the live preview.

You're also set up with a base to start adding your own panels, controls, and live refresh functionality to the theme customizer with the `assets/scripts/customizer.js` file.

The theme customizer is currently going through rapid changes as WordPress has been pushing harder for theme authors to use it for all theme options. Lots of tutorials and example code exists out in the wild right now — do your research, and find out how you can use the theme customizer to offer more flexibility to the users of your theme.

I recently learned a lot about the customizer while working on a new theme. One thing you should know is that you can easily rename the sections and change the priority for WordPress core's existing controls:

```
// Rename 'Site Title & Tagline' to 'Branding'
$wp_customize->get_section('title_tagline')->title = __('Branding',
'sage');
$wp_customize->get_section('title_tagline')->priority = 1;
```

You can also remove core controls easily. If you've enabled custom backgrounds, you might want to remove some of the existing options and add your own. The following code is going to add a new control for 'Background Size' with an option for 'cover':

```
$wp_customize->add_setting('background_size', [
  'type'      => 'option',
  'default'   => 'auto',
  'transport' => 'postMessage'
]);
$wp_customize->add_control('background_size', [
  'label'      => __('Background Size', 'sage'),
  'section'    => 'background_image',
  'type'       => 'radio',
  'choices'    => [
    'auto'  => __('Default', 'sage'),
    'cover' => __('Cover', 'sage')
  ]
]);
$wp_customize->remove_control('background_position_x');
$wp_customize->remove_control('background_attachment');
```

In order to get the new background size setting working with the live preview, add the following within the `assets/scripts/customizer.js` file:

```
wp.customize(
  'background_size',
  function(value) {
    value.bind(
      function(to) {
        $('head').append('<style>body { background-size: ' + to + ';
}</style>');
      }
    );
  }
);
```

One last change is needed to get the new styling output on the front-end:

```
// Print styles
function print_styles() {
  $background_image = get_theme_mod('background_image', '');
  $background_size = get_option('background_size', '');
?>
  <style>
    <?php if ($background_image && $background_size) { ?>
      body {
        background-size: <?= $background_size; ?>;
      }
    <?php } ?>
  </style>
<?php
}
add_action('wp_head', __NAMESPACE__ . '\\print_styles');
```

Advanced Custom Fields

Advanced Custom Fields is a popular WordPress plugin that's used to create custom edit screens.

Instead of having hardcoded data in your custom page templates, use ACF to create an easy-to-use interface for your site editors to manage custom content.

Theme deployment

When you’re ready to move your theme assets to production, you’ll need to generate the production ready assets:

```
TERMINAL

➜ ~  cd Sites/example.dev/site/web/app/themes/theme-name/
➜ theme-name  gulp --production
```

The `--production` flag will build your assets without the source maps and it’ll also revision your files. Your production web server should be setting expires headers on your CSS and JS files for better performance. When your theme CSS and JS changes and you re-build them with `gulp --production`, the filenames change due to revisioning.

Instead of `main.js`, `modernizr.js`, and `main.css`, your filenames look similar to `main-b0e2df59.js`, `modernizr-45f0e1f4.js`, and `main-7a1a0f2d.css`.

The theme already knows which filenames to use thanks to the `asset_path` function in `lib/assets.php`.

Sage excludes the `dist/` folder via `.gitignore` with your built theme assets by default. You don’t want to ever commit compiled files to your Git repository.

Since your assets don't exist in your Git repository, you'll need to compile them somehow during your deploy process. One option is to compile the assets locally and then copy them over. Another option is to compile them on the server during your deploy.

Our Trellis project allows you to deploy assets after compiling them locally using Ansible, and our Roots Example Project shows exactly how this is done in the `deploy-hooks/build-before.yml` file:

```
- name: Run npm install
  command: npm install
  connection: local
  args:
    chdir: "{{ project.local_path }}/web/app/themes/sage"

- name: Run bower install
  command: bower install
  connection: local
  args:
    chdir: "{{ project.local_path }}/web/app/themes/sage"

- name: Run gulp
  command: gulp --production
  connection: local
  args:
    chdir: "{{ project.local_path }}/web/app/themes/sage"

- name: Copy project local files
  synchronize:
    src: "{{ project.local_path }}/web/app/themes/sage/dist"
    dest: "{{ deploy_helper.new_release_path }}/web/app/themes/sage"
    group: no
    owner: no
    rsync_opts: --chmod=Du=rwx,--chmod=Dg=rx,--chmod=Do=rx,--chmod=Fu=rw,--chmod=Fg=r,--chmod=Fo=r
```

Theme updates and maintenance

Since Sage is a starter theme, there's usually not a need to update your project after you've already started it.

We don't recommend trying to keep your theme always up to date with the latest changes to Sage. If you happen to encounter a bug, you can usually make quick, minor changes to a few files to apply fixes to your theme.

One recent example is when a bug popped up that used an incorrect file path for assets in stylesheets. This bug was caused by one of the Node dependencies introducing a bug. By looking at the git diff on GitHub, you can see that only a few lines needed to be updated in the gulpfile. Those types of changes are very quick to manually update on your theme. If you'd like to merge in bigger changes, follow these steps.

If you're doing ongoing work on a theme, you should keep an eye on updates to your dependencies, including:

- Bower packages — Bootstrap, other packages you've included
- Node dependencies — asset-builder, browser-sync, and gulp

packages such as gulp-sass

David is a Node project that tells you when your npm dependencies are out of date. If you have a public GitHub project you can add a badge to make it easier to see the current status:

There's several ways to stay on top of the latest changes to Sage:

- GitHub — If you **Watch** the https://github.com/roots/sage project, you'll get notifications for any new pull requests and issues that are created.

- RSS feeds — You can watch for new versions from the project's GitHub releases feed at https://github.com/roots/sage/releases.atom. You can also subscribe to our blog at https://roots.io/feed/, but we don't always post about minor updates.

- Twitter — I try to usually only tweet about WordPress/web development things at @retlehs, but there's also the @rootswp account for Roots-only updates.

- Discourse — Join us at https://discourse.roots.io/.

Resources

- Code Guide
  http://codeguide.co/

- nvm — Node Version Manager
  https://github.com/creationix/nvm

- asset-builder — the `manifest.json` asset pipeline used by Sage
  https://github.com/austinpray/asset-builder
  https://github.com/austinpray/asset-builder/tree/master/help
  https://github.com/austinpray/asset-builder/blob/master/help/spec.md

- BrowserSync
  http://www.browsersync.io/

- Autoprefixer
  https://github.com/postcss/autoprefixer-core

Wrapping up

I hope this book has helped you get more familiar with Sage and pushes you to learn new tools to help you improve your development workflow.

Things always change fast in the web world, and Sage will continue to change as both the web and WordPress move forward.

This book will be updated as major changes to Sage are made — you'll get notified via email when new editions are released. You'll be able to immediately download new releases for free if you've purchased this book through https://roots.io/.

Please write to ben@benword.com with any corrections or feedback and join us at the Roots Discourse (https://discourse.roots.io/) for discussion.

CHANGELOG

Second edition (December 2015)

- Now up to date with Sage 8.4.0
- Expanded on why to use Trellis
- Added new customizer examples — previous examples were added to Sage master
- Updated the Font Awesome example after they updated their bower.json file
- Updated theme deployment information based off latest Trellis deploys

First edition (June 2015)

- Based on Sage 8.2.0