How To Install WordPress With Docker Compose

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Introduction

WordPress is a free and open-source Content Management System (CMS) built on a MySQL database with PHP processing. Thanks to its extensible plugin architecture and templating system, and the fact that most of its administration can be done through the web interface, WordPress is a popular choice when creating different types of websites, from blogs to product pages to eCommerce sites.

Running WordPress typically involves installing a LAMP (Linux, Apache, MySQL, and PHP) or LEMP (Linux, Nginx, MySQL, and PHP) stack, which can be time-consuming. However, by using tools like Docker and Docker Compose, you can simplify the process of setting up your preferred stack and installing WordPress. Instead of installing like

libraries, configuration files, and environment variables, and run these images in *containers*, isolated processes that run on a shared operating system. Additionally, by using Compose, you can coordinate multiple containers — for example, an application and database — to communicate with one another.

In this tutorial, you will build a multi-container WordPress installation. Your containers will include a MySQL database, an Nginx web server, and WordPress itself. You will also secure your installation by obtaining TLS/SSL certificates with Let's Encrypt for the domain you want associated with your site. Finally, you will set up a `cron` job to renew your certificates so that your domain remains secure.

Prerequisites

To follow this tutorial, you will need:

- A server running Ubuntu 18.04, along with a non-root user with `sudo` privileges and an active firewall. For guidance on how to set these up, please see this Initial Server Setup guide.
- Docker installed on your server, following Steps 1 and 2 of How To Install and Use Docker on Ubuntu 18.04.
- Docker Compose installed on your server, following Step 1 of How To Install Docker Compose on Ubuntu 18.04.
- A registered domain name. This tutorial will use **example.com** throughout. You can get one for free at Freenom, or use the domain registrar of your choice.
- Both of the following DNS records set up for your server. You can follow this introduction to DigitalOcean DNS for details on how to add them to a DigitalOcean account, if that's what you're using:
    - An A record with `example.com` pointing to your server's public IP address.
    - An A record with `www.example.com` pointing to your server's public IP address.

Step 1 — Defining the Web Server Configuration

Before running any containers, our first step will be to define the configuration for our Nginx web server. Our configuration file will include some WordPress-specific location blocks, along with a location block to direct Let's Encrypt verification requests to the Certbot client for automated certificate renewals.

First, create a project directory for your WordPress setup called `wordpress` and navigate to it:

```
$ mkdir wordpress && cd wordpress
```

Next, make a directory for the configuration file:

```
$ mkdir nginx-conf
```

Open the file with `nano` or your favorite editor:

```
$ nano nginx-conf/nginx.conf
```

In this file, we will add a server block with directives for our server name and document root, and location blocks to direct the Certbot client's request for certificates, PHP processing, and static asset requests.

Paste the following code into the file. Be sure to replace `example.com` with your own domain name:

~/wordpress/nginx-conf/nginx.conf

```
server {
        listen 80;
        listen [::]:80;

        server_name example.com www.example.com;

        index index.php index.html index.htm;

        root /var/www/html;

        location ~ /.well-known/acme-challenge {
                allow all;
                root /var/www/html;
        }

        location / {
                try_files $uri $uri/ /index.php$is_args$args;
        }
```

```
                try_files $uri =404;
                fastcgi_split_path_info ^(.+\.php)(/.+)$;
                fastcgi_pass wordpress:9000;
                fastcgi_index index.php;
                include fastcgi_params;
                fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
                fastcgi_param PATH_INFO $fastcgi_path_info;
        }

        location ~ /\.ht {
                deny all;
        }

        location = /favicon.ico {
                log_not_found off; access_log off;
        }
        location = /robots.txt {
                log_not_found off; access_log off; allow all;
        }
        location ~* \.(css|gif|ico|jpeg|jpg|js|png)$ {
                expires max;
                log_not_found off;
        }
}
```

Our server block includes the following information:

Directives:

- `listen`: This tells Nginx to listen on port `80`, which will allow us to use Certbot's webroot plugin for our certificate requests. Note that we are *not* including port `443` yet — we will update our configuration to include SSL once we have successfully obtained our certificates.
- `server_name`: This defines your server name and the server block that should be used for requests to your server. Be sure to replace `example.com` in this line with your own domain name.
- `index`: The `index` directive defines the files that will be used as indexes when processing requests to your server. We've modified the default order of priority here, moving `index.php` in front of `index.html` so that Nginx prioritizes files called `index.php` when possible.
- `root`: Our `root` directive names the root directory for requests to our server. This ons in our

WordPress Dockerfile. These Dockerfile instructions also ensure that the files from the WordPress release are mounted to this volume.

Location Blocks:

- `location ~ /.well-known/acme-challenge`: This location block will handle requests to the `.well-known` directory, where Certbot will place a temporary file to validate that the DNS for our domain resolves to our server. With this configuration in place, we will be able to use Certbot's webroot plugin to obtain certificates for our domain.
- `location /`: In this location block, we'll use a `try_files` directive to check for files that match individual URI requests. Instead of returning a 404 `Not Found` status as a default, however, we'll pass control to WordPress's `index.php` file with the request arguments.
- `location ~ \.php$`: This location block will handle PHP processing and proxy these requests to our `wordpress` container. Because our WordPress Docker image will be based on the `php:fpm` image, we will also include configuration options that are specific to the FastCGI protocol in this block. Nginx requires an independent PHP processor for PHP requests: in our case, these requests will be handled by the `php-fpm` processor that's included with the `php:fpm` image. Additionally, this location block includes FastCGI-specific directives, variables, and options that will proxy requests to the WordPress application running in our `wordpress` container, set the preferred index for the parsed request URI, and parse URI requests.
- `location ~ /\.ht`: This block will handle `.htaccess` files since Nginx won't serve them. The `deny_all` directive ensures that `.htaccess` files will never be served to users.
- `location = /favicon.ico`, `location = /robots.txt`: These blocks ensure that requests to `/favicon.ico` and `/robots.txt` will not be logged.
- `location ~* \.(css|gif|ico|jpeg|jpg|js|png)$`: This block turns off logging for static asset requests and ensures that these assets are highly cacheable, as they are typically expensive to serve.

For more information about FastCGI proxying, see Understanding and Implementing FastCGI Proxying in Nginx. For information about server and location blocks, see Understanding Nginx Server and Location Block Selection Algorithms.

Save and close the file when you are finished editing. If you used `nano`, do so by pressing `CTRL+X`, `Y`, then `ENTER`.

With your Nginx configuration in place, you can move on to creating environment

Step 2 — Defining Environment Variables

Your database and WordPress application containers will need access to certain environment variables at runtime in order for your application data to persist and be accessible to your application. These variables include both sensitive and non-sensitive information: sensitive values for your MySQL **root** password and application database user and password, and non-sensitive information for your application database name and host.

Rather than setting all of these values in our Docker Compose file — the main file that contains information about how our containers will run — we can set the sensitive values in an `.env` file and restrict its circulation. This will prevent these values from copying over to our project repositories and being exposed publicly.

In your main project directory, `~/wordpress`, open a file called `.env`:

```
$ nano .env
```

The confidential values that we will set in this file include a password for our MySQL **root** user, and a username and password that WordPress will use to access the database.

Add the following variable names and values to the file. Remember to supply **your own values** here for each variable:

~/wordpress/.env

```
MYSQL_ROOT_PASSWORD=your_root_password
MYSQL_USER=your_wordpress_database_user
MYSQL_PASSWORD=your_wordpress_database_password
```

We have included a password for the **root** administrative account, as well as our preferred username and password for our application database.

Save and close the file when you are finished editing.

Because your `.env` file contains sensitive information, you will want to ensure that it is included in your project's `.gitignore` and `.dockerignore` files, which tell Git and Docker what files **not** to copy to your Git repositories and Docker images, respectively.

If you plan to work with Git for version control, initialize your current working directory as a repository with `git init`:

```
$ git init
```

Then open a `.gitignore` file:

```
$ nano .gitignore
```

Add `.env` to the file:

~/wordpress/.gitignore

```
.env
```

Save and close the file when you are finished editing.

Likewise, it's a good precaution to add `.env` to a `.dockerignore` file, so that it doesn't end up on your containers when you are using this directory as your build context.

Open the file:

```
$ nano .dockerignore
```

Add `.env` to the file:

~/wordpress/.dockerignore

```
.env
```

Below this, you can optionally add files and directories associated with your application's development:

~/wordpress/.dockerignore

```
.env
.git
docker-compose.yml
.dockerignore
```

Save and close the file when you are finished.

With your sensitive information in place, you can now move on to defining your services in a `docker-compose.yml` file.

Step 3 — Defining Services with Docker Compose

Your `docker-compose.yml` file will contain the service definitions for your setup. A *service* in Compose is a running container, and service definitions specify information about how each container will run.

Using Compose, you can define different services in order to run multi-container applications, since Compose allows you to link these services together with shared networks and volumes. This will be helpful for our current setup since we will create different containers for our database, WordPress application, and web server. We will also create a container to run the Certbot client in order to obtain certificates for our webserver.

To begin, open the `docker-compose.yml` file:

```
$ nano docker-compose.yml
```

Add the following code to define your Compose file version and `db` database service:

~/wordpress/docker-compose.yml

```
version: '3'

services:
  db:
    image: mysql:8.0
    container_name: db
    restart: unless-stopped
    env_file: .env
    environment:
      - MYSQL_DATABASE=wordpress
    volumes:
      - dbdata:/var/lib/mysql
    command: '--default-authentication-plugin=mysql_native_password'
    networks:
      - app-network
```

The `db` service definition contains the following options:

- `image`: This tells Compose what image to pull to create the container. We are pinning the `mysql:8.0` image here to avoid future conflicts as the `mysql:latest` image continues to be updated. For more information about version pinning and avoiding dependency conflicts, see the Docker documentation on Dockerfile best practices.
- `container_name`: This specifies a name for the container.
- `restart`: This defines the container restart policy. The default is `no`, but we have set the container to restart unless it is stopped manually.
- `env_file`: This option tells Compose that we would like to add environment variables from a file called `.env`, located in our build context. In this case, the build context is our current directory.
- `environment`: This option allows you to add additional environment variables, beyond those defined in your `.env` file. We will set the `MYSQL_DATABASE` variable equal to `wordpress` to provide a name for our application database. Because this is non-sensitive information, we can include it directly in the `docker-compose.yml` file.
- `volumes`: Here, we're mounting a named volume called `dbdata` to the `/var/lib/mysql` directory on the container. This is the standard data directory for MySQL on most distributions.
- `command`: This option specifies a command to override the default CMD instruction for the image. In our case, we will add an option to the Docker image's standard `mysqld` command, which starts the MySQL server on the container. This option, `--default-authentication-plugin=mysql_native_password`, sets the `--default-authentication-plugin` system variable to `mysql_native_password`, specifying which authentication mechanism should govern new authentication requests to the server. Since PHP and therefore our WordPress image won't support MySQL's newer authentication default, we must make this adjustment in order to authenticate our application database user.
- `networks`: This specifies that our application service will join the `app-network` network, which we will define at the bottom of the file.

Next, below your `db` service definition, add the definition for your `wordpress` application service:

~/wordpress/docker-compose.yml

```
...
  wordpress:
    depends_on:
```

```
    container_name: wordpress
    restart: unless-stopped
    env_file: .env
    environment:
      - WORDPRESS_DB_HOST=db:3306
      - WORDPRESS_DB_USER=$MYSQL_USER
      - WORDPRESS_DB_PASSWORD=$MYSQL_PASSWORD
      - WORDPRESS_DB_NAME=wordpress
    volumes:
      - wordpress:/var/www/html
    networks:
      - app-network
```

In this service definition, we are naming our container and defining a restart policy, as we did with the `db` service. We're also adding some options specific to this container:

- `depends_on`: This option ensures that our containers will start in order of dependency, with the `wordpress` container starting after the `db` container. Our WordPress application relies on the existence of our application database and user, so expressing this order of dependency will enable our application to start properly.
- `image`: For this setup, we are using the `5.1.1-fpm-alpine` WordPress image. As discussed in Step 1, using this image ensures that our application will have the `php-fpm` processor that Nginx requires to handle PHP processing. This is also an `alpine` image, derived from the Alpine Linux project, which will help keep our overall image size down. For more information about the benefits and drawbacks of using `alpine` images and whether or not this makes sense for your application, see the full discussion under the **Image Variants** section of the Docker Hub WordPress image page.
- `env_file`: Again, we specify that we want to pull values from our `.env` file, since this is where we defined our application database user and password.
- `environment`: Here, we're using the values we defined in our `.env` file, but we're assigning them to the variable names that the WordPress image expects: `WORDPRESS_DB_USER` and `WORDPRESS_DB_PASSWORD`. We're also defining a `WORDPRESS_DB_HOST`, which will be the MySQL server running on the `db` container that's accessible on MySQL's default port, `3306`. Our `WORDPRESS_DB_NAME` will be the same value we specified in the MySQL service definition for our `MYSQL_DATABASE`: `wordpress`.
- `volumes`: We are mounting a named volume called `wordpress` to the `/var/www/html` mountpoint created by the WordPress image. Using a named volume in this way will allow us to share our application code with other containers.
- `networks`: We're also adding the `wordpress` container to the `app-network` network.

Next, below the `wordpress` application service definition, add the following definition for your `webserver` Nginx service:

~/wordpress/docker-compose.yml

```
...
  webserver:
    depends_on:
      - wordpress
    image: nginx:1.15.12-alpine
    container_name: webserver
    restart: unless-stopped
    ports:
      - "80:80"
    volumes:
      - wordpress:/var/www/html
      - ./nginx-conf:/etc/nginx/conf.d
      - certbot-etc:/etc/letsencrypt
    networks:
      - app-network
```

Again, we're naming our container and making it dependent on the `wordpress` container in order of starting. We're also using an `alpine` image — the `1.15.12-alpine` Nginx image.

This service definition also includes the following options:

- `ports`: This exposes port `80` to enable the configuration options we defined in our `nginx.conf` file in Step 1.
- `volumes`: Here, we are defining a combination of named volumes and bind mounts:
  - `wordpress:/var/www/html`: This will mount our WordPress application code to the `/var/www/html` directory, the directory we set as the `root` in our Nginx server block.
  - `./nginx-conf:/etc/nginx/conf.d`: This will bind mount the Nginx configuration directory on the host to the relevant directory on the container, ensuring that any changes we make to files on the host will be reflected in the container.
  - `certbot-etc:/etc/letsencrypt`: This will mount the relevant Let's Encrypt certificates and keys for our domain to the appropriate directory on the container.

And again, we've added this container to the `app-network` network.

Finally, below your `webserver` definition, add your last service definition for the `certbot` service. Be sure to replace the email address and domain names listed here with your own information:

~/wordpress/docker-compose.yml

```
certbot:
  depends_on:
    - webserver
  image: certbot/certbot
  container_name: certbot
  volumes:
    - certbot-etc:/etc/letsencrypt
    - wordpress:/var/www/html
  command: certonly --webroot --webroot-path=/var/www/html --email sammy@example.com --ag
```

This definition tells Compose to pull the `certbot/certbot` image from Docker Hub. It also uses named volumes to share resources with the Nginx container, including the domain certificates and key in `certbot-etc` and the application code in `wordpress`.

Again, we've used `depends_on` to specify that the `certbot` container should be started once the `webserver` service is running.

We've also included a `command` option that specifies a subcommand to run with the container's default `certbot` command. The `certonly` subcommand will obtain a certificate with the following options:

- `--webroot`: This tells Certbot to use the webroot plugin to place files in the webroot folder for authentication. This plugin depends on the HTTP-01 validation method, which uses an HTTP request to prove that Certbot can access resources from a server that responds to a given domain name.
- `--webroot-path`: This specifies the path of the webroot directory.
- `--email`: Your preferred email for registration and recovery.
- `--agree-tos`: This specifies that you agree to ACME's Subscriber Agreement.
- `--no-eff-email`: This tells Certbot that you do not wish to share your email with the Electronic Frontier Foundation (EFF). Feel free to omit this if you would prefer.
- `--staging`: This tells Certbot that you would like to use Let's Encrypt's staging

configuration options and avoid possible domain request limits. For more information about these limits, please see Let's Encrypt's rate limits documentation.

- `-d`: This allows you to specify domain names you would like to apply to your request. In this case, we've included `example.com` and `www.example.com`. Be sure to replace these with your own domain.

Below the `certbot` service definition, add your network and volume definitions:

~/wordpress/docker-compose.yml

```
…
volumes:
  certbot-etc:
  wordpress:
  dbdata:

networks:
  app-network:
    driver: bridge
```

Our top-level `volumes` key defines the volumes `certbot-etc`, `wordpress`, and `dbdata`. When Docker creates volumes, the contents of the volume are stored in a directory on the host filesystem, `/var/lib/docker/volumes/`, that's managed by Docker. The contents of each volume then get mounted from this directory to any container that uses the volume. In this way, it's possible to share code and data between containers.

The user-defined bridge network `app-network` enables communication between our containers since they are on the same Docker daemon host. This streamlines traffic and communication within the application, as it opens all ports between containers on the same bridge network without exposing any ports to the outside world. Thus, our `db`, `wordpress`, and `webserver` containers can communicate with each other, and we only need to expose port `80` for front-end access to the application.

The finished `docker-compose.yml` file will look like this:

~/wordpress/docker-compose.yml

```
version: '3'

services:
  db:
```

```
    restart: unless-stopped
    env_file: .env
    environment:
      - MYSQL_DATABASE=wordpress
    volumes:
      - dbdata:/var/lib/mysql
    command: '--default-authentication-plugin=mysql_native_password'
    networks:
      - app-network

  wordpress:
    depends_on:
      - db
    image: wordpress:5.1.1-fpm-alpine
    container_name: wordpress
    restart: unless-stopped
    env_file: .env
    environment:
      - WORDPRESS_DB_HOST=db:3306
      - WORDPRESS_DB_USER=$MYSQL_USER
      - WORDPRESS_DB_PASSWORD=$MYSQL_PASSWORD
      - WORDPRESS_DB_NAME=wordpress
    volumes:
      - wordpress:/var/www/html
    networks:
      - app-network

  webserver:
    depends_on:
      - wordpress
    image: nginx:1.15.12-alpine
    container_name: webserver
    restart: unless-stopped
    ports:
      - "80:80"
    volumes:
      - wordpress:/var/www/html
      - ./nginx-conf:/etc/nginx/conf.d
      - certbot-etc:/etc/letsencrypt
    networks:
      - app-network

  certbot:
    depends_on:
      - webserver
```

```
      - certbot-etc:/etc/letsencrypt
      - wordpress:/var/www/html
    command: certonly --webroot --webroot-path=/var/www/html --email sammy@example.com --ag

volumes:
  certbot-etc:
  wordpress:
  dbdata:

networks:
  app-network:
    driver: bridge
```

Save and close the file when you are finished editing.

With your service definitions in place, you are ready to start the containers and test your certificate requests.

Step 4 — Obtaining SSL Certificates and Credentials

We can start our containers with the `docker-compose up` command, which will create and run our containers in the order we have specified. If our domain requests are successful, we will see the correct exit status in our output and the right certificates mounted in the `/etc/letsencrypt/live` folder on the `webserver` container.

Create the containers with `docker-compose up` and the `-d` flag, which will run the `db`, `wordpress`, and `webserver` containers in the background:

```
$ docker-compose up -d
```

You will see output confirming that your services have been created:

```
Output
Creating db … done
Creating wordpress … done
Creating webserver … done
Creating certbot   … done
```

Using `docker-compose ps` check the status of your services:

```
$ docker-compose ps
```

If everything was successful, your `db`, `wordpress`, and `webserver` services will be `Up` and the `certbot` container will have exited with a `0` status message:

```
Output
  Name                 Command               State          Ports
-------------------------------------------------------------------------
certbot     certbot certonly --webroot …   Exit 0
db          docker-entrypoint.sh --def …   Up       3306/tcp, 33060/tcp
webserver   nginx -g daemon off;             Up       0.0.0.0:80->80/tcp
wordpress   docker-entrypoint.sh php-fpm     Up       9000/tcp
```

If you see anything other than `Up` in the `State` column for the `db`, `wordpress`, or `webserver` services, or an exit status other than `0` for the `certbot` container, be sure to check the service logs with the `docker-compose logs` command:

```
$ docker-compose logs service_name
```

You can now check that your certificates have been mounted to the `webserver` container with `docker-compose exec`:

```
$ docker-compose exec webserver ls -la /etc/letsencrypt/live
```

If your certificate requests were successful, you will see output like this:

```
Output
total 16
drwx------    3 root     root          4096 May 10 15:45 .
drwxr-xr-x    9 root     root          4096 May 10 15:45 ..
-rw-r--r--    1 root     root           740 May 10 15:45 README
drwxr-xr-x    2 root     root          4096 May 10 15:45 example.com
```

Now that you know your request will be successful, you can edit the `certbot` service definition to remove the `--staging` flag.

Open `docker-compose.yml`:

```
$ nano docker-compose.yml
```

Find the section of the file with the `certbot` service definition, and replace the `--staging` flag in the `command` option with the `--force-renewal` flag, which will tell Certbot that you want to request a new certificate with the same domains as an existing certificate. The `certbot` service definition will now look like this:

~/wordpress/docker-compose.yml

```
…
  certbot:
    depends_on:
      - webserver
    image: certbot/certbot
    container_name: certbot
    volumes:
      - certbot-etc:/etc/letsencrypt
      - certbot-var:/var/lib/letsencrypt
      - wordpress:/var/www/html

    command: certonly --webroot --webroot-path=/var/www/html --email sammy@example.com --ag
…
```

You can now run `docker-compose up` to recreate the `certbot` container. We will also include the `--no-deps` option to tell Compose that it can skip starting the `webserver` service, since it is already running:

```
$ docker-compose up --force-recreate --no-deps certbot
```

You will see output indicating that your certificate request was successful:

```
Output
Recreating certbot … done
Attaching to certbot
certbot      | Saving debug log to /var/log/letsencrypt/letsencrypt.log
certbot      | Plugins selected: Authenticator webroot, Installer None
certbot      | Renewing an existing certificate
certbot      | Performing the following challenges:
certbot      | http-01 challenge for example.com
```

```
certbot      | Waiting for verification…
certbot      | Cleaning up challenges
certbot      | IMPORTANT NOTES:
certbot      |  - Congratulations! Your certificate and chain have been saved at:
certbot      |    /etc/letsencrypt/live/example.com/fullchain.pem
certbot      |    Your key file has been saved at:
certbot      |    /etc/letsencrypt/live/example.com/privkey.pem
certbot      |    Your cert will expire on 2019-08-08. To obtain a new or tweaked
certbot      |    version of this certificate in the future, simply run certbot
certbot      |    again. To non-interactively renew *all* of your certificates, run
certbot      |    "certbot renew"
certbot      |  - Your account credentials have been saved in your Certbot
certbot      |    configuration directory at /etc/letsencrypt. You should make a
certbot      |    secure backup of this folder now. This configuration directory will
certbot      |    also contain certificates and private keys obtained by Certbot so
certbot      |    making regular backups of this folder is ideal.
certbot      |  - If you like Certbot, please consider supporting our work by:
certbot      |
certbot      |    Donating to ISRG / Let's Encrypt:   https://letsencrypt.org/donate
certbot      |    Donating to EFF:                    https://eff.org/donate-le
certbot      |
certbot exited with code 0
```

With your certificates in place, you can move on to modifying your Nginx configuration to include SSL.

Step 5 — Modifying the Web Server Configuration and Service Definition

Enabling SSL in our Nginx configuration will involve adding an HTTP redirect to HTTPS, specifying our SSL certificate and key locations, and adding security parameters and headers.

Since you are going to recreate the `webserver` service to include these additions, you can stop it now:

```
$ docker-compose stop webserver
```

Before we modify the configuration file itself, let's first get the recommended Nginx security parameters from Certbot using `curl`:

```
$ curl -sSLo nginx-conf/options-ssl-nginx.conf https://raw.githubusercontent.com/certbot/ce
```

This command will save these parameters in a file called `options-ssl-nginx.conf`, located in the `nginx-conf` directory.

Next, remove the Nginx configuration file you created earlier:

```
$ rm nginx-conf/nginx.conf
```

Open another version of the file:

```
$ nano nginx-conf/nginx.conf
```

Add the following code to the file to redirect HTTP to HTTPS and to add SSL credentials, protocols, and security headers. Remember to replace `example.com` with your own domain:

~/wordpress/nginx-conf/nginx.conf

```
server {
        listen 80;
        listen [::]:80;

        server_name example.com www.example.com;

        location ~ /.well-known/acme-challenge {
                allow all;
                root /var/www/html;
        }

        location / {
                rewrite ^ https://$host$request_uri? permanent;
        }
}

server {
        listen 443 ssl http2;
        listen [::]:443 ssl http2;
        server_name example.com www.example.com;

        index index.php index.html index.htm;

        root /var/www/html;
```

```
        ssl_certificate /etc/letsencrypt/live/example.com/fullchain.pem;
        ssl_certificate_key /etc/letsencrypt/live/example.com/privkey.pem;

        include /etc/nginx/conf.d/options-ssl-nginx.conf;

        add_header X-Frame-Options "SAMEORIGIN" always;
        add_header X-XSS-Protection "1; mode=block" always;
        add_header X-Content-Type-Options "nosniff" always;
        add_header Referrer-Policy "no-referrer-when-downgrade" always;
        add_header Content-Security-Policy "default-src * data: 'unsafe-eval' 'unsafe-inlir

        # add_header Strict-Transport-Security "max-age=31536000; includeSubDomains; preloa
        # enable strict transport security only if you understand the implications

        location / {
                try_files $uri $uri/ /index.php$is_args$args;
        }

        location ~ \.php$ {
                try_files $uri =404;
                fastcgi_split_path_info ^(.+\.php)(/.+)$;
                fastcgi_pass wordpress:9000;
                fastcgi_index index.php;
                include fastcgi_params;
                fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
                fastcgi_param PATH_INFO $fastcgi_path_info;
        }

        location ~ /\.ht {
                deny all;
        }

        location = /favicon.ico {
                log_not_found off; access_log off;
        }
        location = /robots.txt {
                log_not_found off; access_log off; allow all;
        }
        location ~* \.(css|gif|ico|jpeg|jpg|js|png)$ {
                expires max;
                log_not_found off;
        }
}
```

The HTTP server block specifies the webroot for Certbot renewal requests to the `.well-known/acme-challenge` directory. It also includes a rewrite directive that directs HTTP requests to the root directory to HTTPS.

The HTTPS server block enables `ssl` and `http2`. To read more about how HTTP/2 iterates on HTTP protocols and the benefits it can have for website performance, please see the introduction to How To Set Up Nginx with HTTP/2 Support on Ubuntu 18.04.

This block also includes our SSL certificate and key locations, along with the recommended Certbot security parameters that we saved to `nginx-conf/options-ssl-nginx.conf`.

Additionally, we've included some security headers that will enable us to get **A** ratings on things like the SSL Labs and Security Headers server test sites. These headers include `X-Frame-Options`, `X-Content-Type-Options`, `Referrer Policy`, `Content-Security-Policy`, and `X-XSS-Protection`. The HTTP `Strict Transport Security` (HSTS) header is commented out — enable this only if you understand the implications and have assessed its "preload" functionality.

Our `root` and `index` directives are also located in this block, as are the rest of the WordPress-specific location blocks discussed in Step 1.

Once you have finished editing, save and close the file.

Before recreating the `webserver` service, you will need to add a `443` port mapping to your `webserver` service definition.

Open your `docker-compose.yml` file:

```
$ nano docker-compose.yml
```

In the `webserver` service definition, add the following port mapping:

~/wordpress/docker-compose.yml

```
…
  webserver:
    depends_on:
      - wordpress
```

```
    restart: unless-stopped
    ports:
      - "80:80"
      - "443:443"
    volumes:
      - wordpress:/var/www/html
      - ./nginx-conf:/etc/nginx/conf.d
      - certbot-etc:/etc/letsencrypt
    networks:
      - app-network
```

The `docker-compose.yml` file will look like this when finished:

~/wordpress/docker-compose.yml

```
version: '3'

services:
  db:
    image: mysql:8.0
    container_name: db
    restart: unless-stopped
    env_file: .env
    environment:
      - MYSQL_DATABASE=wordpress
    volumes:
      - dbdata:/var/lib/mysql
    command: '--default-authentication-plugin=mysql_native_password'
    networks:
      - app-network

  wordpress:
    depends_on:
      - db
    image: wordpress:5.1.1-fpm-alpine
    container_name: wordpress
    restart: unless-stopped
    env_file: .env
    environment:
      - WORDPRESS_DB_HOST=db:3306
      - WORDPRESS_DB_USER=$MYSQL_USER
      - WORDPRESS_DB_PASSWORD=$MYSQL_PASSWORD
      - WORDPRESS_DB_NAME=wordpress
```

```
    networks:
      - app-network

  webserver:
    depends_on:
      - wordpress
    image: nginx:1.15.12-alpine
    container_name: webserver
    restart: unless-stopped
    ports:
      - "80:80"
      - "443:443"
    volumes:
      - wordpress:/var/www/html
      - ./nginx-conf:/etc/nginx/conf.d
      - certbot-etc:/etc/letsencrypt
    networks:
      - app-network

  certbot:
    depends_on:
      - webserver
    image: certbot/certbot
    container_name: certbot
    volumes:
      - certbot-etc:/etc/letsencrypt
      - wordpress:/var/www/html
    command: certonly --webroot --webroot-path=/var/www/html --email sammy@example.com --ag

volumes:
  certbot-etc:
  wordpress:
  dbdata:

networks:
  app-network:
    driver: bridge
```

Save and close the file when you are finished editing.

Recreate the `webserver` service:

Check your services with `docker-compose ps`:

```
$ docker-compose ps
```

You should see output indicating that your `db`, `wordpress`, and `webserver` services are running:

```
Output
  Name                 Command               State                     Ports
-------------------------------------------------------------------------------------------
certbot     certbot certonly --webroot …   Exit 0
db          docker-entrypoint.sh --def …   Up       3306/tcp, 33060/tcp
webserver   nginx -g daemon off;             Up       0.0.0.0:443->443/tcp, 0.0.0.0:80->80/
wordpress   docker-entrypoint.sh php-fpm     Up       9000/tcp
```

With your containers running, you can now complete your WordPress installation through the web interface.

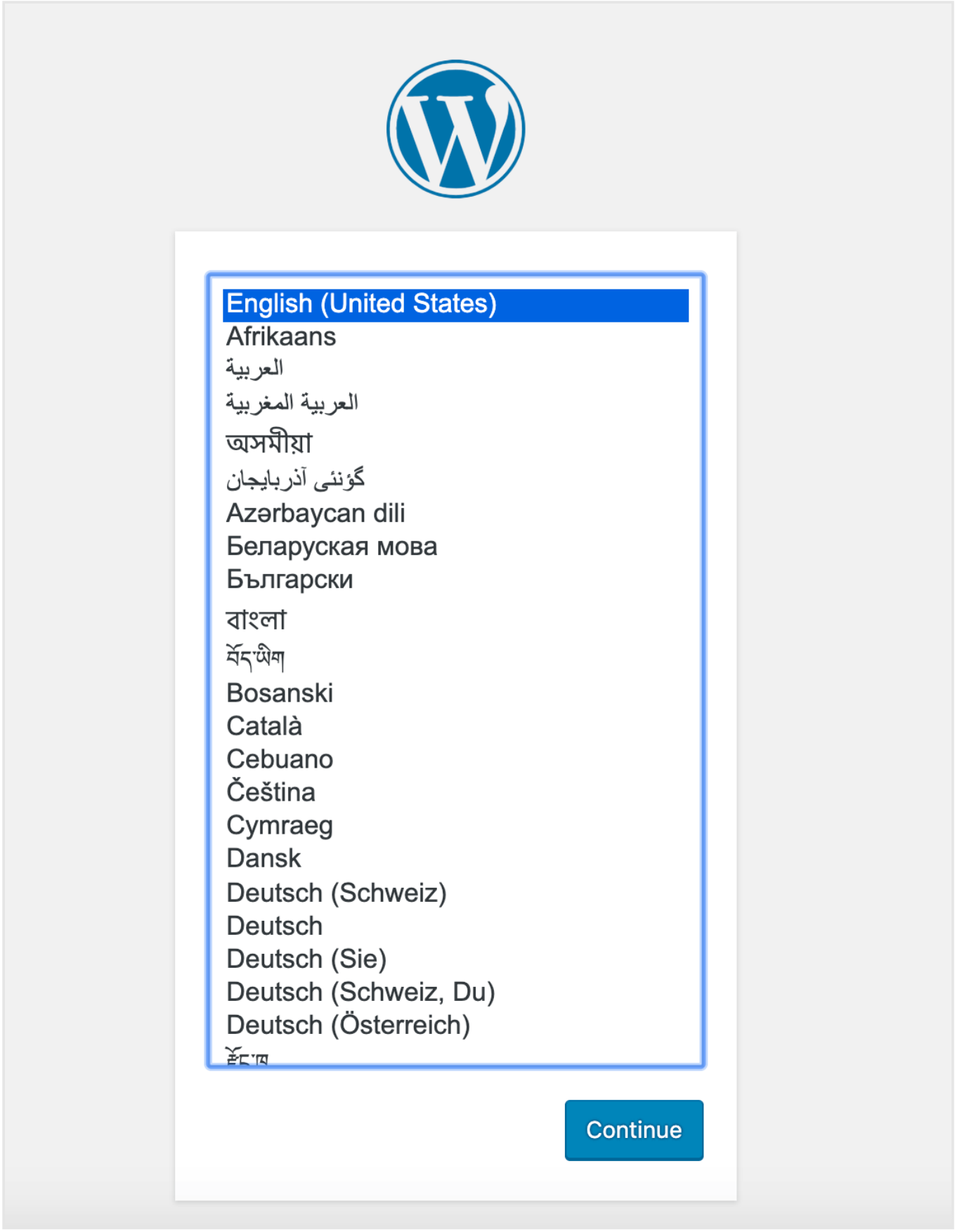
Step 6 — Completing the Installation Through the Web Interface

With our containers running, we can finish the installation through the WordPress web interface.

In your web browser, navigate to your server's domain. Remember to substitute `example.com` here with your own domain name:

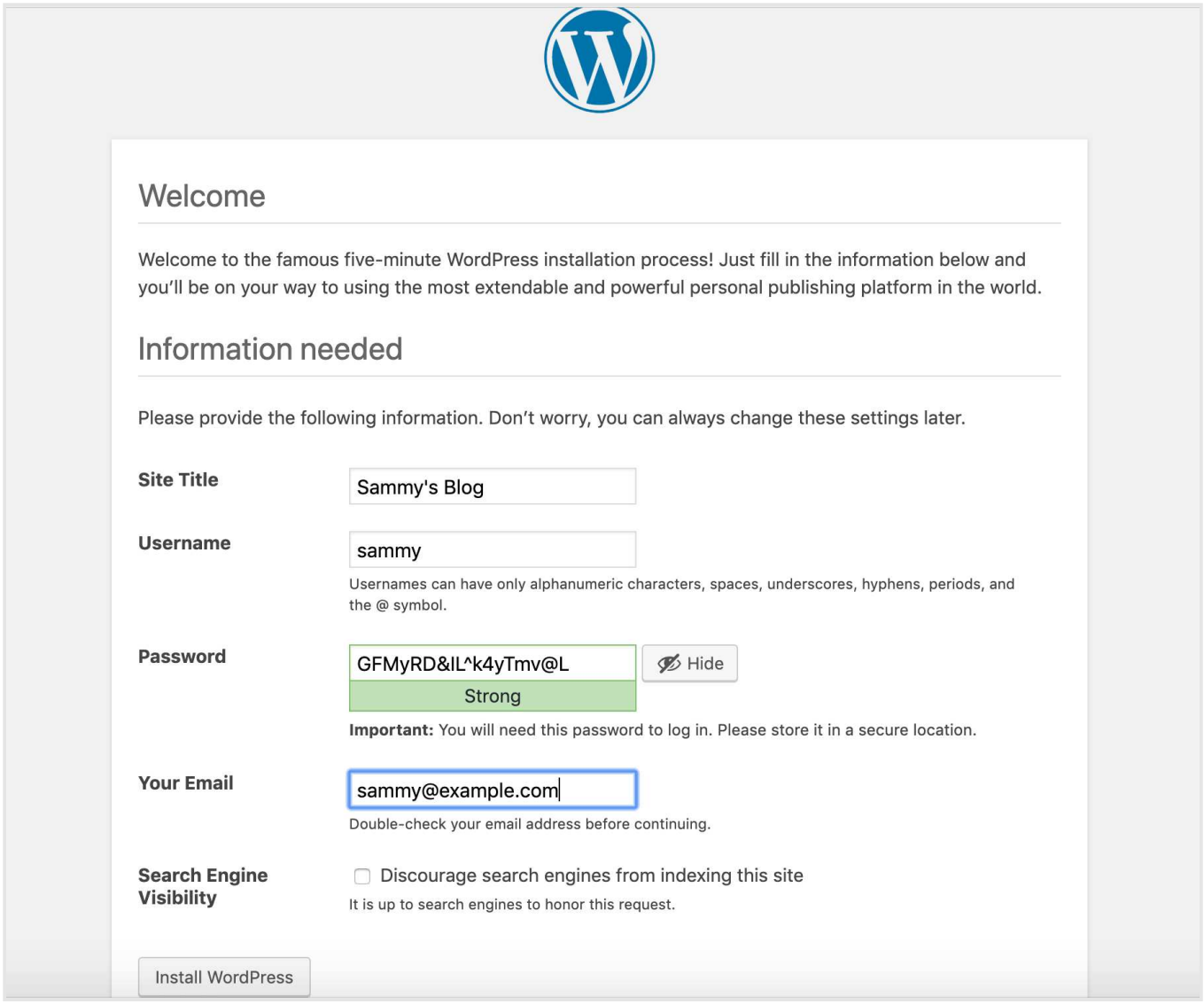
```
https://example.com
```

Select the language you would like to use:

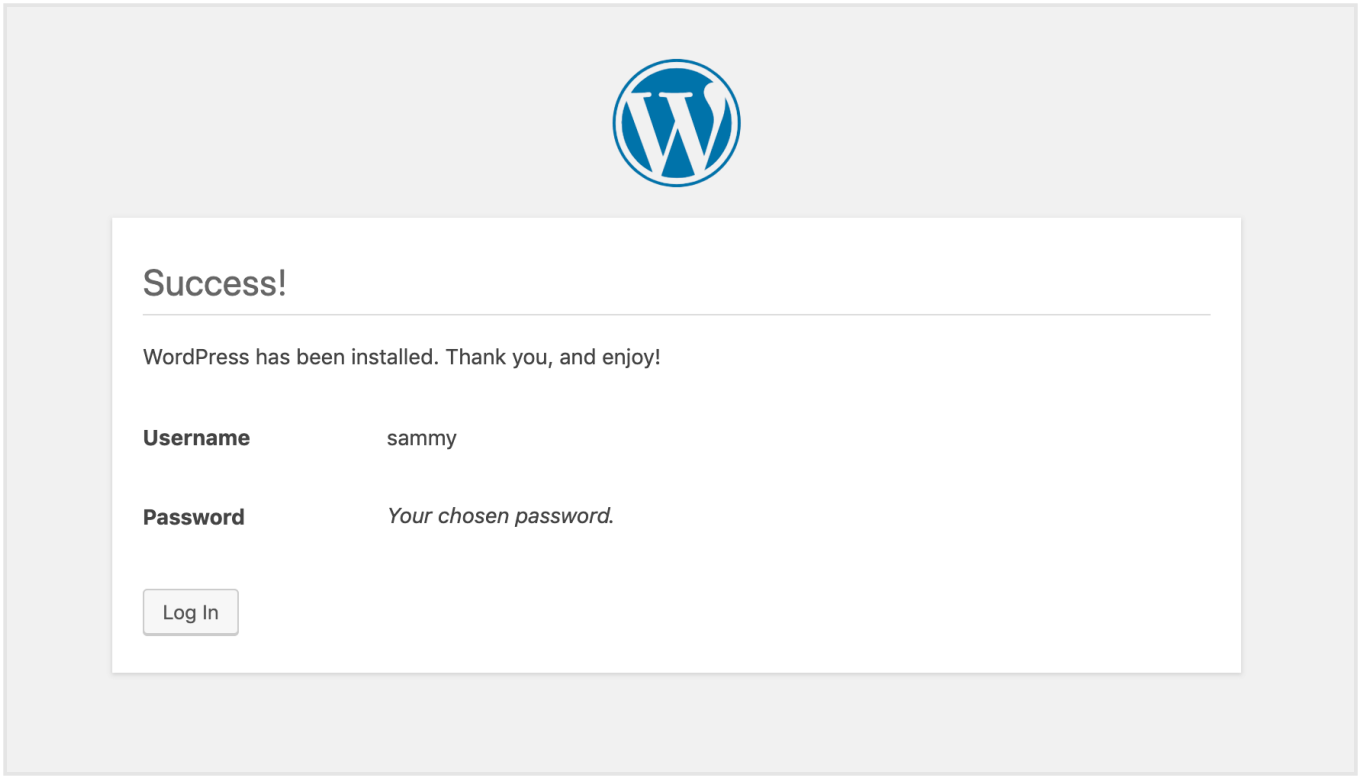


After clicking **Continue**, you will land on the main setup page, where you will need to pick a name for your site and a username. It's a good idea to choose a memorable username here (rather than "admin") and a strong password. You can use the password

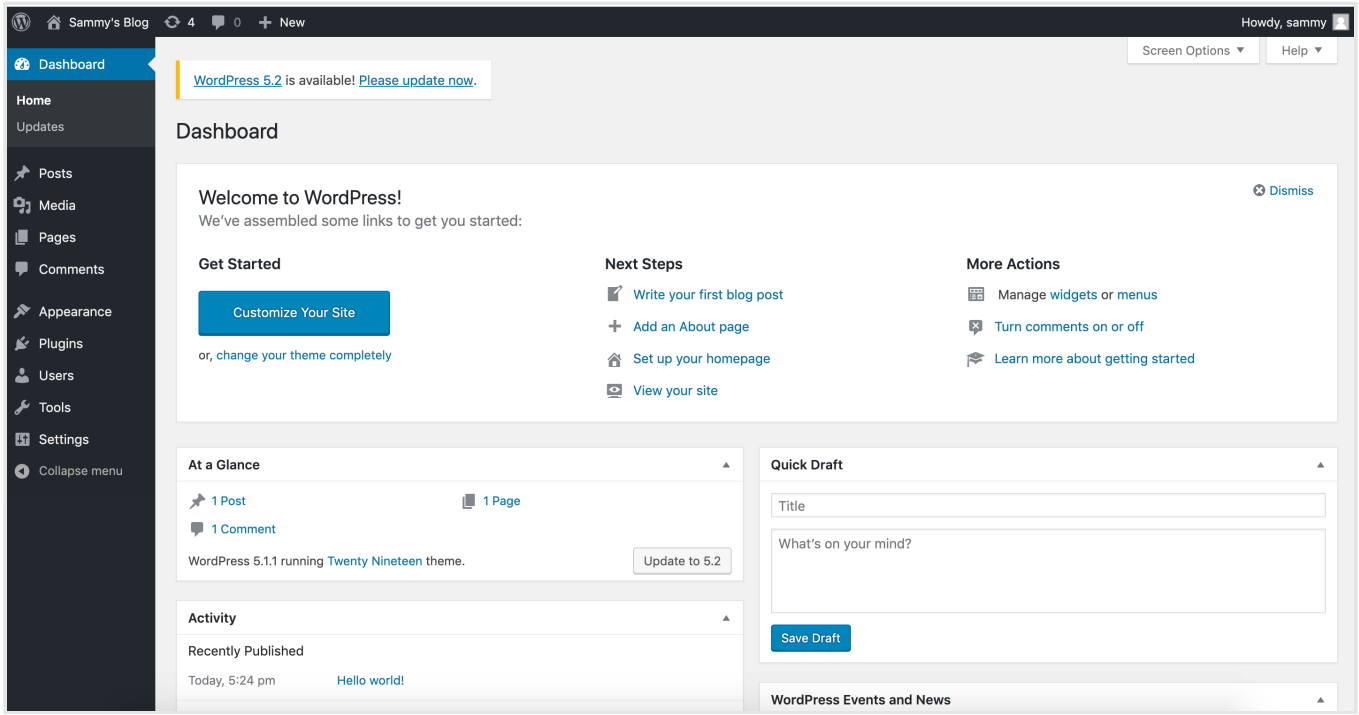
Finally, you will need to enter your email address and decide whether or not you want to discourage search engines from indexing your site:



Clicking on **Install WordPress** at the bottom of the page will take you to a login prompt:



Once logged in, you will have access to the WordPress administration dashboard:



With your WordPress installation complete, you can now take steps to ensure that your SSL certificates will renew automatically.

Step 7 — Renewing Certificates

Let's Encrypt certificates are valid for 90 days, so you will want to set up an automated

with the `cron` scheduling utility. In this case, we will create a `cron` job to periodically run a script that will renew our certificates and reload our Nginx configuration.

First, open a script called `ssl_renew.sh`:

```
$ nano ssl_renew.sh
```

Add the following code to the script to renew your certificates and reload your web server configuration. Remember to replace the example username here with your own non-root username:

~/wordpress/ssl_renew.sh

```
#!/bin/bash

COMPOSE="/usr/local/bin/docker-compose --no-ansi"

cd /home/sammy/wordpress/
$COMPOSE run certbot renew --dry-run && $COMPOSE kill -s SIGHUP webserver
```

This script first assigns the `docker-compose` binary to a variable called `COMPOSE`, and specifies the `--no-ansi` option, which will run `docker-compose` commands without ANSI control characters. It then changes to the `~/wordpress` project directory and runs the following `docker-compose` commands:

- `docker-compose run`: This will start a `certbot` container and override the `command` provided in our `certbot` service definition. Instead of using the `certonly` subcommand, we're using the `renew` subcommand here, which will renew certificates that are close to expiring. We've included the `--dry-run` option here to test our script.
- `docker-compose kill`: This will send a `SIGHUP` signal to the `webserver` container to reload the Nginx configuration. For more information on using this process to reload your Nginx configuration, please see this Docker blog post on deploying the official Nginx image with Docker.

Close the file when you are finished editing. Make it executable:

```
$ chmod +x ssl_renew.sh
```

```
$ sudo crontab -e
```

If this is your first time editing this file, you will be asked to choose an editor:

```
Output
no crontab for root - using an empty one

Select an editor.  To change later, run 'select-editor'.
  1. /bin/nano        <---- easiest
  2. /usr/bin/vim.basic
  3. /usr/bin/vim.tiny
  4. /bin/ed

Choose 1-4 [1]:
…
```

At the bottom of the file, add the following line:

crontab

```
…
*/5 * * * * /home/sammy/wordpress/ssl_renew.sh >> /var/log/cron.log 2>&1
```

This will set the job interval to every five minutes, so you can test whether or not your renewal request has worked as intended. We have also created a log file, `cron.log`, to record relevant output from the job.

After five minutes, check `cron.log` to see whether or not the renewal request has succeeded:

```
$ tail -f /var/log/cron.log
```

You should see output confirming a successful renewal:

```
Output
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
** DRY RUN: simulating 'certbot renew' close to cert expiry
**          (The test certificates below have not been saved.)
```

```
** DRY RUN: simulating 'certbot renew' close to cert expiry
**          (The test certificates above have not been saved.)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

You can now modify the `crontab` file to set a daily interval. To run the script every day at noon, for example, you would modify the last line of the file to look like this:

crontab

```
…
0 12 * * * /home/sammy/wordpress/ssl_renew.sh >> /var/log/cron.log 2>&1
```

You will also want to remove the `--dry-run` option from your `ssl_renew.sh` script:

~/wordpress/ssl_renew.sh

```
#!/bin/bash

COMPOSE="/usr/local/bin/docker-compose --no-ansi"

cd /home/sammy/wordpress/
$COMPOSE run certbot renew && $COMPOSE kill -s SIGHUP webserver
```

Your `cron` job will ensure that your Let's Encrypt certificates don't lapse by renewing them when they are eligible. You can also set up log rotation with the Logrotate utility to rotate and compress your log files.

Conclusion

In this tutorial, you used Docker Compose to create a WordPress installation with an Nginx web server. As part of this workflow, you obtained TLS/SSL certificates for the domain you want associated with your WordPress site. Additionally, you created a `cron` job to renew these certificates when necessary.

As additional steps to improve site performance and redundancy, you can consult the following articles on delivering and backing up WordPress assets:

- How to Speed Up WordPress Asset Delivery Using DigitalOcean Spaces CDN.
- How To Back Up a WordPress Site to Spaces.
- How To Store WordPress Assets on DigitalOcean Spaces.

If you are interested in exploring a containerized workflow with Kubernetes, you can also check out:

- How To Set Up WordPress with MySQL on Kubernetes Using Helm.

By Kathleen Juell

Was this helpful? Yes No

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pinkElephant *May 25, 2019*

0 I noticed the certbot renewal process starts a new container each time it runs. How can we modify ssl_renew.sh to delete the stopped container and its associated volume?

ampsonic *May 25, 2019*

1 First off, this is a fantastic tutorial. Thank you.

Question, what is the correct way to update wordpress? Should I use the wordpress GUI and upgrade that way, or should I update the docker-compose.yaml file to the latest version and rebuild?

Argyle *May 26, 2019*

0 What an excellent tutorial. It doesn't just give the commands to follow, but explains what each command does. This allowed me to get up and running in no time. Thank you!

ampsonic *May 26, 2019*

0 I'm curious as to why the UFW firewall isn't blocking access to 80 and 443, since we never specifically open those ports on the host?

> Argyle *May 26, 2019*
>
> 0 Apparently this is a known issue where Docker directly modifies iptables which allows it to bypass UFW rules. I found this article which discusses the issue and provides a solution: https://www.techrepublic.com/article/how-to-fix-the-docker-and-ufw-security-flaw/

> Argyle *May 26, 2019*
>
> 0 Docker modifies iptables directly, which bypasses UFW rules. This is a known issue. You can find resources elsewhere to make Docker adhere to UFW's rules.

> > ampsonic *May 27, 2019*
> >
> > 0 Good to know!

compulon *June 1, 2019*

0 I have the doubt if using the docker image "https-portal" is more practical and efficient to handle the issue of SSL certificates. What do you think?

sammyabukmeil *June 24, 2019*

Anyone also getting `Timeout during connect (likely firewall problem)` in docker-

I went through all the prerequisite articles, but when my run `curl --connect-timeout 10 -i domain.co.uk` I get `curl: (28) Connection timed out after 10005 milliseconds`

My `ufw status` only has `OpenSSH` and `OpenSSH (v6)`. All I have installed on my server is **docker** and **docker-compose**.

> sammyabukmeil *June 26, 2019*
> 0 Never mind... I was running `docker-compose up -d` on my local machine, not on my server..

robfish *July 10, 2019*

0 I already have a docker-compose.yml (for another container) file in my home directory.
Can I simply add to it?
Or does running docker-compose up -d from different locations work OK?

iasazid *July 20, 2019*

0 Hi, thanks for the tutorial.

I have been facing an issue of **“413 request entity too large”**. Could you please help me resolve it?

choubb2001 *August 16, 2019*

0 very nice and clean tutorial, I started my docker-compose as a freshhand.

One more question in the ssl renew script:

*#!/bin/bash

COMPOSE=“/usr/local/bin/docker-compose –no-ansi”

cd /home/**sammy**/wordpress/
$COMPOSE run certbot renew && $COMPOSE kill -s SIGHUP webserver*

How the value sammy defined? i know it was used as the email name before, could thisbe a random value?

0 This tutorial is great! I just have one issue that I'm stuck on. At the very end when I run `docker-compose ps` the webserver says `restarting` instead of `up`. My initial thought was this would eventually start up, but it continually says `restarting`.

Anyone know why that might be?

```
certbot     certbot certonly --webroot …   Exit 0
db          docker-entrypoint.sh --def …   Up           3306/tcp, 33060/tcp
webserver   nginx -g daemon off;             Restarting
wordpress   docker-entrypoint.sh php-fpm     Up           9000/tcp
adam@Docker:~/wordpress$ sudo docker-compose ps
  Name                 Command                 State             Ports
-------------------------------------------------------------------------------
```

0 choubb2001 *August 20, 2019*

hi buddy, i figure out with 1 week time.

reason: options-ssl-nginx.conf downloaded from git is an empty file. This means this command failed: curl -sSLo nginx-conf/options-ssl-nginx.conf https://raw.githubusercontent.com/certbot/certbot/master/certbot-nginx/certbot_nginx/options-ssl-nginx.conf

solution: nano/vim the options-ssl-nginx.conf file, paste the following in the file:

ssl*session*cache shared:le*nginx*SSL:1m;
ssl*session*timeout 1d;
ssl*session*tickets off;

ssl*protocols TLSv1.2;*
*ssl*prefer*server*ciphers on;
ssl*ciphers "EECDH+AESGCM:EDH+AESGCM:AES256+EECDH:AES256+EDH";*
*ssl*ecdh_curve secp384r1;

ssl*stapling on;*
*ssl*stapling_verify on;

add*header Strict-Transport-Security "max-age=15768000; includeSubdomains; preload;";*
*add*header Content-Security-Policy "default-src 'none'; frame-ancestors 'none'; script-

*add*header X-Frame-Options SAMEORIGIN;
add*header X-Content-Type-Options nosniff;*
*add*header X-XSS-Protection “1; mode=block”;

**You can check here for detail:*
**https://gist.github.com/cecilemuller/a26737699a7e70a7093d4dc115915de8*

hemantkamalakar *August 26, 2019*

0 Awesome tutorial.
One broken URL needs to be updated.

https://raw.githubusercontent.com/certbot/certbot/master/certbot-nginx/certbot_nginx/tls_configs/options-ssl-nginx.conf

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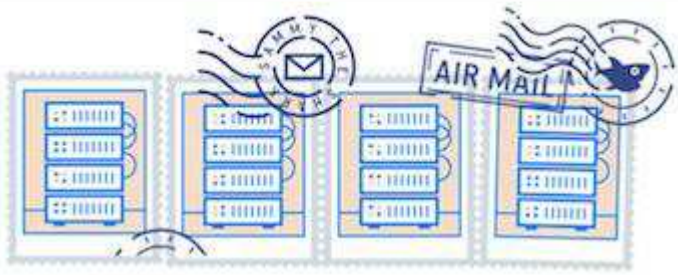

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