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How To Install the Apache Web Server on Ubuntu 16.04 | DigitalOcean

By Justin Ellingwood Become an author

10-12 minutes

Introduction

The Apache HTTP server is the most widely-used web server in the world. It provides many powerful features including dynamically loadable modules, robust media support, and extensive integration with other popular software.

In this guide, we'll discuss how to install an Apache web server on your Ubuntu 16.04 server.

Prerequisites

Before you begin this guide, you should have a regular, non-root user with `sudo` privileges configured on your server. Additionally, you will need to configure a basic firewall to block non-essential ports. You can learn how to configure a regular user account and set up a firewall for your server by following our initial server setup guide for Ubuntu 16.04.

When you have an account available, log in as your non-root

user to begin.

Step 1: Install Apache

Apache is available within Ubuntu's default software repositories, so we will install it using conventional package management tools.

We will begin by updating the local package index to reflect the latest upstream changes. Afterwards, we can install the `apache2` package:

- `sudo apt-get update`
- `sudo apt-get install apache2`

After confirming the installation, `apt-get` will install Apache and all required dependencies.

Step 2: Adjust the Firewall

Before we can test Apache, we need to modify our firewall to allow outside access to the default web ports. Assuming that you followed the instructions in the prerequisites, you should have a UFW firewall configured to restrict access to your server.

During installation, Apache registers itself with UFW to provide a few application profiles. We can use these profiles to simplify the process of enabling or disabling access to Apache through our firewall.

We can list the `ufw` application profiles by typing:

- `sudo ufw app list`

You should get a listing of the application profiles:

```
Output

Available applications:
  Apache
  Apache Full
  Apache Secure
  OpenSSH
```

As you can see, there are three profiles available for Apache:

- **Apache**: This profile opens only port 80 (normal, unencrypted web traffic)
- **Apache Full**: This profile opens both port 80 (normal, unencrypted web traffic) and port 443 (TLS/SSL encrypted traffic)
- **Apache Secure**: This profile opens only port 443 (TLS/SSL encrypted traffic)

  For our purposes, we will allow incoming traffic for the **Apache Full** profile by typing:

- `sudo ufw allow 'Apache Full'`

  You can verify the change by typing:

- `sudo ufw status`

  You should see HTTP traffic allowed in the displayed output:

```
Output

Status: active

To                         Action      From
--                         ------      ----
OpenSSH                    ALLOW       Anywhere
```

```
Apache Full                ALLOW       Anywhere
OpenSSH (v6)               ALLOW       Anywhere
(v6)
Apache Full (v6)           ALLOW       Anywhere
(v6)
```

As you can see, the profile has been activated to allow access to the web server.

Step 3: Check your Web Server

At the end of the installation process, Ubuntu 16.04 starts Apache. The web server should already be up and running.

We can check with the `systemd` init system to make sure the service is running by typing:

- `sudo systemctl status apache2`

Output

```
● apache2.service - LSB: Apache2 web server
   Loaded: loaded (/etc/init.d/apache2; bad;
vendor preset: enabled)
  Drop-In: /lib/systemd/system/apache2.service.d
           └─apache2-systemd.conf
   Active: active (running) since Fri 2017-05-19
18:30:10 UTC; 1h 5min ago
     Docs: man:systemd-sysv-generator(8)
  Process: 4336 ExecStop=/etc/init.d/apache2
stop (code=exited, status=0/SUCCESS)
  Process: 4359 ExecStart=/etc/init.d/apache2
start (code=exited, status=0/SUCCESS)
```

```
    Tasks: 55
   Memory: 2.3M
      CPU: 4.094s
   CGroup: /system.slice/apache2.service
           ├─4374 /usr/sbin/apache2 -k start
           ├─4377 /usr/sbin/apache2 -k start
           └─4378 /usr/sbin/apache2 -k start

May 19 18:30:09 ubuntu-512mb-nyc3-01 systemd[1]:
Stopped LSB: Apache2 web server.
May 19 18:30:09 ubuntu-512mb-nyc3-01 systemd[1]:
Starting LSB: Apache2 web server...
May 19 18:30:09 ubuntu-512mb-nyc3-01
apache2[4359]:  * Starting Apache httpd web
server apache2
May 19 18:30:09 ubuntu-512mb-nyc3-01
apache2[4359]: AH00558: apache2: Could not
reliably determine the server's fully qualified
domain name, using 127.0.1.1. Set the
'ServerName' directive globally to suppress this
message
May 19 18:30:10 ubuntu-512mb-nyc3-01
apache2[4359]:  *
May 19 18:30:10 ubuntu-512mb-nyc3-01 systemd[1]:
Started LSB: Apache2 web server.
```

As you can see above, the service appears to have started successfully. However, the best way to test this is to actually request a page from Apache.

You can access the default Apache landing page to confirm that the software is running properly. You can access this through your server's domain name or IP address.

If you are using DigitalOcean and do not have a domain name set up for your server, you can follow our guide how to set up a domain with DigitalOcean to set one up.

If you do not want to set up a domain name for your server, you can use your server's public IP address. If you do not know your server's IP address, you can get it a few different ways from the command line.

Try typing this at your server's command prompt:

- `hostname -I`

You will get back a few addresses separated by spaces. You can try each in your web browser to see if they work.

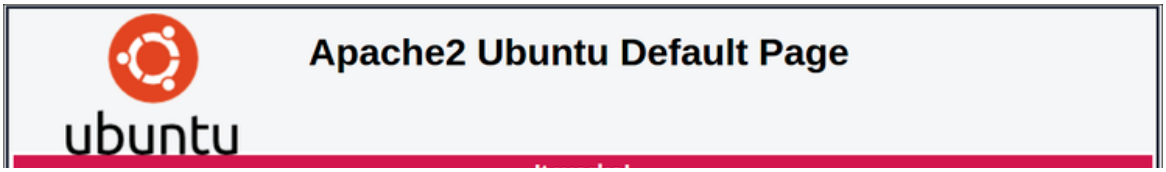
An alternative is typing this, which should give you your public IP address as seen from another location on the internet:

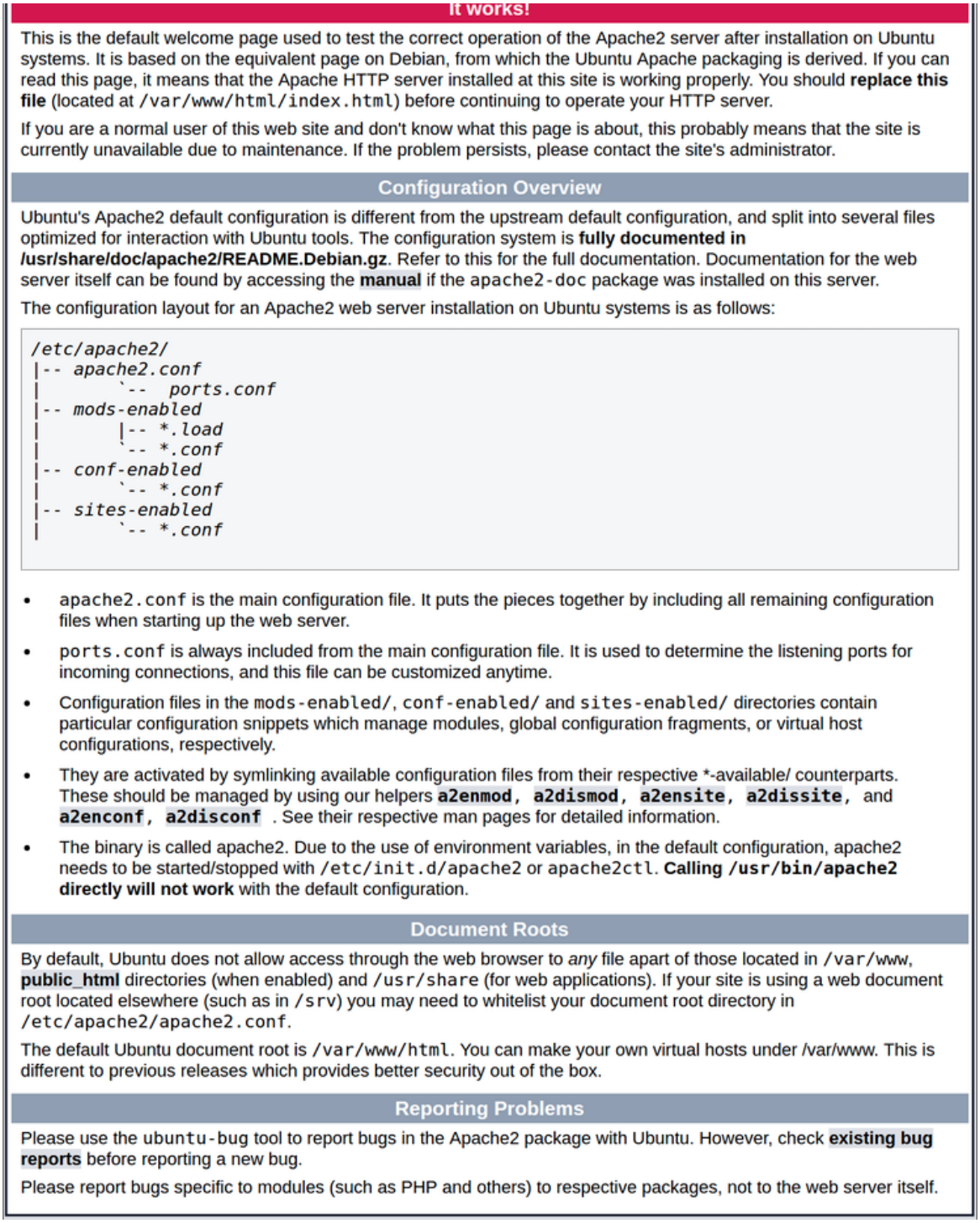
- `sudo apt-get install curl`
- `curl -4 icanhazip.com`

When you have your server's IP address or domain, enter it into your browser's address bar:

`http://server_domain_or_IP`

You should see the default Ubuntu 16.04 Apache web page, which should look something like this:





It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in /usr/share/doc/apache2/README.Debian.gz**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|       `--  ports.conf
|-- mods-enabled
|       |-- *.load
|       `-- *.conf
|-- conf-enabled
|       `-- *.conf
|-- sites-enabled
|       `-- *.conf
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- `ports.conf` is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the `mods-enabled/`, `conf-enabled/` and `sites-enabled/` directories contain particular configuration snippets which manage modules, global configuration fragments, or virtual host configurations, respectively.
- They are activated by symlinking available configuration files from their respective *-available/ counterparts. These should be managed by using our helpers **`a2enmod`**, **`a2dismod`**, **`a2ensite`**, **`a2dissite`**, and **`a2enconf`**, **`a2disconf`** . See their respective man pages for detailed information.
- The binary is called apache2. Due to the use of environment variables, in the default configuration, apache2 needs to be started/stopped with `/etc/init.d/apache2` or `apache2ctl`. **Calling `/usr/bin/apache2` directly will not work** with the default configuration.

Document Roots

By default, Ubuntu does not allow access through the web browser to *any* file apart of those located in `/var/www`, **public_html** directories (when enabled) and `/usr/share` (for web applications). If your site is using a web document root located elsewhere (such as in `/srv`) you may need to whitelist your document root directory in `/etc/apache2/apache2.conf`.

The default Ubuntu document root is `/var/www/html`. You can make your own virtual hosts under /var/www. This is different to previous releases which provides better security out of the box.

Reporting Problems

Please use the `ubuntu-bug` tool to report bugs in the Apache2 package with Ubuntu. However, check **existing bug reports** before reporting a new bug.

Please report bugs specific to modules (such as PHP and others) to respective packages, not to the web server itself.

This page is simply included to show that Apache is working correctly. It also includes some basic information about important Apache files and directory locations.

Step 4: Manage the Apache Process

Now that you have your web server up and running, we can go

over some basic management commands.

To stop your web server, you can type:

- `sudo systemctl stop apache2`

To start the web server when it is stopped, type:

- `sudo systemctl start apache2`

To stop and then start the service again, type:

- `sudo systemctl restart apache2`

If you are simply making configuration changes, Apache can often reload without dropping connections. To do this, you can use this command:

- `sudo systemctl reload apache2`

By default, Apache is configured to start automatically when the server boots. If this is not what you want, you can disable this behavior by typing:

- `sudo systemctl disable apache2`

To re-enable the service to start up at boot, you can type:

- `sudo systemctl enable apache2`

Apache should now start automatically when the server boots again.

Step 5: Get Familiar with Important Apache Files and Directories

Now that you know how to manage the service itself, you should take a few minutes to familiarize yourself with a few important

directories and files.

Content

- `/var/www/html`: The actual web content, which by default only consists of the default Apache page you saw earlier, is served out of the `/var/www/html` directory. This can be changed by altering Apache configuration files.

Server Configuration

- `/etc/apache2`: The Apache configuration directory. All of the Apache configuration files reside here.
- `/etc/apache2/apache2.conf`: The main Apache configuration file. This can be modified to make changes to the Apache global configuration. This file is responsible for loading many of the other files in the configuration directory.
- `/etc/apache2/ports.conf`: This file specifies the ports that Apache will listen on. By default, Apache listens on port 80 and additionally listens on port 443 when a module providing SSL capabilities is enabled.
- `/etc/apache2/sites-available/`: The directory where per-site “Virtual Hosts” can be stored. Apache will not use the configuration files found in this directory unless they are linked to the `sites-enabled` directory (see below). Typically, all server block configuration is done in this directory, and then enabled by linking to the other directory with the `a2ensite` command.
- `/etc/apache2/sites-enabled/`: The directory where enabled per-site “Virtual Hosts” are stored. Typically, these are

created by linking to configuration files found in the `sites-available` directory with the `a2ensite`. Apache reads the configuration files and links found in this directory when it starts or reloads to compile a complete configuration.

- `/etc/apache2/conf-available/`, `/etc/apache2/conf-enabled/`: These directories have the same relationship as the `sites-available` and `sites-enabled` directories, but are used to store configuration fragments that do not belong in a Virtual Host. Files in the `conf-available` directory can be enabled with the `a2enconf` command and disabled with the `a2disconf` command.
- `/etc/apache2/mods-available/`, `/etc/apache2/mods-enabled/`: These directories contain the available and enabled modules, respectively. Files in ending in `.load` contain fragments to load specific modules, while files ending in `.conf` contain the configuration for those modules. Modules can be enabled and disabled using the `a2enmod` and `a2dismod` command.

Server Logs

- `/var/log/apache2/access.log`: By default, every request to your web server is recorded in this log file unless Apache is configured to do otherwise.
- `/var/log/apache2/error.log`: By default, all errors are recorded in this file. The `LogLevel` directive in the Apache configuration specifies how much detail the error logs will contain.

Conclusion

Now that you have your web server installed, you have many options for the type of content to serve and the technologies you want to use to create a richer experience.

Learn how to use Apache Virtual Hosts here. If you'd like to build out a more complete application stack, check out this article on how to configure a LAMP stack on Ubuntu 16.04.