How to Configure an IPv6-Only Apache Server

Author: Alejandro Acosta
Coordination and Revision: Guillermo Cicileo
Edition: Paula Suárez, Martín Mañana
Department: Tecnología

lacnic
www.lacnic.net

Introduction

Motivated by the rise of IPv6-only datacenters and the scarcity of IPv4 addresses, the following article will try to present how to easily configure a web server (Apache) in an IPv6-only server.

Requirements

For the example below we will use:
- Ubuntu 20.04
- Apache 2 (we will assume it has already been installed)

Note: Everything that is done in this post should work on any Linux machine in which Apache 2 is installed.

Scenario

- Ubuntu 2 server
- Server IP address: 2001:db8:cafe::1/64
- Interface to be used in the server: eth0
- Port 80 TCP

eth0: 2001:db8:cafe::1/64

Why an IPv6-only server?

The reasons vary depending on the administrator and their specific needs. The most common include:

   a) Some IPv6-only VPS servers are cheaper than dual-stacked servers
   b) The server is located in an IPv6-only datacenter
   c) Less complex administration (administering a single-stack server is easier than administering a dual-stack server)
   d) Security (some security flaws that may exist in IPv4 will not be reflected in the IPv6 stack)
   e) Performance (a dual-stack server typically consumes less resources)

First steps: Check our server and make sure that everything is OK

1) First, we must make sure that Apache 2 is installed. We can do so by running the following command in our Linux console:
   #apache2 -v

   The command should return something like this:
   Server version: Apache/2.4.18 (Ubuntu)
   Server built: 2020-06-15T14:09:55

2) Then, we must check the IPv6 addressing of the device. To do so, it is important to know which interfaces the Linux device has and their IP addresses. There are many ways to do this, but for the example we will use the following commands:
   a) To find out the names of the server's interfaces:
      i)   *#ip link*
           1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1
               link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
           2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP mode DEFAULT group default qlen 1000
               link/ether 52:54:00:f8:10:68 brd ff:ff:ff:ff:ff:ff

   b) To check the server's IPv6 addresses:
      i)   *#ip -6 addr show*
           1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 state UNKNOWN qlen 1
               inet6 ::1/128 scope host
                  valid_lft forever preferred_lft forever
           2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 state UP qlen 1000
               inet6 2001:db8:cafe::1/64 scope global

valid_lft forever preferred_lft forever
inet6 fe80::5054:ff:fef6:2028/64 scope link
valid_lft forever preferred_lft forever

The output of **a** and **b** will tell us the device's interfaces and addresses. In our case, we will use the interface eth0 and the address 2001:db8:cafe::1/64.

Important: Knowing the interface name only helps with troubleshooting. It is not essential for the Apache server.

Steps to configure an IPv6-only Apache server

Making Apache listen on IPv6 is very simple, as editing the *ports.conf* file and configuring the *Listen* directive should be enough.

1) In the *ports.conf* file (probably found at: /etc/apache2), configure the *Listen* directive as follows:
   Listen [2001:db8:cafe::1]:80

   Very important: If you want Apache to listen on more than one IP address, you can add multiple *Listen* directives to the same *ports.conf* file.

2) Restart Apache:
   #apachectl restart

Check that everything is properly configured

To check that what we have done is correct, we can follow the steps below:

1) Check the status of the Apache server
   a) *#apachectl status*
2) Check that Apache is listening on port 80
   a) *#netstat -pan | grep 80*
   b) tcp6   0   0 2001:db8:cafe::1:**80**   :::*   LISTEN   852/apache2
3) Telnet to port 80 of the address on which Apache is listening
   a) #telnet 2001:db8:cafe::1 80

Is it possible to have virtual hosting on an IPv6-only Apache server?

Yes, it is. The logic is the same as with IPv4.

We suggest watching the following video: https://www.youtube.com/watch?v=PYwDdO_FlaA

Common mistakes

As always, problems can occur and some of this may not work. The main problems include:

1) Not restarting Apache after modifying ports.conf
2) Restarting the Apache server when the IP address has not been specified in ports.conf
3) Not using square brackets ([ ]) in the ports.conf directive

Conclusions

Configuring an Apache server to listen on IPv6 only is very easy.

References

[1] https://www.youtube.com/watch?v=PYwDdO_FlaA