

1. OPNSeNSE Installation

In this chapter we will discuss how you get OPNsense up and running on a bare metal instance. It is fairly easy and straightforward if you just follow the steps.

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1. Flash USB drive with Ventoy

Now, the first thing we will take a look at before installing any OS on bare metal is the program called Ventoy. Now, why is this program important ? Well for any operating system install you will need a USB stick on which the OS lives that can then be transferred to your laptop/pc/server etcetera. Now, before Ventoy this meant that for each OS you needed a separate USB drive or you needed to delete the OS that was on the USB stick and then install the new one. Well with Ventoy no more ! Ventoy allows you to install multiple OS's just on one USB stick. In this way you can always carry around all the OS's your USB stick has capacity for. The installation of Ventoy can be done via either Windows, Mac or Linux. Since, we are focused on open source we will demonstrate here how to do it on a linux system, but on the other operating systems it is sort of similar.

1. First go to ventoy.net
2. Click on Downloads
3. Select your operating system
4. You are then brought to a SOURCEFORGE Page where you can download the ventoy iso
5. We then want to choose the **.tar.gz** version
6. I would then recommend to save the ventoy .tar.gz under an ISO folder where you will also keep all your other ISO's in the future. All of these ISO's can always be found online but if you are in some situation with a slow or no internet connection then it is handy to have already saved them.
7. What's next is unzip the file -> then click on anything that ends with x86_64. This will start the GUI to install ventory on your USB stick
8. Select the right USB stick
9. Hit Install
10. After installing you should remove the USB stick and plug it back in for your computer to recognize it
11. After that you can simply drag and drop iso files into the Ventoy USB stick.
12. Then once you pop open a new install on a machine you have the option to boot from all the ISO images you have stored on it.

2. Installation

Source: [HomeNetworkGuy](#)

Perfect! So you have the following things ready

1. Ventoy USB stick with OPNSense ISO on it
2. Keyboard with USB connection or a wireless mouse with keyboard included
3. Monitor with HDMI connection
4. HDMI Cable
5. Mini PC and power cord
6. Laptop with an Ethernet port
7. Ethernet Cable

Port Configuration

1. Alright so let's install OPNSense then on your Mini PC. Now, to stay as general as possible we assume that we don't know yet the interface names on your mini pc. Hence, we first assume that you need to figure out how each port is labeled, because they are not always labeled internally in chronological order. For instance one of my mini pc's I used as my OPNSense box was labelled igc3, igc2, igc0, igc1.
2. Now, it is up to you which port you will use for your WAN and LAN port but it is common to have the WAN port completely right or left and the LAN port next to it. Then if you have any other ports you can use them for other networks. But for now we will focus on 2 ports and later extend to use the other ports as well.
3. Now, before starting the OPNSense router make sure you plug in an Ethernet cable in the second port from left or right and plug the other end in your laptop. This is how we will know which link is up and can identify the interface name with it.
4. The first thing we will do now is start the mini pc and hit the DEL, ESC, F10 or F12 key depending on which key combination brings you to the bios screen of your mini pc. Then in the bios screen we will change the boot order to load the Ventoy USB stick first. This will make sure we can choose the OPNSense installation iso.
4. Once, rebooted choose the OPNSense iso to load
5. Now, you can configure already things from the CLI but to make it simple we will just let the whole script run until we end up with this screen

```
Root file system: /dev/iso9660/OPNSENSE_INSTALL
Fri Sep 16 18:51:31 UTC 2022

*** OPNsense.localdomain: OPNsense 22.7 (amd64/OpenSSL) ***

LAN (vtnet1)    -> v4: 192.168.1.1/24
WAN (vtnet0)    -> v4/DHCP4: 192.168.1.112/24
                  v6/DHCP6: 2601:
HTTPS: SHA256 73 43 06 3D 90 E8 C2 4B 47 01 89 7D EB 44 88 37
          51 A8 A6 EB B2 1E 13 42 C7 90 85 C4 BB E9 11 14
SSH:   SHA256 4K4tmEfRd2bQ10JgIGG7YS0qbMfCvh0uHeDQmLIo+z4 (ECDSA)
SSH:   SHA256 VjtfvXvBKRNnTMxVn4MMFuDyd1TEvu76A0beZMc8dVA (ED25519)
SSH:   SHA256 u71+rRbtrNNAitfVo30BKYZ15Hif64IUvuLIle/dBaA (RSA)
pw: no such user `installer'

Welcome! OPNsense is running in live mode from install media. Please
login as 'root' to continue in live mode, or as 'installer' to start the
installation. Use the default or previously-imported root password for
both accounts. Remote login via SSH is also enabled.

FreeBSD/amd64 (OPNsense.localdomain) (ttyv0)

login: installer
Password:
```

6. You can now login with root

7. Now

ifconfig for FreeBSD

3. Initial Local Configuration

Alright! So you have installed OPNSense on your machine of choice and now you want to configure it for its basic settings. At this moment no WAN is connected yet this will be done in the next chapter. The first thing we want to do is open the OPNSense WebGui in your web browser.

1. Take a laptop and connect an Ethernet cable from your laptop to the port your configured your LAN on.
2. Now, by default OPNSense creates a DHCP server on the LAN network i.e the 192.168.1.1/24 network.
3. Hence, if you plugin your laptop then your laptop should get an IP address on this network e.g 192.168.1.101. This can be confirmed in your network settings. If you don't get an IP address then your LAN port is configured on a different port. Don't worry, just try out all the different ports until you get an IP address. Later in the WebGui we can then adjust the LAN port to your preferred port.
4. So if you have an IP address on your laptop go to <http://192.168.1.1> which should open up the OPNSense WebGui
5. Assuming you have not changed the password in your installation process you can login with

```
username: root
password: opnsense
```

6. Once logged in you will be prompted with the configuration wizard. You could go through this, but I prefer to abort it and setup everything manually (Especially for static WAN IP addresses, and if ports are not yet correctly configured). In this way you also directly learn where all the options are located. Hence, click on Abort
7. Then the first thing I like to do is to go to Interfaces > Assignments where you can assign the right LAN and WAN port. We will focus first on the **LAN** port hence you can delete the WAN port for now as we will add it later.

 **OPNsense**
Securing networks made easy

Lobby

Reporting

System

Interfaces

[LAN]

[WAN]

Assignments

Devices

Neighbors

Overview

Settings

Virtual IPs

Wireless

Diagnostics

Firewall

VPN

Services

Power

Help

root@OPNsense.internal



Interfaces: Assignments

Interface	Identifier	Device	
[LAN]	lan	ix0 (c8:1f:be:19:4d:31)	
[WAN]	wan	ix1 (c8:1f:be:19:4d:32)	

Save

+ Assign a new interface

Device

ix2 (ac:61:75:ae:36:ca)

Description

Add

OPNsense (c) 2014-2026 Deciso B.V.

8. Now, if you want to switch your LAN physical port you can do that here by simply clicking on the Device drop down menu behind the LAN connection. Choose the right interface and hit save and apply. If that's done you can then now switch the cable to the right physical port and reconnect to the WebGui.

4. Initial System Settings

Next we will have a look at the system settings of your OPNSense box and configure it to your local needs ;).

1. Go to System > Settings > General

2. In here we will choose a hostname and a domain name. You can call your OPNSense router whatever you want but I like to call it CR1 for core router 1 and the domain name I would choose something related to the location your OPNSense router is running.

3. Set your time zone, language and theme. One of the themes I personally like is the cicada theme, but it is up to you of course.

4. Then if you have a nice picture of your whole setup then you can also add it here, which then later can be added to your home screen.

5. Then the DNS information you can leave blank for now

6. Finally, make sure the following are unchecked

- ☐ Allow DNS server list to be overridden by DHCP/PPP on WAN
- ☐ Do not use the local DNS service as a nameserver for this system
- ☐ Allow default gateway switching

7. That's it for now, but we will come back to this later ;)

2. Hardware Choice

To setup a home network you need a router and in this

The first step is to choose the hardware in which you are running OPNsense. You can either run OPNsense directly on the system (bare metal) or in a virtual machine on a hypervisor such as [Proxmox](#), [ESXi](#), etc. Many home users will either choose a dedicated mini-PC firewall appliance or a virtual machine on a hypervisor.

If you are not familiar with how to set up virtual machines, I recommend you either gain a solid of that first or start with a mini-PC firewall appliance. Mini-PC firewall appliances are compact, power efficient, silent, and powerful systems (compared to many consumer grade routers).

I personally prefer to have a dedicated device rather than using a virtual machine since it allows me to tinker with my Proxmox server without worrying about taking down my network. If you need some insight on the types of hardware options that are available, you may refer to my [hardware recommendations page](#).

6. Users

The first thing after logging in for security reasons is

1. Create a new user different from root

Go to System > Access > Users > + Add user

Add a new user name, password, and other settings as you please.

Finally, it is important to add a public ssh key from your laptop or computer to it s.t if you want to login in the ssh shell then you will login with an ssh key instead of the a password which is more insecure.

2. Now, that a new user has been created we will log out from root and login with the new username

3. Then we will go back again to users and disable root login by clicking on the edit button at the root user and check the box "disable login". From that moment you can only login with the new user account you have created in the WebGui

4. Now, regarding SSH shell access it is best to leave it turned off and only activate via the WebGui when you actually need it. However, it can happen that you won't have access to the WebGui if you made a change that by accident turned off webgui access. But if you are at the location of your OPNSense box then you can still login via the local console or if you have a KVM setup then even remote access would still be possible. Hence, this is a decision you need to make for your self. In my opinion leaving it off is best for security purposes.

5. By default shell login is already turned off so you don't need to do anything. However, if you want to turn it on you go to System > Settings > Administration. From there you scroll down and hit the box "Enable Secure Shell".