pfSense Home Lab Setup Report – Step by Step

1. Overview

This project sets up a pfSense firewall lab running on VirtualBox. The purpose:
Practice firewall and NAT rules
Configure VPNs and IDS/IPS
Create a demonstrable project for resume/GitHub
Host machine: Parrot OS 6.12.32-amd64, 12GB RAM, 250GB SSD

Downloading pfSense

Open browser → pfSense official download page: https://www.pfsense.org/download/
or you can download form internet archive
https://archive.org/download/pfsense_28_ce

Select version: pfSense-CE 2.8.0 DEVELOPMENT amd64 ISO
File type: ISO (DVD Image) → pfSense-CE-2.8.0-DEVELOPMENT-amd64-20240501-0530.iso.gz
Download the file and extract it using gunzip or file manager
The resulting ISO is ready for VirtualBox installation

VirtualBox Setup

Create a New VM → Name: pfSense-Lab
Type: BSD, Version: FreeBSD (64-bit)
Memory: 1024MB (for lab testing)
Hard Disk: 15GB VDI, dynamically allocated
Storage: Attach the downloaded ISO for installation
Network:
Adapter 1 → Bridged Adapter (WAN)
Adapter 2 → Internal Network (LAN)

pfSense Installation

Start the VM → boot from ISO
Welcome screen → accept the license
Partitioning:
Entire Disk
Partition type: GPT (GUID Partition Table)
Swap: 819MB, UFS root: 15GB
Complete installation → reboot VM
Detach the ISO from storage

Initial Interface Assignment

On console → Assign Interfaces? → Yes
WAN interface → em0 (Bridged Adapter)
LAN interface → em1 (Internal Network)
WAN IP → DHCP or static (example: 192.168.0.177/24)
LAN IP → Static 192.168.1.1/24

pfSense Web GUI Login

Browser → http://192.168.1.1 (LAN IP)
Default credentials:
Username: admin
Password: pfsense
Initial setup wizard:
Hostname: pfsense.home.arpa
Domain: local
Change admin password (use a strong password)

Firewall Configuration

GUI → Firewall → Rules → LAN
LAN → WAN traffic is allowed by default
WAN interface blocks incoming traffic; manually add allow rules as needed
Example: Allow HTTP → TCP port 80, source any, destination WAN IP

NAT (Port Forwarding)

GUI → Firewall → NAT → Port Forward
Port forwarding setup:
WAN port: 80
LAN server: internal VM or host IP
Protocol: TCP
Firewall rules automatically created for the NAT

Testing

LAN client ping test: ping 192.168.1.1 (LAN gateway)
WAN test: Nmap scan → sudo nmap -sS 192.168.0.177
Browser test → open LAN IP to access pfSense GUI
Firewall rules test → try accessing blocked ports from WAN