Introduction to pfSense

Open Source Firewall and Router Software

Victor Cervantes

Cyber Warrior's


pfsense

What is pfSense?

* pfSense is an open-source firewall and routing software distribution based on FreeBSD. It s widely used for securing networks, providing advanced routing features and offering various network services.
* **Key features**
  Firewall, provide robust firewall capabilities, including packet inspection, NAT (Network Address Translation) port forwarding, and traffic filtering based on rules and policies. It helps to protect networks from unauthorized access and malicious activities.
  Routing, offers advanced routing functionalities, such as dynamic routing protocols (e.g., OSPF, BGP), static routers, policy-based routing, and multi WAN load balancing. It enables efficient and optimized data routing within networks.
  VPN (Virtual Private Network), support various VPN protocols, including IPsec, Open-VPN, and L2TP/IPsec. It allows secure remote access to networks, site-to-site VPN connections for connecting multiple locations, and VPN client configurations for individual users.

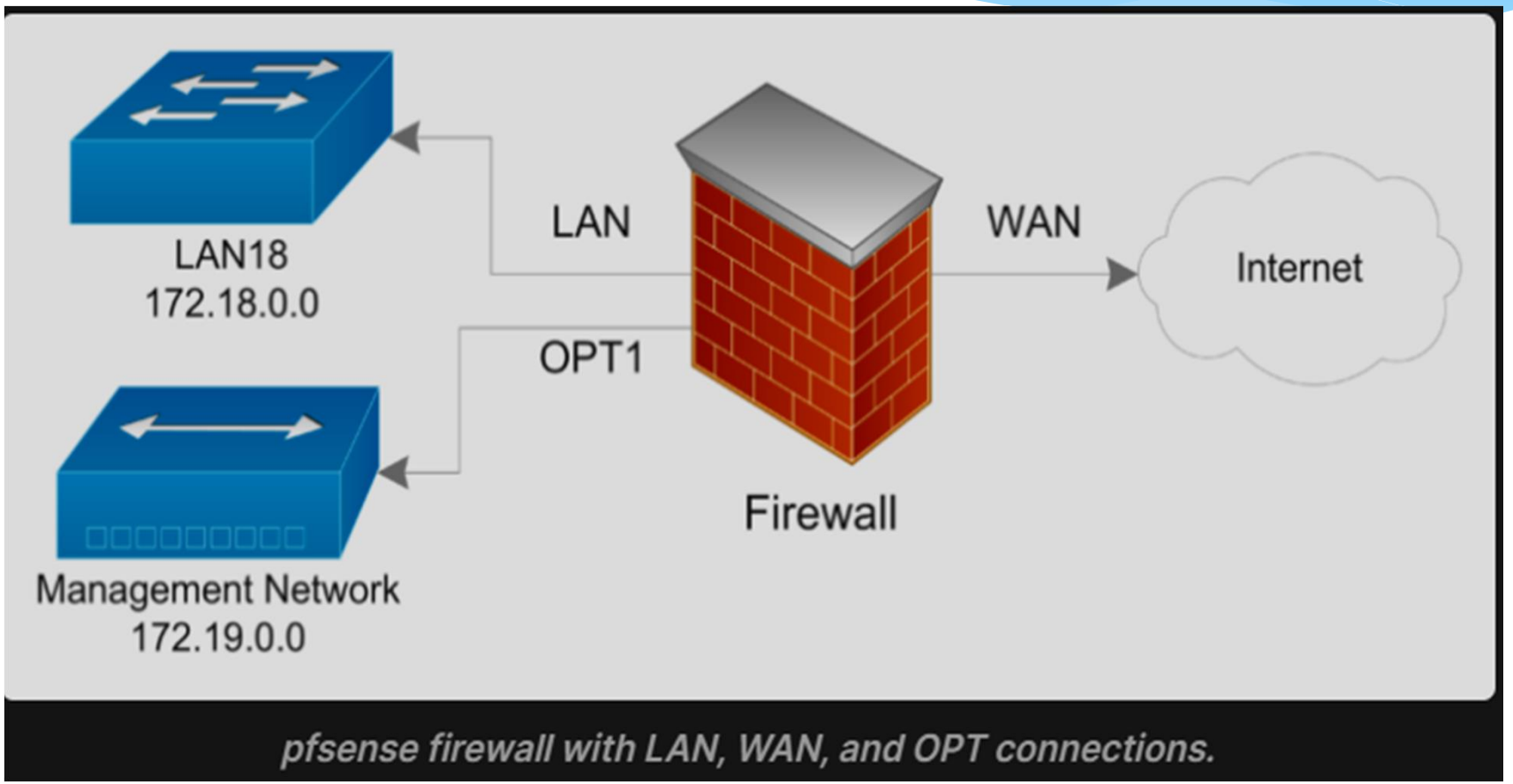

netgate
WAN
LAN
OPT

Key features I

* **Traffic Shaping and QoS (Quality of Service)** pfSense facilities bandwidth management through traffic shaping and QoS mechanisms. It enable prioritization of network traffic, bandwidth allocation, and traffic throttling, ensuring optimal performance for critical applications and services.
High Availability (HA) offers high availability features for mission-critical environments, ensuring continuous network operation and failover protection. It supports active-passive and active-active HA configuration, minimizing downtime and ensuring reliability.
Load Balancing, allows load balancing across multiple WAN connections, distributing network traffic efficiently and optimizing bandwidth utilization. It improves network performance, redundancy, and reliability by spreading the load across available links.

Key features II

* **DNS and DHCP services.** Includes built-in DNS resolver and forwarder services, providing DNS caching, DNSSEC support, and DNS filtering capabilities. It also offers DHCP server and relay functionalities for dynamic IP address assignment within networks
Captive portal, features a captive portal functionality for controlling user access to the internet. It enables authentication, authorization, and accounting for network users, facilitating guest Wi-Fi access and implementing usage policies.
Package system. Includes a package system for extending its functionality with additional features and services. Users can install packages such as Squid Proxy, Snort IDS/IPS, HAProxy, and more to enhance network security and performance.
User-friendly Web Interface. Provides a user-friendly web-based graphical user interface (GUI) for configuration, monitoring, and management. It offers intuitive navigation, real-time monitoring, and extensive logging capabilities for easy administration of network settings.



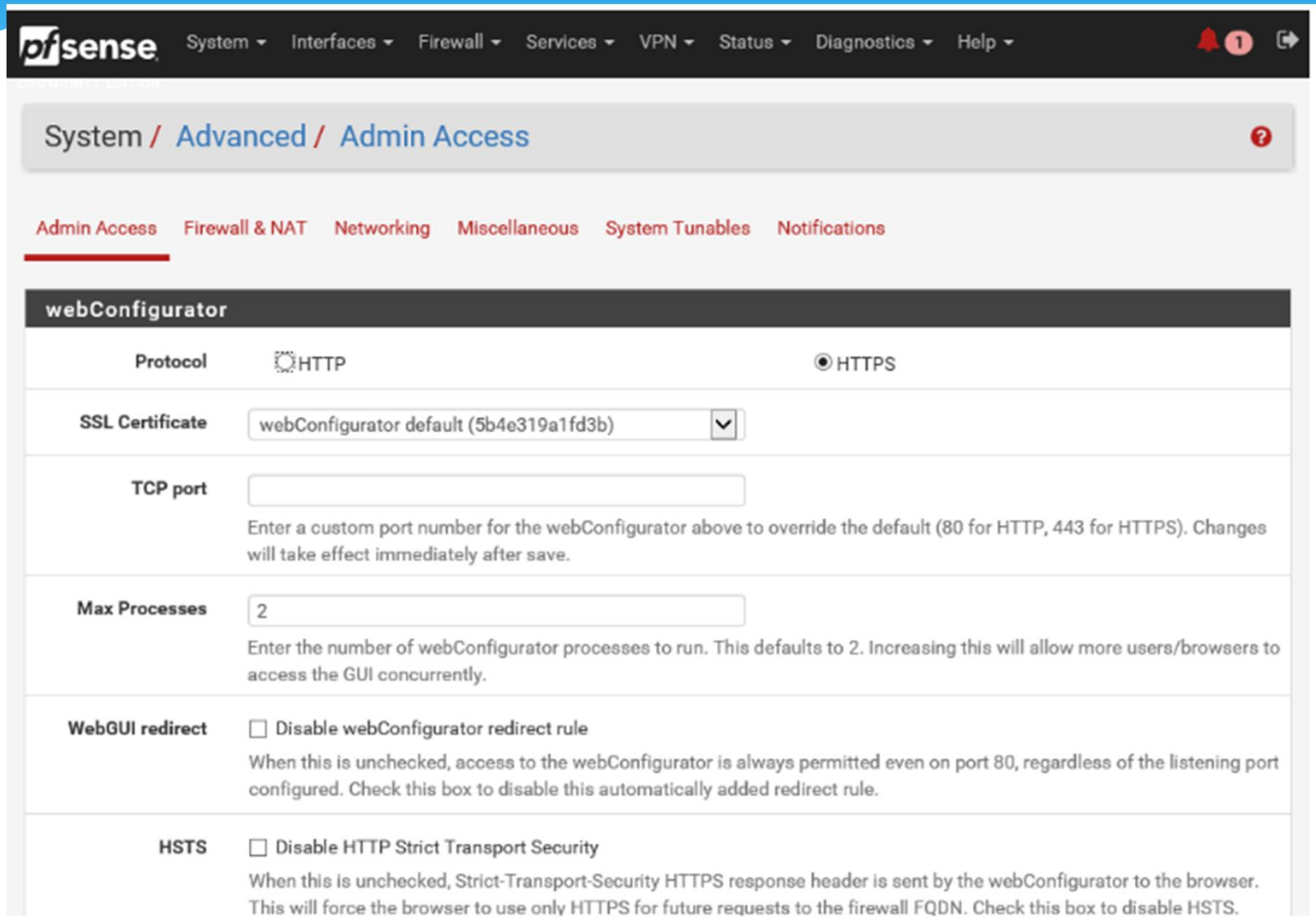
pfsense firewall with LAN, WAN, and OPT connections.

Benefits of pfSense

* **Scalability**, in the context of pfSense, which is an open-source firewall and router platform based on FreeBSD, REFERS to its ability to handle increasing demands as the network grows in terms of traffic volume, number of users, and complexity of network configurations.
* **Flexibility**, is one of the key strengths of pfSense, offering a wide range of features and customization options to meet various networking requirements.
* **Cost-effectiveness,** pfSense is widely regarded as a cost-effective solution for firewall and routing. Stems from its open-source nature, flexibility, scalability, and feature-rich functionality.
* **Community support**, pfSense benefits from a robust and active community of users and contributors who provide various forms of support and resources. Community plays a crucial role in providing support, knowledge sharing, and collaboration opportunities for users at all levels expertise.

Core features of pfSense

* **Firewall capabilities**, is a popular open-source firewall and router distribution based on FreeBSD. It offers a wide range of features and capabilities for network security and management.
* **Routing functionalities**, routing functionalities make pfSense a power platform for building and managing complex network infrastructures, whether it is for small business, large enterprise, or service providers.
* **VPN (Virtual Private Network) support**, offers robust support for Virtual Private Networks (VPNs), allowing secure remote access and site-to-site connectivity. Also offers a comprehensive set of VPN features, making it suitable for both small-scale deployments and large, complex VPN environments. Its flexibility, security, and ease of configuration make it a popular choice for organizations seeking to implement secure remote access and site-to-site connectivity.
* **Traffic shaping and quality of service (QoS),** enable administrators to optimize bandwidth utilization, prioritize critical applications, and ensure a consistent quality of service for users accessing the network.


pfsense
System
Interfaces
Firewall
Services
VPN
Status
Diagnostics
Help
1
System / Advanced / Admin Access
Admin Access
Firewall & NAT
Networking
Miscellaneous
System Tunables
Notifications
webConfigurator
Protocol
HTTP
HTTPS
SSL Certificate
webConfigurator default (5b4e319a1fd3b)
TCP port
Enter a custom port number for the webConfigurator above to override the default (80 for HTTP, 443 for HTTPS). Changes will take effect immediately after save.
Max Processes
2
Enter the number of webConfigurator processes to run. This defaults to 2. Increasing this will allow more users/browsers to access the GUI concurrently.
WebGUI redirect
Disable webConfigurator redirect rule
When this is unchecked, access to the webConfigurator is always permitted even on port 80, regardless of the listening port configured. Check this box to disable this automatically added redirect rule.
HSTS
Disable HTTP Strict Transport Security
When this is unchecked, Strict-Transport-Security HTTPS response header is sent by the webConfigurator to the browser. This will force the browser to use only HTTPS for future requests to the firewall FQDN. Check this box to disable HSTS.

Advanced features of pfsense

* High availability and redundancy
* DNS (Domain Name System) and DHCP (Dynamic Host Configuration Protocol) services
* Intrusion Detection and Prevention Systems (IDPS) integration
* **Hardware Requirements**

Vary depending on factors.
CPU for basic home or small business a modern dual-core (Intel or AMD Ryzen)

Memory at least 2GB | 4GB or more a better performance.

Storage doesn't require much storage, a small SSD or even USB flash drive for installation. SSD are recommended for better performance and reliability.

Network Interface Cards (NICs) at least two network interfaces 1 for WAN and 1 for LAN, for more complex a additional network segments.

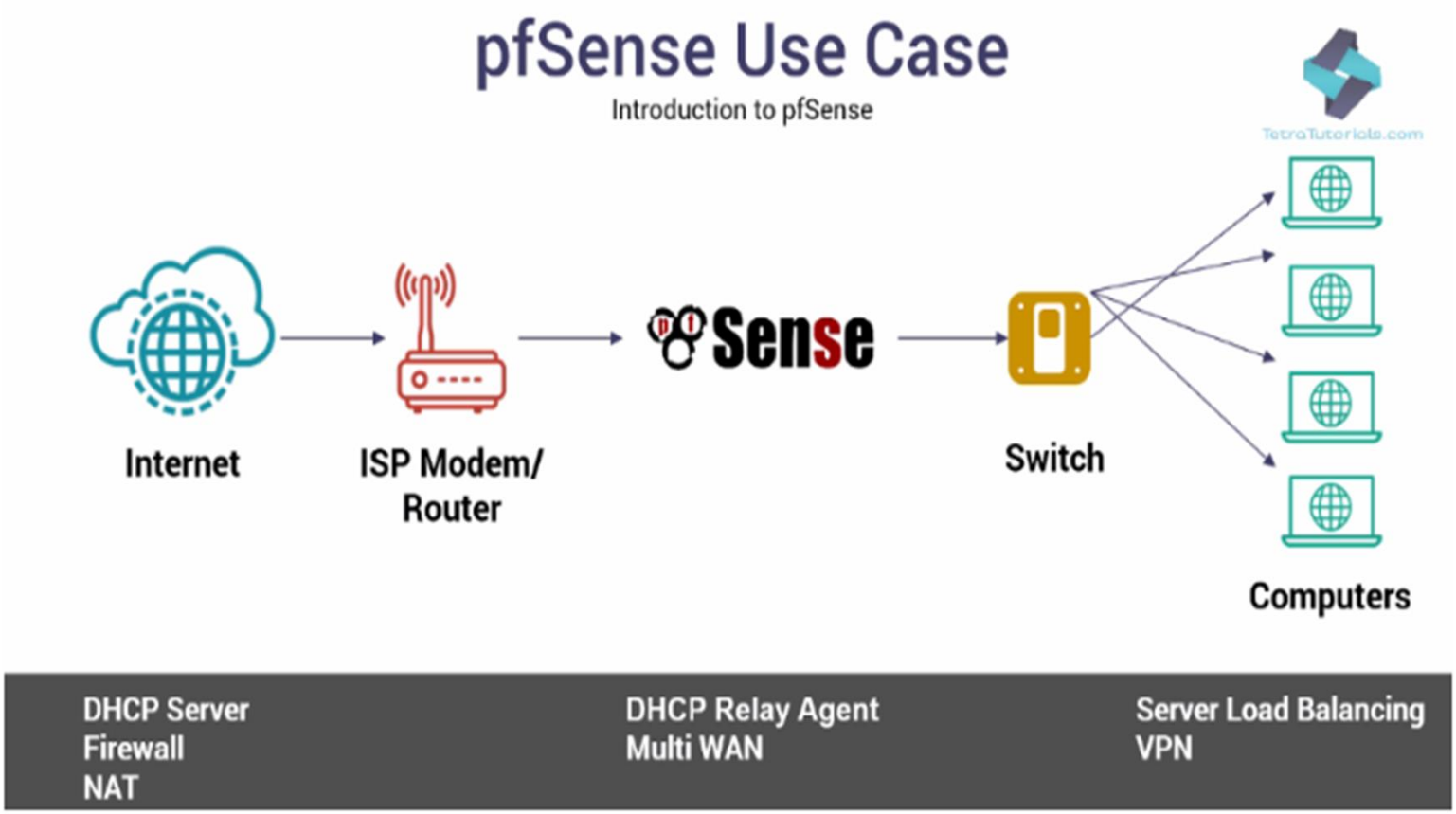
Power Supply and cooling, ensure that the hardware has an adequate power supply and proper cooling to handle continuous operation.

pfSense deployment Scenarios

* Small office/home office (SOHO) environments
* Enterprise networks
* Remote locations and branch offices
* Cloud-based deployments

Use Cases of pfSense

Secure internet gateway
Site-to-site VPN connections
Remote access VPN for telecommuters
Network segmentation and VLANs (Virtual Local Area Network)

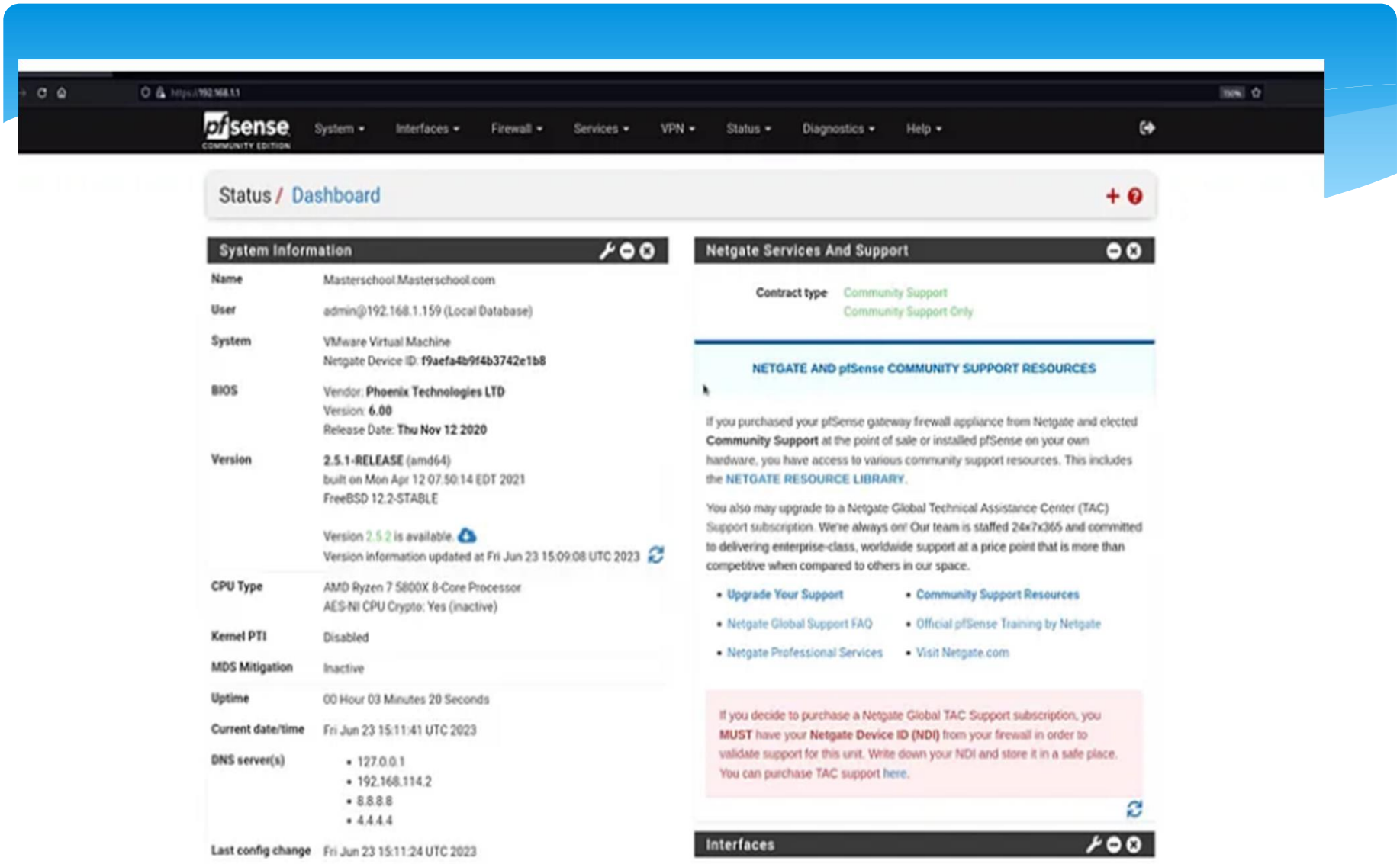

pfSense Use Case
Introduction to pfSense
TetraTutorials.com
Internet
ISP Modem/
Router
Sense
Switch
Computers
DHCP Server
Firewall
NAT
DHCP Relay Agent
Multi WAN
Server Load Balancing
VPN

pfSense Interface Overview

* Web-based graphical user interface (GUI)
* Navigation and menu structure
* Dashboard overview

Package system
introduction to package management
Available packages for extending functionality
Example of commonly used package (e.g., Squid Proxy, Snort IDS/IPS)

Security features of pfSense
Stateful packet filtering
Firewall rules and rules sets
Alias and NAT (Network Address Translation) configurations.


pfsense
COMMUNITY EDITION
System
Interfaces
Firewall
Services
VPN
Status
Diagnostics
Help
Status / Dashboard
System Information
Name
Masterschool.Masterschool.com
User
admin@192.168.1.159 (Local Database)
System
VMware Virtual Machine
Netgate Device ID: f9aefa4b9f4b3742e1b8
BIOS
Vendor: Phoenix Technologies LTD
Version: 6.00
Release Date: Thu Nov 12 2020
Version
2.5.1-RELEASE (amd64)
built on Mon Apr 12 07:50:14 EDT 2021
FreeBSD 12.2-STABLE
Version 2.5.2 is available.
Version information updated at Fri Jun 23 15:09:08 UTC 2023
CPU Type
AMD Ryzen 7 5800X 8-Core Processor
AES-NI CPU Crypto: Yes (inactive)
Kernel PTI
Disabled
MDS Mitigation
Inactive
Uptime
00 Hour 03 Minutes 20 Seconds
Current date/time
Fri Jun 23 15:11:41 UTC 2023
DNS server(s)
127.0.0.1
192.168.114.2
8.8.8.8
4.4.4.4
Last config change
Fri Jun 23 15:11:24 UTC 2023
Netgate Services And Support
Contract type
Community Support
Community Support Only
NETGATE AND pfSense COMMUNITY SUPPORT RESOURCES
If you purchased your pfSense gateway firewall appliance from Netgate and elected Community Support at the point of sale or installed pfSense on your own hardware, you have access to various community support resources. This includes the NETGATE RESOURCE LIBRARY.
You also may upgrade to a Netgate Global Technical Assistance Center (TAC) Support subscription. We're always on! Our team is staffed 24x7x365 and committed to delivering enterprise-class, worldwide support at a price point that is more than competitive when compared to others in our space.
Upgrade Your Support
Community Support Resources
Netgate Global Support FAQ
Official pfSense Training by Netgate
Netgate Professional Services
Visit Netgate.com
If you decide to purchase a Netgate Global TAC Support subscription, you MUST have your Netgate Device ID (NDI) from your firewall in order to validate support for this unit. Write down your NDI and store it in a safe place. You can purchase TAC support here.
Interfaces

Support and Community Resources

* Official pfSense documentation
* Online forums and communities
* Commercial support options

Conclusion

Summary of key points

pfSense serves as a critical component of network infrastructure, providing essential security, routing, and management functionalities that help safeguarding data, ensure reliable connectivity, and optimize network performance. Its flexibility, scalability, and comprehensive feature set make it a popular choice for organizations of all sizes seeking to enhance their network security posture and streamline network operations.


pfsense
World's Leading Open-Source
Firewall, VPN, and Router