

# Lab Assignment



Cybersecurity Professional Program

Linux Security

## Networking and System Management

**LNK-04-L4**

**Service Debugging**

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## Lab Objective

Understand how to troubleshoot service errors by identifying their cause.



## Lab Mission

Install the Apache and Nginx services, and resolve a port conflict.



## Lab Duration

20–30 minutes



## Requirements

- Knowledge of networking, listening ports, and commands.
- Knowledge of Linux commands and configuration files.



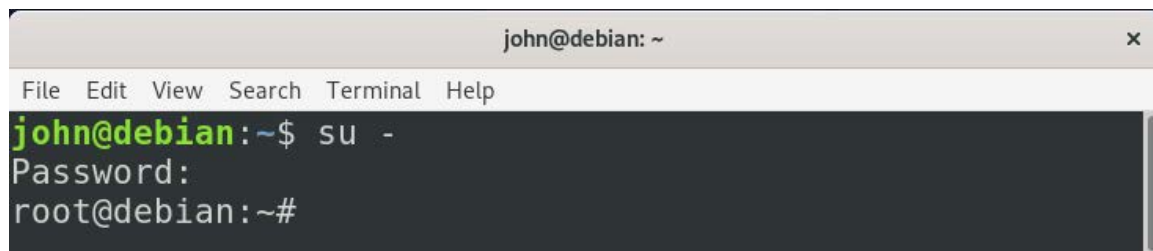
## Resources

- Environment & Tools
  - VirtualBox
    - Debian
  - Nginx
  - Apache

## Lab Task

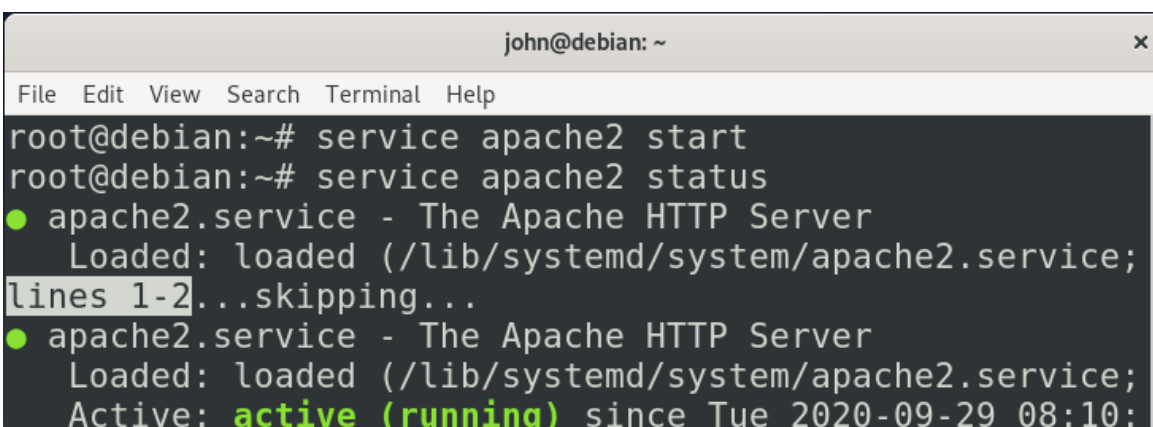
In the following scenario, the Nginx service does not operate.  
Your task is to troubleshoot and solve the issue.

- 1 Open the terminal and use the command **su -** to switch to the root user.



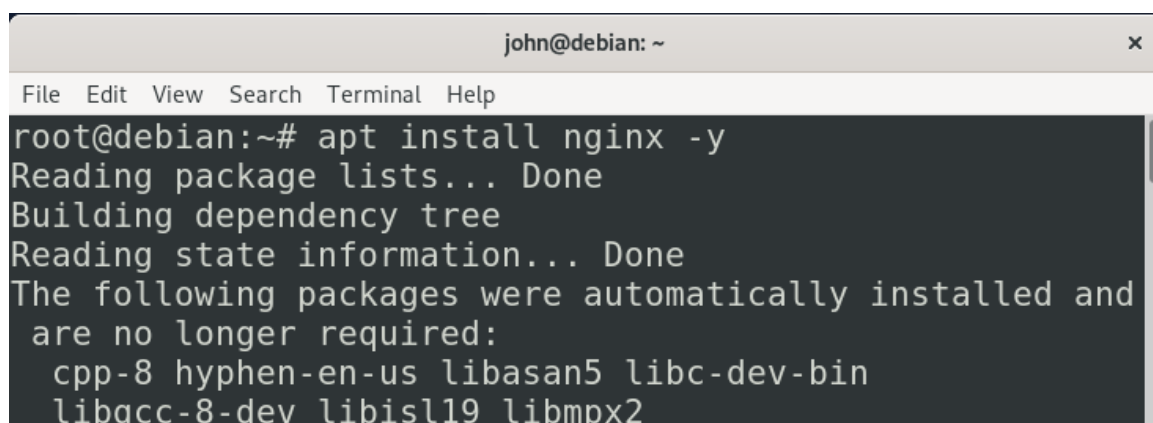
```
john@debian: ~  
File Edit View Search Terminal Help  
john@debian:~$ su -  
Password:  
root@debian:~#
```

- 2 Use the command **service apache2 start** to turn on the Apache2 service. Verify that it is active using the command **service apache2 status**.



```
john@debian: ~  
File Edit View Search Terminal Help  
root@debian:~# service apache2 start  
root@debian:~# service apache2 status  
● apache2.service - The Apache HTTP Server  
   Loaded: loaded (/lib/systemd/system/apache2.service;  
lines 1-2...skipping...  
● apache2.service - The Apache HTTP Server  
   Loaded: loaded (/lib/systemd/system/apache2.service;  
   Active: active (running) since Tue 2020-09-29 08:10:
```

- 3 Use the command **apt install nginx -y** to install the Nginx service. Nginx is a web server, similar to Apache2.



```
john@debian: ~  
File Edit View Search Terminal Help  
root@debian:~# apt install nginx -y  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following packages were automatically installed and  
are no longer required:  
  cpp-8 hyphen-en-us libasan5 libc-dev-bin  
  libgcc-8-dev libisl19 libmpx2
```

- 4 Use the command **service nginx start** to start the **Nginx** service. Note the message that appears.

```
john@debian: ~
File Edit View Search Terminal Help
root@debian:~# service nginx start
Job for nginx.service failed because the control process exited with error code.
See "systemctl status nginx.service" and "journalctl -xe" for details.
root@debian:~#
```

- 5 Use the command **systemctl status nginx.service** as suggested in the output. Note that a message states that port 80 is already in use.

```
john@debian: ~
File Edit View Search Terminal Help
root@debian:~# systemctl status nginx.service
● nginx.service - A high performance web server and a reverse proxy server
   Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
   Active: failed (Result: exit-code) since Tue 2020-09-29 08:24:26 EDT; 36s ago
     Docs: man:nginx(8)
  Process: 4783 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
  Process: 4784 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=1/FAILURE)

Sep 29 08:24:25 debian nginx[4784]: nginx: [emerg] bind() to 0.0.0.0:80 failed (98: Address already in use)
Sep 29 08:24:25 debian nginx[4784]: nginx: [emerg] bind() to [::]:80 failed (98: Address already in use)
Sep 29 08:24:25 debian nginx[4784]: nginx: [emerg] bind() to 0.0.0.0:80 failed (98: Address already in use)
Sep 29 08:24:25 debian nginx[4784]: nginx: [emerg] bind() to [::]:80 failed (98: Address already in use)
Sep 29 08:24:26 debian nginx[4784]: nginx: [emerg] bind() to 0.0.0.0:80 failed (98: Address already in use)
Sep 29 08:24:26 debian nginx[4784]: nginx: [emerg] bind() to [::]:80 failed (98: Address already in use)
Sep 29 08:24:26 debian nginx[4784]: nginx: [emerg] still could not bind()
Sep 29 08:24:26 debian systemd[1]: nginx.service: Control process exited, code=exited, status=1/FAILURE
Sep 29 08:24:26 debian systemd[1]: nginx.service: Failed with result 'exit-code'.
Sep 29 08:24:26 debian systemd[1]: Failed to start A high performance web server and a reverse proxy server.
lines 1-17/17 (END)
```

- 6 Check which service is listening on port 80 using **lsof -i :80**.

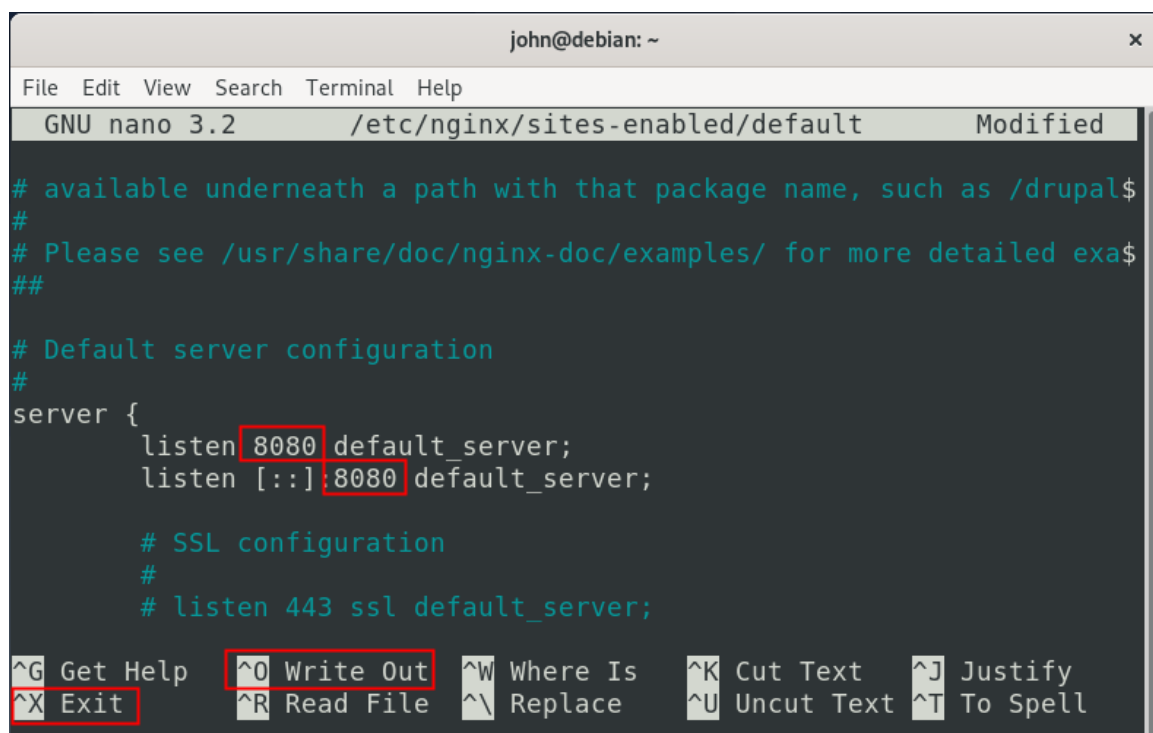
```
john@debian: ~
File Edit View Search Terminal Help
root@debian:~# lsof -i :80
COMMAND  PID    USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
apache2  3825   root    4u    IPv6  38564    0t0  TCP *:http (LISTEN)
apache2  3826 www-data 4u    IPv6  38564    0t0  TCP *:http (LISTEN)
apache2  3827 www-data 4u    IPv6  38564    0t0  TCP *:http (LISTEN)
root@debian:~#
```

- 7 Use the command **nano /etc/nginx/sites-enabled/default** to open the nginx configuration file.



```
john@debian: ~  
File Edit View Search Terminal Help  
root@debian:~# nano /etc/nginx/sites-enabled/default
```

- 8 Scroll down until you see **server {...**, and change port 80 to 8080. Save the file and exit it.



```
john@debian: ~  
File Edit View Search Terminal Help  
GNU nano 3.2 /etc/nginx/sites-enabled/default Modified  
# available underneath a path with that package name, such as /drupal$  
#  
# Please see /usr/share/doc/nginx-doc/examples/ for more detailed exa$  
##  
# Default server configuration  
#  
server {  
    listen 8080 default_server;  
    listen [::]:8080 default_server;  
  
    # SSL configuration  
    #  
    # listen 443 ssl default_server;  
  
^G Get Help    ^O Write Out  ^W Where Is   ^K Cut Text   ^J Justify  
^X Exit        ^R Read File  ^\ Replace    ^U Uncut Text ^T To Spell
```

- 9 Use the command **service nginx start** to start the nginx service. Verify that it is active using the command **service nginx status**.

```
john@debian: ~  
File Edit View Search Terminal Help  
root@debian:~# service nginx start  
root@debian:~# service nginx status  
● nginx.service - A high performance web server and a reverse proxy se  
   Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor  
lines 1-2...skipping...  
● nginx.service - A high performance web server and a reverse proxy se  
   Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor  
   Active: active (running) since Tue 2020-09-29 08:33:27 EDT; 58s ago  
lines 1-3...skipping...
```

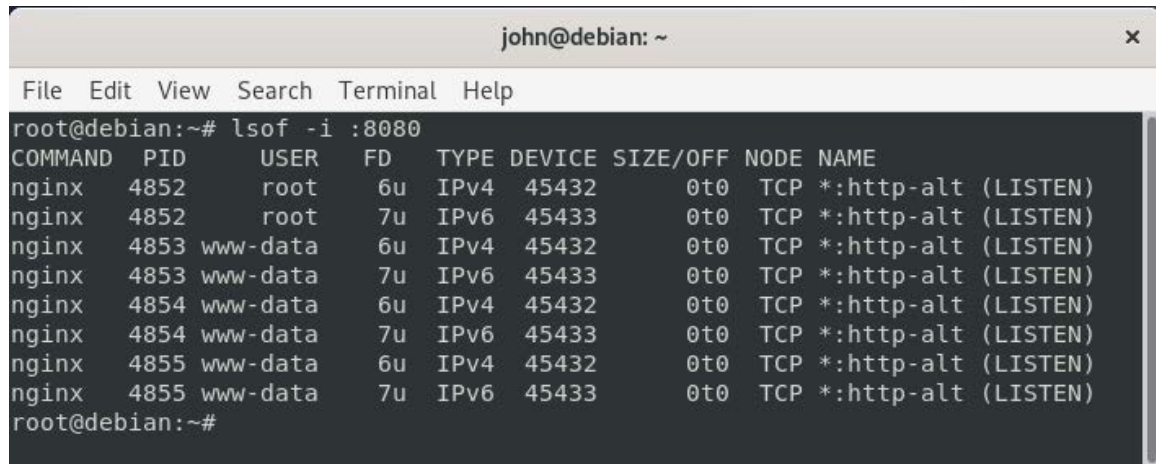
- 10 Verify that the Apache2 service is still active using the command **service apache2 status**.

```
john@debian: ~  
File Edit View Search Terminal Help  
root@debian:~# service apache2 status  
● apache2.service - The Apache HTTP Server  
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendo  
   Active: active (running) since Tue 2020-09-29 08:10:01 EDT; 25min a  
   Docs: https://httpd.apache.org/docs/2.4/  
Main PID: 3825 (apache2)  
   Tasks: 55 (limit: 4689)  
  Memory: 21.5M  
   CGroup: /system.slice/apache2.service  
           └─3825 /usr/sbin/apache2 -k start
```

- 11 Use the command **lsof -i :80** to verify that Apache is listening to port 80.

```
john@debian: ~  
File Edit View Search Terminal Help  
root@debian:~# lsof -i :80  
COMMAND PID    USER  FD  TYPE DEVICE SIZE/OFF NODE NAME  
apache2 3825    root   4u   IPv6 38564      0t0  TCP *:http (LISTEN)  
apache2 3826 www-data 4u   IPv6 38564      0t0  TCP *:http (LISTEN)  
apache2 3827 www-data 4u   IPv6 38564      0t0  TCP *:http (LISTEN)  
root@debian:~# █
```

**12** Use the command **lsof -i :8080** to verify that nginx is listening to port 8080.



```
john@debian: ~  
File Edit View Search Terminal Help  
root@debian:~# lsof -i :8080  
COMMAND  PID    USER  FD  TYPE DEVICE SIZE/OFF NODE NAME  
nginx    4852   root   6u  IPv4 45432    0t0  TCP *:http-alt (LISTEN)  
nginx    4852   root   7u  IPv6 45433    0t0  TCP *:http-alt (LISTEN)  
nginx    4853 www-data 6u  IPv4 45432    0t0  TCP *:http-alt (LISTEN)  
nginx    4853 www-data 7u  IPv6 45433    0t0  TCP *:http-alt (LISTEN)  
nginx    4854 www-data 6u  IPv4 45432    0t0  TCP *:http-alt (LISTEN)  
nginx    4854 www-data 7u  IPv6 45433    0t0  TCP *:http-alt (LISTEN)  
nginx    4855 www-data 6u  IPv4 45432    0t0  TCP *:http-alt (LISTEN)  
nginx    4855 www-data 7u  IPv6 45433    0t0  TCP *:http-alt (LISTEN)  
root@debian:~#
```