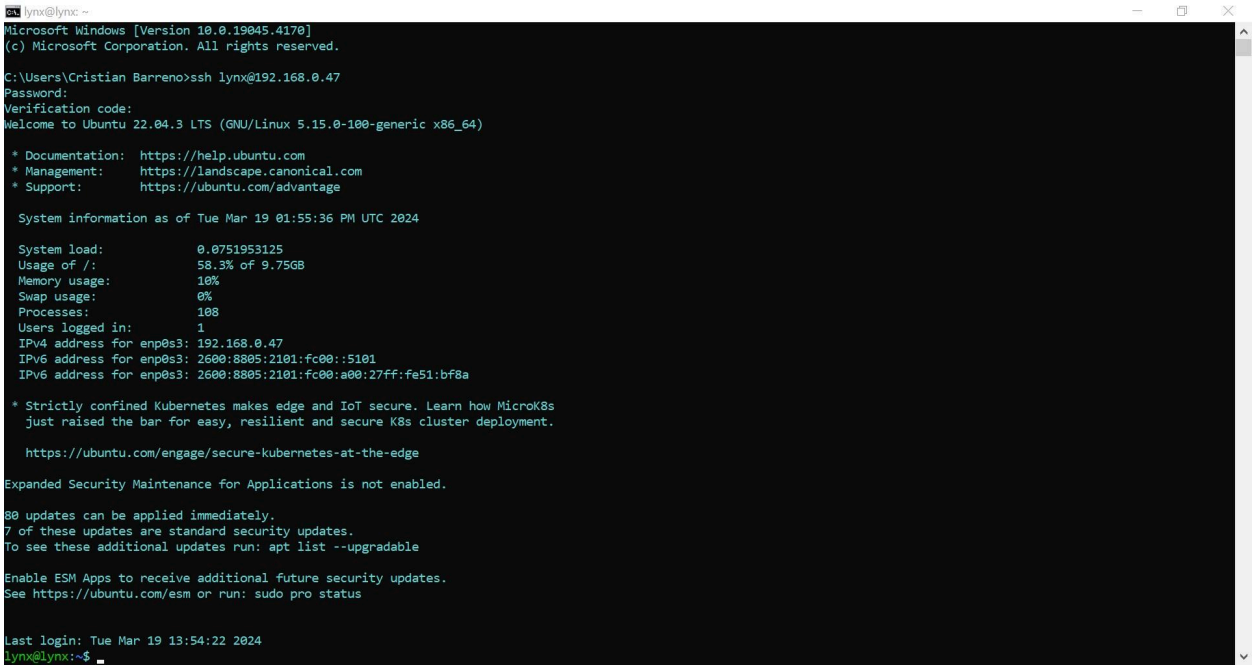
Name: Cristian Barreno

Logwatch Intro

Prerequisites

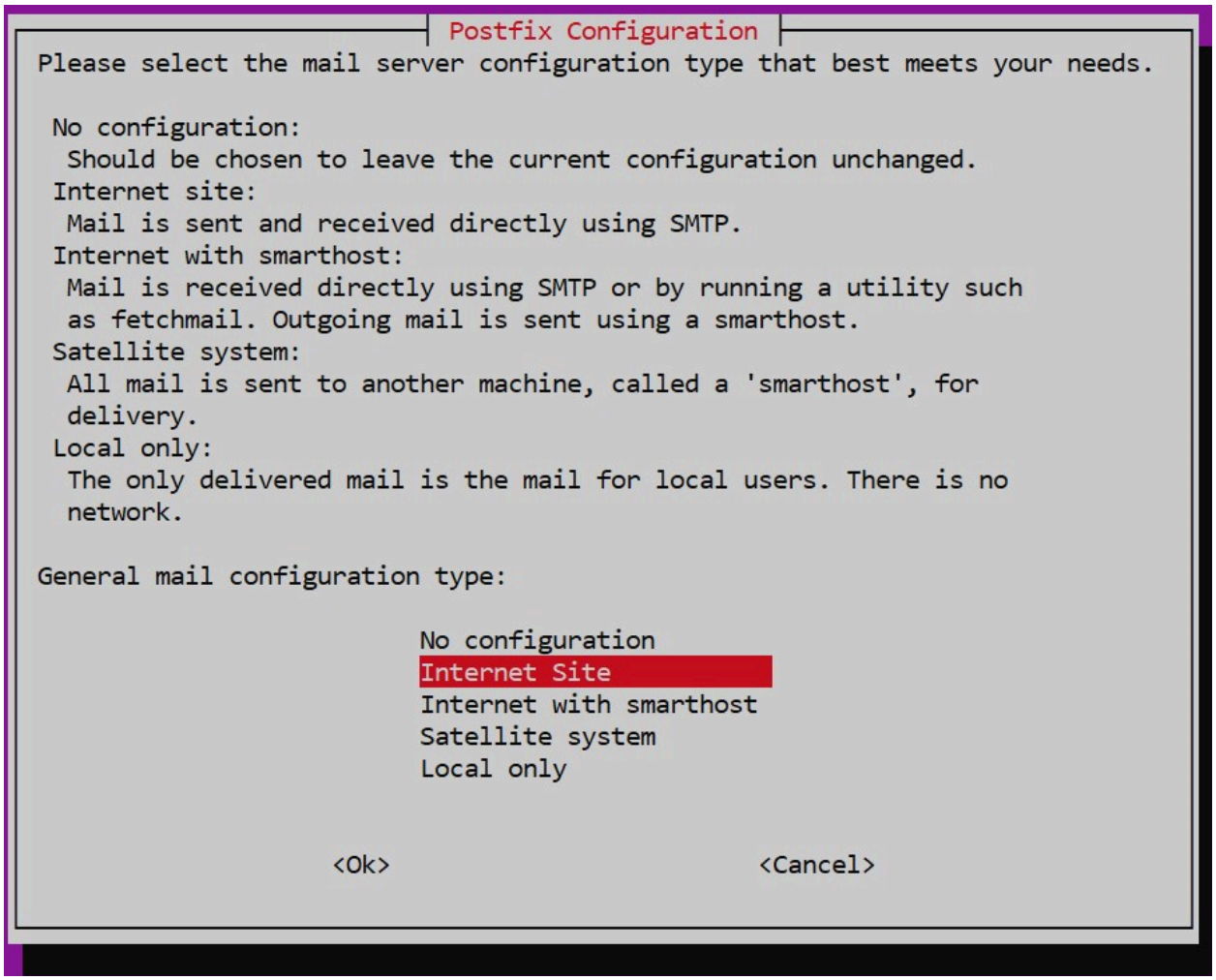
- Ubuntu 22.04 Server Powered up
- Ubuntu Server on Bridged mode
- From Host OS, ssh to the Ubuntu Server

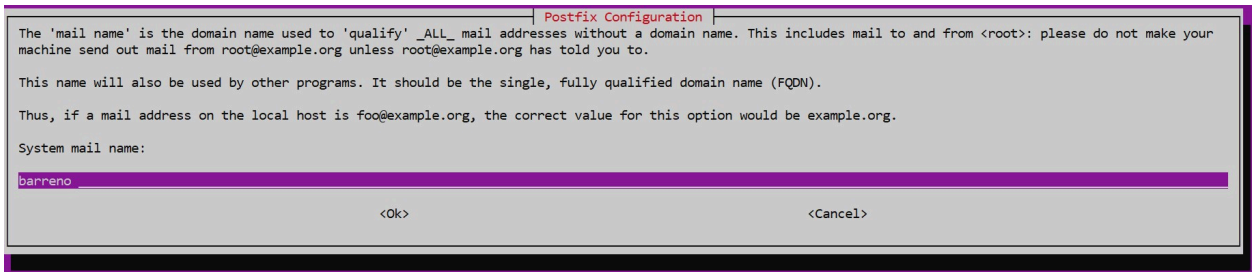


EXERCISE 4 – Installing Logwatch

`sudo apt install logwatch -y`

Using the Advanced Package Tool install the Logwatch application.





```
lynx@lynx:~$ sudo apt install logwatch -y
[sudo] password for lynx:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libdate-manip-perl postfix ssl-cert
Suggested packages:
  libsys-cpu-perl libsys-meminfo-perl procmail postfix-mysql postfix-pgsql postfix-ldap postfix-pcre postfix-lmdb postfix-sqlite sasl2-bin | dovecot-common resolvconf
  postfix-cdb mail-reader postfix-mta-sts-resolver postfix-doc
The following NEW packages will be installed:
  libdate-manip-perl logwatch postfix ssl-cert
0 upgraded, 4 newly installed, 0 to remove and 73 not upgraded.
Need to get 2,589 kB of archives.
After this operation, 19.3 MB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu jammy/main amd64 ssl-cert all 1.1.2 [17.4 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu jammy-updates/main amd64 postfix amd64 3.6.4-1ubuntu1.3 [1,248 kB]
Get:3 http://us.archive.ubuntu.com/ubuntu jammy/main amd64 libdate-manip-perl all 6.86-1 [946 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu jammy/main amd64 logwatch all 7.5.6-1ubuntu1 [378 kB]
Fetched 2,589 kB in 0s (6,071 kB/s)
Preconfiguring packages ...
Selecting previously unselected package ssl-cert.
(Reading database ... 110836 files and directories currently installed.)
Preparing to unpack .../ssl-cert_1.1.2_all.deb ...
Unpacking ssl-cert (1.1.2) ...
Selecting previously unselected package postfix.
Preparing to unpack .../postfix_3.6.4-1ubuntu1.3_amd64.deb ...
Unpacking postfix (3.6.4-1ubuntu1.3) ...
Selecting previously unselected package libdate-manip-perl.
Preparing to unpack .../libdate-manip-perl_6.86-1_all.deb ...
Unpacking libdate-manip-perl (6.86-1) ...
Selecting previously unselected package logwatch.
Preparing to unpack .../logwatch_7.5.6-1ubuntu1_all.deb ...
Unpacking logwatch (7.5.6-1ubuntu1) ...
Setting up ssl-cert (1.1.2) ...
Setting up postfix (3.6.4-1ubuntu1.3) ...
Adding group `postfix' (GID 120) ...
Done.
Adding system user `postfix' (UID 114) ...
Adding new user `postfix' (UID 114) with group `postfix' ...
Not creating home directory `/var/spool/postfix'.
```

EXERCISE 5 – Basic service usage

Create a Detailed Report for a Specific Service
To focus on a particular service, such as SSH, and get more detailed information, you can adjust the detail level and specify the service of interest.

`sudo logwatch --service sshd --detail High --range 'Today' --output stdout`

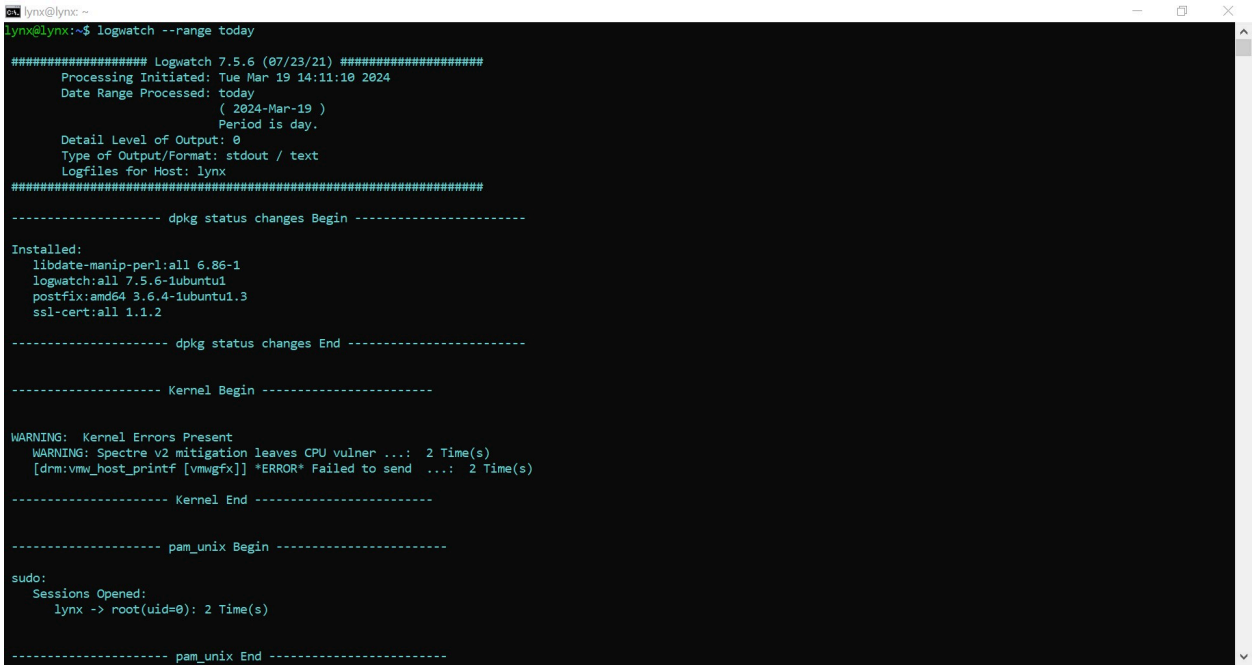
```
lynx@lynx:~$ sudo logwatch --service sshd --detail High --range 'Today' --output stdout

 ################### Logwatch 7.5.6 (07/23/21) ####################
        Processing Initiated: Tue Mar 19 14:07:36 2024
        Date Range Processed: today
                              ( 2024-Mar-19 )
                              Period is day.
        Detail Level of Output: 10
        Type of Output/Format: stdout / text
        Logfiles for Host: lynx
 ##################################################################

 --------------------- SSHD Begin -----------------------

 SSHD Started: 4 Times

 Users logging in through sshd:
    lynx:
       192.168.0.247: 2 Times

 ---------------------- SSHD End ------------------------


 ###################### Logwatch End #########################

lynx@lynx:~$
```

EXERCISE 6 – Examining logs over certain date ranges

Do not copy and paste the following command, it merely gives you options.
`logwatch --range yesterday|today|all|help --detail low|medium|others`

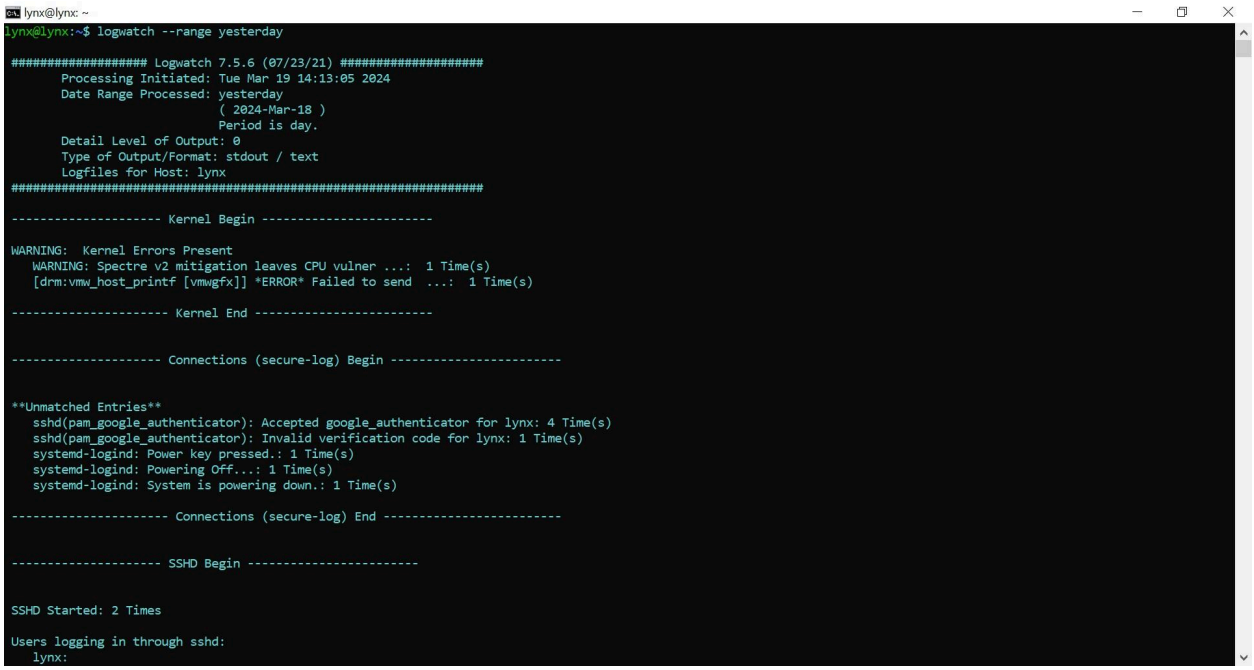
One can mix and match the filters (or queries) to provide the appropriate output you seek.

If I just wanted today's logs:
`logwatch --range today`



If I just wanted yesterday's logs:

`logwatch --range yesterday`

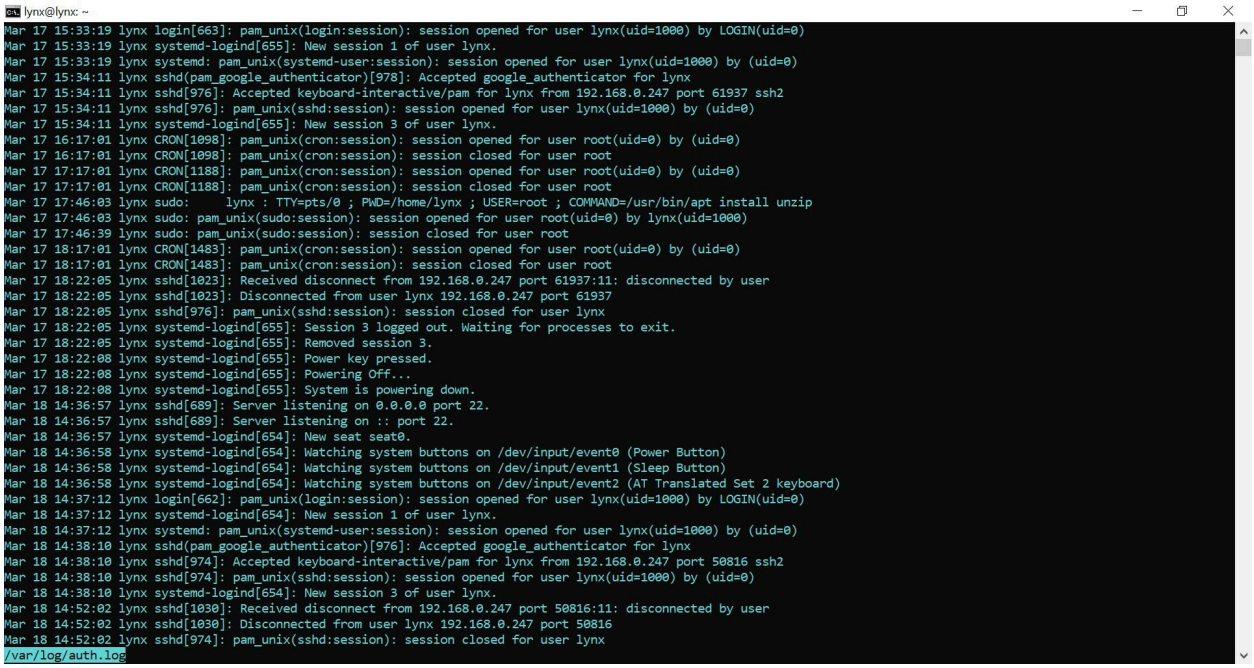


EXERCISE 7 – View the local Auth Log and compare it to the output of Logwatch

Task 1. Review Raw Log Entries

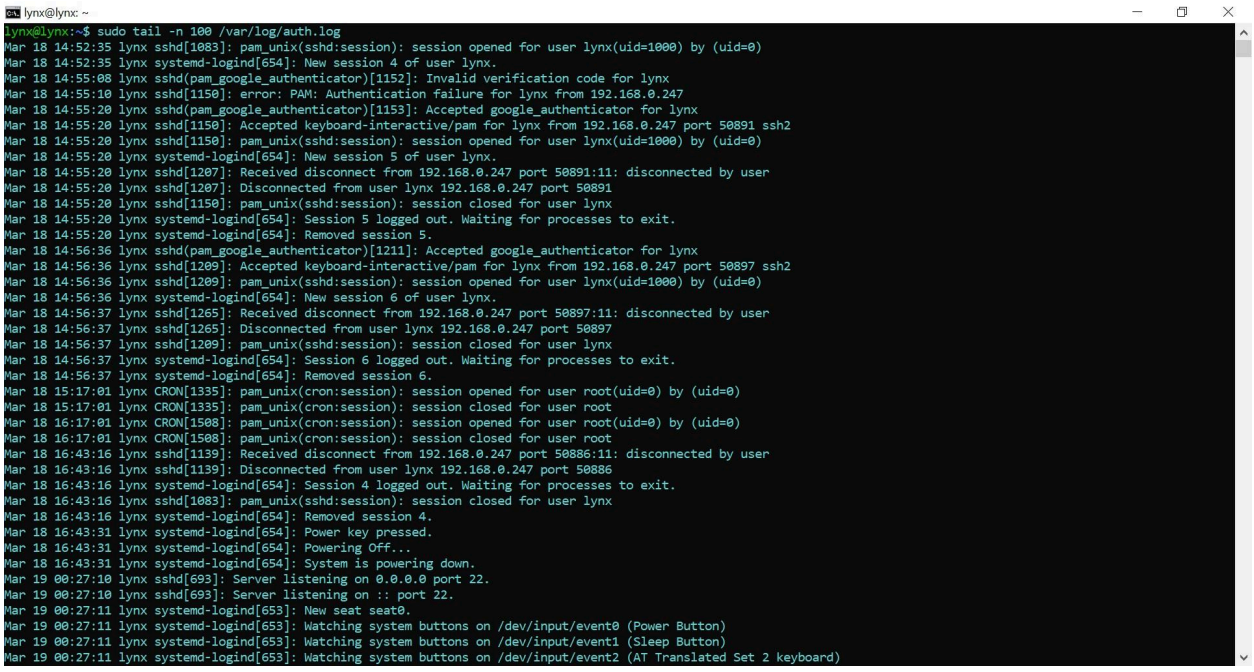
First, inspect the raw log entries in /var/log/auth.log. You can view the contents of this file using a command like less or tail, depending on whether you want to read from the beginning or just see the most recent entries.

`sudo less /var/log/auth.log`



or to see the most recent entries

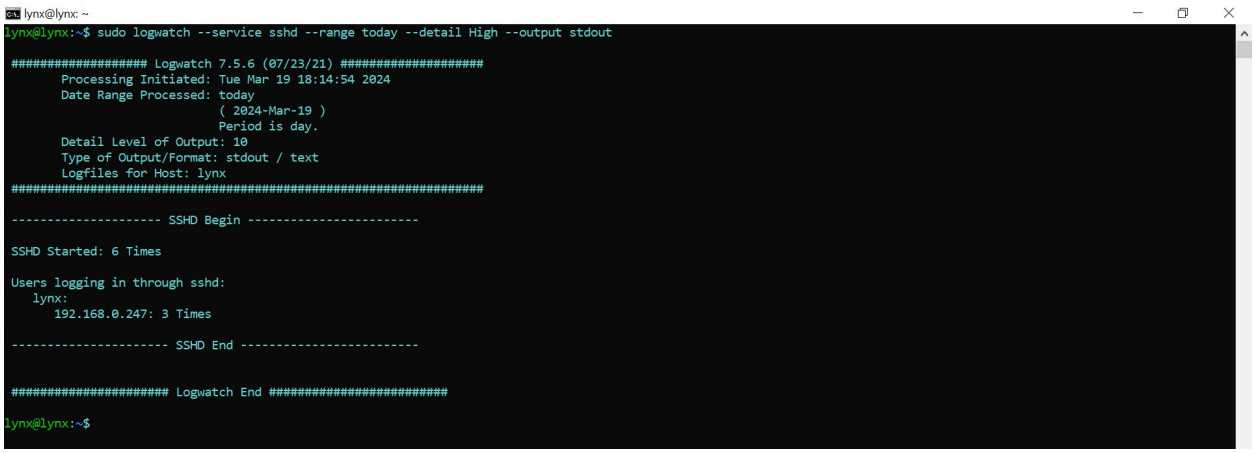
sudo tail -n 100 /var/log/auth.log



2. Generate a Logwatch Report

Next, generate a Logwatch report that includes the authentication logs. You might need to specify the service (`--service sshd` for SSH logs, for example) and ensure the report covers the same date range as the entries you're examining in `auth.log`.

```
sudo logwatch --service sshd --range today --detail High --output stdout
```



This command tells Logwatch to generate a detailed report for SSH-related logs (sshd) from today. Adjust the `--range` parameter as necessary to match the period you're investigating in the raw logs.

3. Compare the Information

With both the raw log entries and the Logwatch report open, you can start comparing the information:

- **Timestamps:** Check that events in the raw logs correspond to entries in the Logwatch report based on their timestamps.
- **Usernames and IP Addresses:** Look for mentions of specific usernames or IP addresses in the Logwatch report that you've seen in the raw logs.
- **Event Descriptions:** Compare the descriptions of events. Logwatch summarizes and categorizes events, so it may present information differently. For example, multiple failed login attempts might be summarized into a single line in the Logwatch report.

lynx@lynx: ~

```
lynx@lynx:~$ sudo logwatch --service sshd --range today --detail High --output stdout

 ################### Logwatch 7.5.6 (07/23/21) ####################
        Processing Initiated: Tue Mar 19 18:14:54 2024
        Date Range Processed: today
                              ( 2024-Mar-19 )
                              Period is day.
        Detail Level of Output: 10
        Type of Output/Format: stdout / text
        Logfiles for Host: lynx
 ##################################################################

 -------------------- SSHD Begin ------------------------

 SSHD Started: 6 Times

 Users logging in through sshd:
    lynx:
       192.168.0.247: 3 Times

 ---------------------- SSHD End ------------------------


 ####################### Logwatch End #########################

lynx@lynx:~$
```

lynx@lynx: ~

```
lynx@lynx:~$ sudo tail -n 100 /var/log/auth.log
Mar 18 14:52:35 lynx sshd[1083]: pam_unix(sshd:session): session opened for user lynx(uid=1000) by (uid=0)
Mar 18 14:52:35 lynx systemd-logind[654]: New session 4 of user lynx.
Mar 18 14:55:08 lynx sshd(pam_google_authenticator)[1152]: Invalid verification code for lynx
Mar 18 14:55:10 lynx sshd[1150]: error: PAM: Authentication failure for lynx from 192.168.0.247
Mar 18 14:55:20 lynx sshd(pam_google_authenticator)[1153]: Accepted google_authenticator for lynx
Mar 18 14:55:20 lynx sshd[1150]: Accepted keyboard-interactive/pam for lynx from 192.168.0.247 port 50891 ssh2
Mar 18 14:55:20 lynx sshd[1150]: pam_unix(sshd:session): session opened for user lynx(uid=1000) by (uid=0)
Mar 18 14:55:20 lynx systemd-logind[654]: New session 5 of user lynx.
Mar 18 14:55:20 lynx sshd[1207]: Received disconnect from 192.168.0.247 port 50891:11: disconnected by user
Mar 18 14:55:20 lynx sshd[1207]: Disconnected from user lynx 192.168.0.247 port 50891
Mar 18 14:55:20 lynx sshd[1150]: pam_unix(sshd:session): session closed for user lynx
Mar 18 14:55:20 lynx systemd-logind[654]: Session 5 logged out. Waiting for processes to exit.
Mar 18 14:55:20 lynx systemd-logind[654]: Removed session 5.
Mar 18 14:56:36 lynx sshd(pam_google_authenticator)[1211]: Accepted google_authenticator for lynx
Mar 18 14:56:36 lynx sshd[1209]: Accepted keyboard-interactive/pam for lynx from 192.168.0.247 port 50897 ssh2
Mar 18 14:56:36 lynx sshd[1209]: pam_unix(sshd:session): session opened for user lynx(uid=1000) by (uid=0)
Mar 18 14:56:36 lynx systemd-logind[654]: New session 6 of user lynx.
Mar 18 14:56:37 lynx sshd[1265]: Received disconnect from 192.168.0.247 port 50897:11: disconnected by user
Mar 18 14:56:37 lynx sshd[1265]: Disconnected from user lynx 192.168.0.247 port 50897
Mar 18 14:56:37 lynx sshd[1209]: pam_unix(sshd:session): session closed for user lynx
Mar 18 14:56:37 lynx systemd-logind[654]: Session 6 logged out. Waiting for processes to exit.
Mar 18 14:56:37 lynx systemd-logind[654]: Removed session 6.
Mar 18 15:17:01 lynx CRON[1335]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
Mar 18 15:17:01 lynx CRON[1335]: pam_unix(cron:session): session closed for user root
Mar 18 16:17:01 lynx CRON[1508]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
Mar 18 16:17:01 lynx CRON[1508]: pam_unix(cron:session): session closed for user root
Mar 18 16:43:16 lynx sshd[1139]: Received disconnect from 192.168.0.247 port 50886:11: disconnected by user
Mar 18 16:43:16 lynx sshd[1139]: Disconnected from user lynx 192.168.0.247 port 50886
Mar 18 16:43:16 lynx systemd-logind[654]: Session 4 logged out. Waiting for processes to exit.
Mar 18 16:43:16 lynx sshd[1083]: pam_unix(sshd:session): session closed for user lynx
Mar 18 16:43:16 lynx systemd-logind[654]: Removed session 4.
Mar 18 16:43:31 lynx systemd-logind[654]: Power key pressed.
Mar 18 16:43:31 lynx systemd-logind[654]: Powering Off...
Mar 18 16:43:31 lynx systemd-logind[654]: System is powering down.
Mar 19 00:27:10 lynx sshd[693]: Server listening on 0.0.0.0 port 22.
Mar 19 00:27:10 lynx sshd[693]: Server listening on :: port 22.
Mar 19 00:27:11 lynx systemd-logind[653]: New seat seat0.
Mar 19 00:27:11 lynx systemd-logind[653]: Watching system buttons on /dev/input/event0 (Power Button)
Mar 19 00:27:11 lynx systemd-logind[653]: Watching system buttons on /dev/input/event1 (Sleep Button)
Mar 19 00:27:11 lynx systemd-logind[653]: Watching system buttons on /dev/input/event2 (AT Translated Set 2 keyboard)
```

```
lynx@lynx: ~
Mar 17 15:33:19 lynx login[663]: pam_unix(login:session): session opened for user lynx(uid=1000) by LOGIN(uid=0)
Mar 17 15:33:19 lynx systemd-logind[655]: New session 1 of user lynx.
Mar 17 15:33:19 lynx systemd: pam_unix(systemd-user:session): session opened for user lynx(uid=1000) by (uid=0)
Mar 17 15:34:11 lynx sshd(pam_google_authenticator)[978]: Accepted google_authenticator for lynx
Mar 17 15:34:11 lynx sshd[976]: Accepted keyboard-interactive/pam for lynx from 192.168.0.247 port 61937 ssh2
Mar 17 15:34:11 lynx sshd[976]: pam_unix(sshd:session): session opened for user lynx(uid=1000) by (uid=0)
Mar 17 15:34:11 lynx systemd-logind[655]: New session 3 of user lynx.
Mar 17 16:17:01 lynx CRON[1098]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
Mar 17 16:17:01 lynx CRON[1098]: pam_unix(cron:session): session closed for user root
Mar 17 17:17:01 lynx CRON[1188]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
Mar 17 17:17:01 lynx CRON[1188]: pam_unix(cron:session): session closed for user root
Mar 17 17:46:03 lynx sudo:     lynx : TTY=pts/0 ; PWD=/home/lynx ; USER=root ; COMMAND=/usr/bin/apt install unzip
Mar 17 17:46:03 lynx sudo: pam_unix(sudo:session): session opened for user root(uid=0) by lynx(uid=1000)
Mar 17 17:46:39 lynx sudo: pam_unix(sudo:session): session closed for user root
Mar 17 18:17:01 lynx CRON[1483]: pam_unix(cron:session): session opened for user root(uid=0) by (uid=0)
Mar 17 18:17:01 lynx CRON[1483]: pam_unix(cron:session): session closed for user root
Mar 17 18:22:05 lynx sshd[1023]: Received disconnect from 192.168.0.247 port 61937:11: disconnected by user
Mar 17 18:22:05 lynx sshd[1023]: Disconnected from user lynx 192.168.0.247 port 61937
Mar 17 18:22:05 lynx sshd[976]: pam_unix(sshd:session): session closed for user lynx
Mar 17 18:22:05 lynx systemd-logind[655]: Session 3 logged out. Waiting for processes to exit.
Mar 17 18:22:05 lynx systemd-logind[655]: Removed session 3.
Mar 17 18:22:08 lynx systemd-logind[655]: Power key pressed.
Mar 17 18:22:08 lynx systemd-logind[655]: Powering Off...
Mar 17 18:22:08 lynx systemd-logind[655]: System is powering down.
Mar 18 14:36:57 lynx sshd[689]: Server listening on 0.0.0.0 port 22.
Mar 18 14:36:57 lynx sshd[689]: Server listening on :: port 22.
Mar 18 14:36:57 lynx systemd-logind[654]: New seat seat0.
Mar 18 14:36:58 lynx systemd-logind[654]: Watching system buttons on /dev/input/event0 (Power Button)
Mar 18 14:36:58 lynx systemd-logind[654]: Watching system buttons on /dev/input/event1 (Sleep Button)
Mar 18 14:36:58 lynx systemd-logind[654]: Watching system buttons on /dev/input/event2 (AT Translated Set 2 keyboard)
Mar 18 14:37:12 lynx login[662]: pam_unix(login:session): session opened for user lynx(uid=1000) by LOGIN(uid=0)
Mar 18 14:37:12 lynx systemd-logind[654]: New session 1 of user lynx.
Mar 18 14:37:12 lynx systemd: pam_unix(systemd-user:session): session opened for user lynx(uid=1000) by (uid=0)
Mar 18 14:38:10 lynx sshd(pam_google_authenticator)[976]: Accepted google_authenticator for lynx
Mar 18 14:38:10 lynx sshd[974]: Accepted keyboard-interactive/pam for lynx from 192.168.0.247 port 50816 ssh2
Mar 18 14:38:10 lynx sshd[974]: pam_unix(sshd:session): session opened for user lynx(uid=1000) by (uid=0)
Mar 18 14:38:10 lynx systemd-logind[654]: New session 3 of user lynx.
Mar 18 14:52:02 lynx sshd[1030]: Received disconnect from 192.168.0.247 port 50816:11: disconnected by user
Mar 18 14:52:02 lynx sshd[1030]: Disconnected from user lynx 192.168.0.247 port 50816
Mar 18 14:52:02 lynx sshd[974]: pam_unix(sshd:session): session closed for user lynx
/var/log/auth.log
```

TCPDump

Basic Usage

Capture packets on an interface: `tcpdump -i enp0s3`

```
lynx@lynx: ~
lynx@lynx:~$ sudo tcpdump -i enp0s3
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
20:42:42.228308 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 3123675921:3123676029, ack 4109583206, win 501, length 108
20:42:42.228428 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 108:272, ack 1, win 501, length 164
20:42:42.228487 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 108, win 4100, length 0
20:42:42.228537 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 272:340, ack 1, win 501, length 68
20:42:42.228635 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 340:376, ack 1, win 501, length 36
20:42:42.228667 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 340, win 4106, length 0
20:42:42.269271 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 376, win 4106, length 0
20:42:42.329094 IP lynx.51355 > cdns1.cox.net.domain: 33309+ [1au] PTR? 247.0.168.192.in-addr.arpa. (55)
20:42:42.344644 IP cdns1.cox.net.domain > lynx.51355: 33309 NXDomain 0/0/1 (55)
20:42:42.344841 IP lynx.51355 > cdns1.cox.net.domain: 33309+ PTR? 247.0.168.192.in-addr.arpa. (44)
20:42:42.361028 IP cdns1.cox.net.domain > lynx.51355: 33309 NXDomain 0/0/0 (44)
20:42:42.362287 IP lynx.36895 > cdns1.cox.net.domain: 51505+ [1au] PTR? 47.0.168.192.in-addr.arpa. (54)
20:42:42.376060 IP cdns1.cox.net.domain > lynx.36895: 51505 NXDomain 0/0/1 (54)
20:42:42.376263 IP lynx.36895 > cdns1.cox.net.domain: 51505+ PTR? 47.0.168.192.in-addr.arpa. (43)
20:42:42.387944 IP cdns1.cox.net.domain > lynx.36895: 51505 NXDomain 0/0/0 (43)
20:42:42.389103 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 376:540, ack 1, win 501, length 164
20:42:42.389836 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 540:576, ack 1, win 501, length 36
20:42:42.390274 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 576, win 4105, length 0
20:42:42.390393 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 576:716, ack 1, win 501, length 140
20:42:42.390837 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 716:752, ack 1, win 501, length 36
20:42:42.391446 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 752, win 4104, length 0
20:42:42.391692 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 752:876, ack 1, win 501, length 124
20:42:42.392101 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 876:912, ack 1, win 501, length 36
20:42:42.392327 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 912:1052, ack 1, win 501, length 140
20:42:42.392793 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 912, win 4104, length 0
20:42:42.393038 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1052:1088, ack 1, win 501, length 36
20:42:42.393447 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1088, win 4103, length 0
20:42:42.393643 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1088:1228, ack 1, win 501, length 140
20:42:42.394038 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1228:1264, ack 1, win 501, length 36
20:42:42.394252 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1264:1388, ack 1, win 501, length 124
20:42:42.394529 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1264, win 4102, length 0
20:42:42.394765 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1388:1424, ack 1, win 501, length 36
20:42:42.395191 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1424, win 4102, length 0
20:42:42.395339 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1424:1548, ack 1, win 501, length 124
20:42:42.395710 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1548:1584, ack 1, win 501, length 36
20:42:42.396140 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1584, win 4101, length 0
20:42:42.431356 IP lynx.56360 > cdns1.cox.net.domain: 58268+ [1au] PTR? 11.28.105.68.in-addr.arpa. (54)
20:42:42.446351 IP cdns1.cox.net.domain > lynx.56360: 58268 1/0/1 PTR cdns1.cox.net. (81)
```

Capture only N packets: `tcpdump -c N -i enp0s3`

```
lynx@lynx: ~
lynx@lynx:~$ sudo tcpdump -c 5 -i enp0s3
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
20:50:23.567288 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 3123848461:3123848569, ack 4109590850, win 501, length 108
20:50:23.567411 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 108:272, ack 1, win 501, length 164
20:50:23.567470 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 108, win 4105, length 0
20:50:23.567522 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 272:340, ack 1, win 501, length 68
20:50:23.567620 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 340:376, ack 1, win 501, length 36
5 packets captured
28 packets received by filter
0 packets dropped by kernel
lynx@lynx:~$
```

Display captured packets in verbose mode: `tcpdump -v -i enp0s3`

```
lynx@lynx: ~
lynx@lynx:~$ sudo tcpdump -v -i enp0s3
tcpdump: listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
20:54:47.407664 IP (tos 0x10, ttl 64, id 31488, offset 0, flags [DF], proto TCP (6), length 84)
    lynx.ssh > 192.168.0.247.54444: Flags [P.], cksum 0x82bd (incorrect -> 0x45c6), seq 3132527937:3132527981, ack 4109598750, win 501, length 44
20:54:47.407750 IP (tos 0x10, ttl 64, id 31489, offset 0, flags [DF], proto TCP (6), length 100)
    lynx.ssh > 192.168.0.247.54444: Flags [P.], cksum 0x82cd (incorrect -> 0xb5c9), seq 44:104, ack 1, win 501, length 60
20:54:47.407896 IP (tos 0x0, ttl 128, id 1609, offset 0, flags [DF], proto TCP (6), length 40)
    192.168.0.247.54444 > lynx.ssh: Flags [.], cksum 0x835e (correct), ack 44, win 4102, length 0
20:54:47.407908 IP (tos 0x10, ttl 64, id 31490, offset 0, flags [DF], proto TCP (6), length 108)
    lynx.ssh > 192.168.0.247.54444: Flags [P.], cksum 0x82d5 (incorrect -> 0x53d3), seq 104:172, ack 1, win 501, length 68
20:54:47.408012 IP (tos 0x10, ttl 64, id 31491, offset 0, flags [DF], proto TCP (6), length 144)
    lynx.ssh > 192.168.0.247.54444: Flags [P.], cksum 0x82f9 (incorrect -> 0xa7ad), seq 172:276, ack 1, win 501, length 104
20:54:47.408091 IP (tos 0x0, ttl 128, id 1610, offset 0, flags [DF], proto TCP (6), length 40)
    192.168.0.247.54444 > lynx.ssh: Flags [.], cksum 0x82df (correct), ack 172, win 4101, length 0
20:54:47.448223 IP (tos 0x0, ttl 128, id 1611, offset 0, flags [DF], proto TCP (6), length 40)
    192.168.0.247.54444 > lynx.ssh: Flags [.], cksum 0x8277 (correct), ack 276, win 4101, length 0
20:54:47.507415 IP (tos 0x10, ttl 64, id 31492, offset 0, flags [DF], proto TCP (6), length 172)
    lynx.ssh > 192.168.0.247.54444: Flags [P.], cksum 0x8315 (incorrect -> 0xedf0), seq 276:408, ack 1, win 501, length 132
20:54:47.507596 IP (tos 0x10, ttl 64, id 31493, offset 0, flags [DF], proto TCP (6), length 76)
    lynx.ssh > 192.168.0.247.54444: Flags [P.], cksum 0x82b5 (incorrect -> 0x7737), seq 408:444, ack 1, win 501, length 36
20:54:47.507730 IP (tos 0x0, ttl 128, id 1612, offset 0, flags [DF], proto TCP (6), length 40)
    192.168.0.247.54444 > lynx.ssh: Flags [.], cksum 0x81d0 (correct), ack 444, win 4100, length 0
20:54:47.507852 IP (tos 0x0, ttl 64, id 11517, offset 0, flags [none], proto UDP (17), length 83)
    lynx.56011 > cdns1.cox.net.domain: 28795+ [1au] PTR? 247.0.168.192.in-addr.arpa. (55)
20:54:47.526334 IP (tos 0x0, ttl 60, id 10523, offset 0, flags [DF], proto UDP (17), length 83)
    cdns1.cox.net.domain > lynx.56011: 28795 NXDomain 0/0/1 (55)
20:54:47.526441 IP (tos 0x0, ttl 64, id 11518, offset 0, flags [none], proto UDP (17), length 72)
    lynx.56011 > cdns1.cox.net.domain: 28795+ PTR? 247.0.168.192.in-addr.arpa. (44)
20:54:47.554190 IP (tos 0x0, ttl 60, id 10537, offset 0, flags [DF], proto UDP (17), length 72)
    cdns1.cox.net.domain > lynx.56011: 28795 NXDomain 0/0/0 (44)
20:54:47.555963 IP (tos 0x0, ttl 64, id 10660, offset 0, flags [none], proto UDP (17), length 82)
    lynx.53125 > cdns1.cox.net.domain: 38815+ [1au] PTR? 47.0.168.192.in-addr.arpa. (54)
20:54:47.571236 IP (tos 0x0, ttl 60, id 62699, offset 0, flags [DF], proto UDP (17), length 82)
    cdns1.cox.net.domain > lynx.53125: 38815 NXDomain 0/0/1 (54)
20:54:47.571525 IP (tos 0x0, ttl 64, id 10661, offset 0, flags [none], proto UDP (17), length 71)
    lynx.53125 > cdns1.cox.net.domain: 38815+ PTR? 47.0.168.192.in-addr.arpa. (43)
20:54:47.584123 IP (tos 0x0, ttl 60, id 62708, offset 0, flags [DF], proto UDP (17), length 71)
    cdns1.cox.net.domain > lynx.53125: 38815 NXDomain 0/0/0 (43)
20:54:47.585661 IP (tos 0x10, ttl 64, id 31494, offset 0, flags [DF], proto TCP (6), length 220)
    lynx.ssh > 192.168.0.247.54444: Flags [P.], cksum 0x8345 (incorrect -> 0x77ca), seq 444:624, ack 1, win 501, length 180
20:54:47.586269 IP (tos 0x10, ttl 64, id 31495, offset 0, flags [DF], proto TCP (6), length 76)
```

Write captured packets to a file: `tcpdump -w file.pcap -i enp0s3`

```
lynx@lynx: ~
lynx@lynx:~$ sudo tcpdump -w file.pcap -i enp0s3
tcpdump: listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
^C10 packets captured
12 packets received by filter
0 packets dropped by kernel
lynx@lynx:~$
```

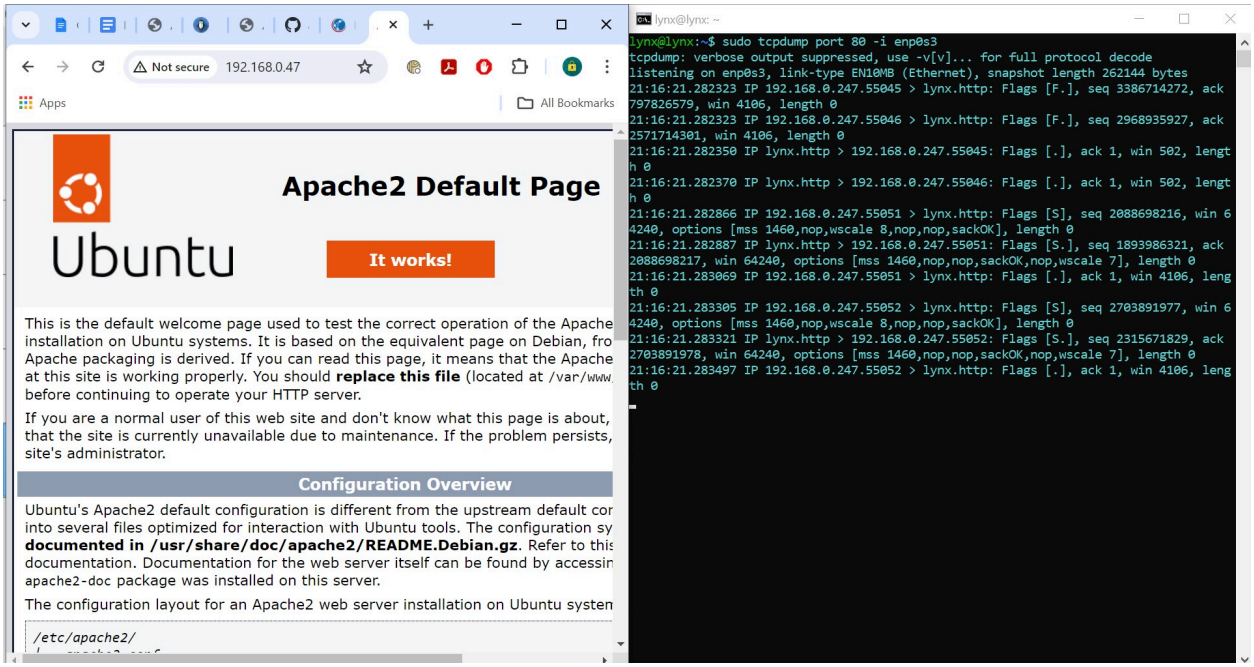
Read packets from a file: `tcpdump -r file.pcap`

```
lynx@lynx: ~
lynx@lynx:~$ sudo tcpdump -r file.pcap
reading from file file.pcap, link-type EN10MB (Ethernet), snapshot length 262144
21:07:14.022212 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 3132579893:3132579937, ack 4109605790, win 501, length 44
21:07:14.022270 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 44:104, ack 1, win 501, length 60
21:07:14.022386 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 44, win 4100, length 0
21:07:14.022395 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 104:172, ack 1, win 501, length 68
21:07:14.022450 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 172:276, ack 1, win 501, length 104
21:07:14.022519 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 172, win 4106, length 0
21:07:14.062318 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 276, win 4105, length 0
21:07:15.380190 IP6 _gateway > ip6-allnodes: ICMP6, router advertisement, length 80
21:07:15.390985 IP6 lynx > ff02::16: HBH ICMP6, multicast listener report v2, 2 group record(s), length 48
21:07:15.475198 IP6 lynx > ff02::16: HBH ICMP6, multicast listener report v2, 2 group record(s), length 48
lynx@lynx:~$
```

Use Cases and Examples

1. Monitoring Specific Ports

- Capture HTTP traffic: **`tcpdump port 80 -i enp0s3`**
- This is useful for troubleshooting web server issues or inspecting HTTP request and response headers.



2. Capturing Packets from Specific IP

- Capture traffic from a specific IP: **`tcpdump src host 192.168.0.47 -i enp0s3`**
- This can help in analyzing traffic from a suspicious source or debugging network issues related to a specific device.

```
lynx@lynx:~$ sudo tcpdump src host 192.168.0.47 -i enp0s3
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
21:26:25.215384 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 3132768861:3132768969, ack 4109615934, win 501, length 108
21:26:25.215620 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 108:204, ack 1, win 501, length 96
21:26:25.215765 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 204:272, ack 1, win 501, length 68
21:26:25.215908 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 272:340, ack 1, win 501, length 68
21:26:25.216027 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 340:376, ack 1, win 501, length 36
21:26:25.316394 IP lynx.45652 > cdns1.cox.net.domain: 7565+ [1au] PTR? 247.0.168.192.in-addr.arpa. (55)
21:26:25.339348 IP lynx.45652 > cdns1.cox.net.domain: 7565+ PTR? 247.0.168.192.in-addr.arpa. (44)
21:26:25.353505 IP lynx.48458 > cdns1.cox.net.domain: 17616+ [1au] PTR? 47.0.168.192.in-addr.arpa. (54)
21:26:25.368294 IP lynx.48458 > cdns1.cox.net.domain: 17616+ PTR? 47.0.168.192.in-addr.arpa. (43)
21:26:25.386461 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 376:540, ack 1, win 501, length 164
21:26:25.386745 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 540:576, ack 1, win 501, length 36
21:26:25.387049 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 576:716, ack 1, win 501, length 140
21:26:25.387202 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 716:752, ack 1, win 501, length 36
21:26:25.387279 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 752:892, ack 1, win 501, length 140
21:26:25.387486 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 892:928, ack 1, win 501, length 36
21:26:25.387579 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 928:1068, ack 1, win 501, length 140
21:26:25.387763 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1068:1104, ack 1, win 501, length 36
21:26:25.387858 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1104:1244, ack 1, win 501, length 140
21:26:25.388087 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1244:1280, ack 1, win 501, length 36
21:26:25.419793 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1280:1420, ack 1, win 501, length 140
21:26:25.420043 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1420:1456, ack 1, win 501, length 36
21:26:25.420123 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1456:1588, ack 1, win 501, length 132
21:26:25.420319 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1588:1624, ack 1, win 501, length 36
21:26:25.420729 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1624:1764, ack 1, win 501, length 140
21:26:25.420889 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1764:1800, ack 1, win 501, length 36
21:26:25.421062 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1800:1932, ack 1, win 501, length 132
21:26:25.421221 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1932:1968, ack 1, win 501, length 36
21:26:25.421314 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1968:2108, ack 1, win 501, length 140
21:26:25.421453 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2108:2144, ack 1, win 501, length 36
21:26:25.421541 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2144:2284, ack 1, win 501, length 140
21:26:25.421687 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2284:2320, ack 1, win 501, length 36
21:26:25.421848 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2320:2460, ack 1, win 501, length 140
21:26:25.421989 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2460:2496, ack 1, win 501, length 36
21:26:25.422212 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2496:2636, ack 1, win 501, length 140
21:26:25.422389 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2636:2672, ack 1, win 501, length 36
21:26:25.422573 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2672:2812, ack 1, win 501, length 140
21:26:25.422710 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2812:2848, ack 1, win 501, length 36
21:26:25.422998 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2848:2988, ack 1, win 501, length 140
```

3. Filtering by Protocol

- Capture only TCP packets: **`tcpdump tcp -i enp0s3`**
- Useful for focusing on TCP traffic, which might be necessary for troubleshooting TCP connection issues.

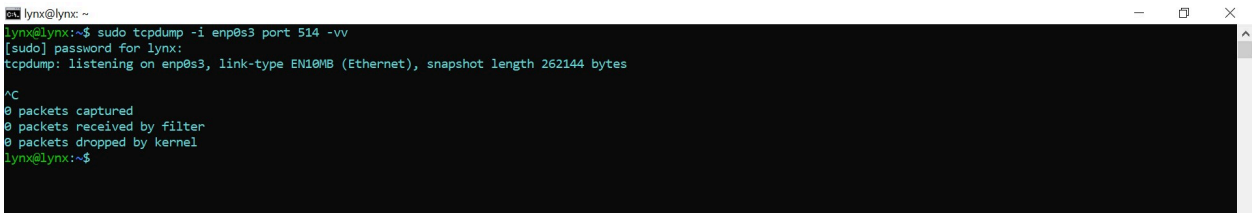
```
lynx@lynx:~$ sudo tcpdump tcp -i enp0s3
tcpdump: verbose output suppressed, use -v[v]... for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), snapshot length 262144 bytes
21:28:42.723203 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 3132791085:3132791193, ack 4109617946, win 501, length 108
21:28:42.723321 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 108:272, ack 1, win 501, length 164
21:28:42.723382 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 108, win 4102, length 0
21:28:42.723431 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 272:340, ack 1, win 501, length 68
21:28:42.723546 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 340:376, ack 1, win 501, length 36
21:28:42.723598 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 340, win 4101, length 0
21:28:42.763362 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 376, win 4101, length 0
21:28:43.033330 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 376:540, ack 1, win 501, length 164
21:28:43.033488 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 540:576, ack 1, win 501, length 36
21:28:43.033530 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 576:716, ack 1, win 501, length 140
21:28:43.033614 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 716:752, ack 1, win 501, length 36
21:28:43.033700 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 752:876, ack 1, win 501, length 124
21:28:43.033740 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 576, win 4101, length 0
21:28:43.033822 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 752, win 4106, length 0
21:28:43.033869 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 876:912, ack 1, win 501, length 36
21:28:43.033954 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 912, win 4105, length 0
21:28:43.033970 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 912:1052, ack 1, win 501, length 140
21:28:43.034120 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1052:1088, ack 1, win 501, length 36
21:28:43.034158 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1088:1228, ack 1, win 501, length 140
21:28:43.034262 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1228:1264, ack 1, win 501, length 36
21:28:43.034322 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1088, win 4104, length 0
21:28:43.034357 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1264:1388, ack 1, win 501, length 124
21:28:43.034387 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1264, win 4104, length 0
21:28:43.034497 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1388:1424, ack 1, win 501, length 36
21:28:43.034583 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1424:1548, ack 1, win 501, length 124
21:28:43.034683 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1424, win 4103, length 0
21:28:43.034867 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1548:1584, ack 1, win 501, length 36
21:28:43.035106 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1584, win 4103, length 0
21:28:43.135063 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1584:1724, ack 1, win 501, length 140
21:28:43.135457 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1724:1760, ack 1, win 501, length 36
21:28:43.135555 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1760:1900, ack 1, win 501, length 140
21:28:43.136286 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1760, win 4102, length 0
21:28:43.136401 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1900:1936, ack 1, win 501, length 36
21:28:43.136700 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 1936, win 4101, length 0
21:28:43.136776 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 1936:2076, ack 1, win 501, length 140
21:28:43.137049 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2076:2112, ack 1, win 501, length 36
21:28:43.137202 IP lynx.ssh > 192.168.0.247.54444: Flags [P.], seq 2112:2252, ack 1, win 501, length 140
21:28:43.137332 IP 192.168.0.247.54444 > lynx.ssh: Flags [.], ack 2112, win 4100, length 0
```

Capturing Syslog Messages

Example Command

`tcpdump -i enp0s3 port 514 -vv`

- **`-i eth0:`** Specifies the interface to listen on.
- **`port 514:`** Filters packets for UDP port 514, the standard port for syslog messages.
- **`-vv:`** Verbose output, to see more details of each packet. You might not need this.



Example Command (2)

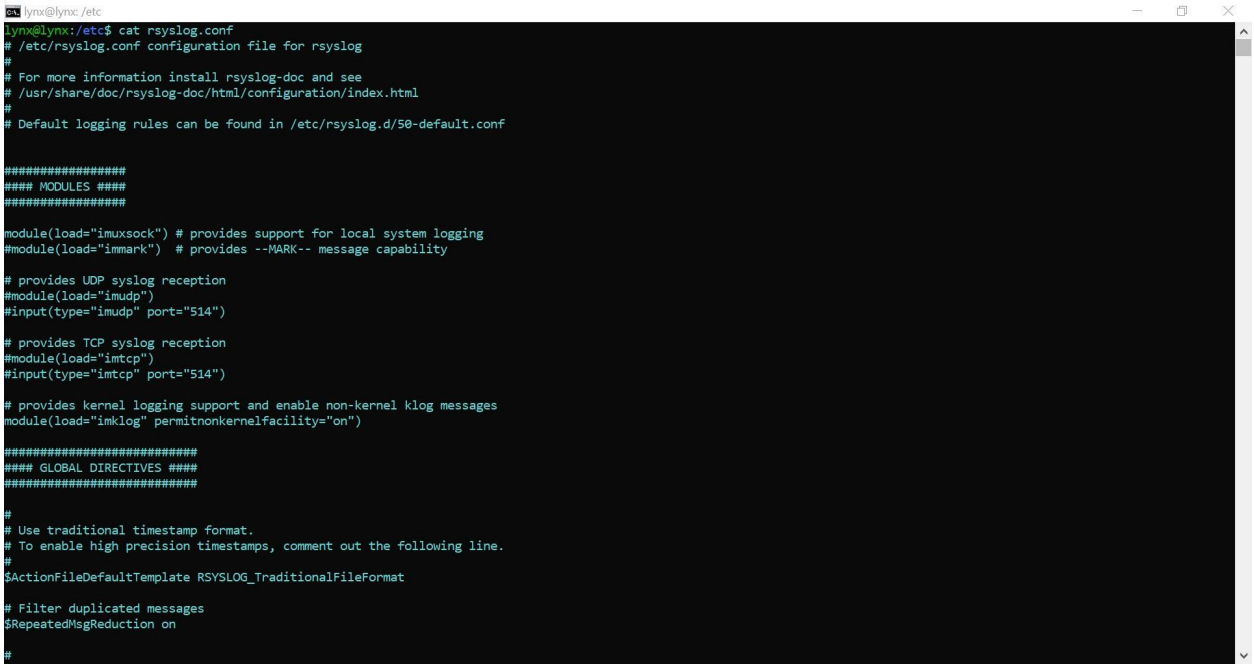
`tcpdump -port 514`

- More simple and to the point if you are just validating syslog traffic.

EXERCISE 8 – Syslog in Linux

Configuration

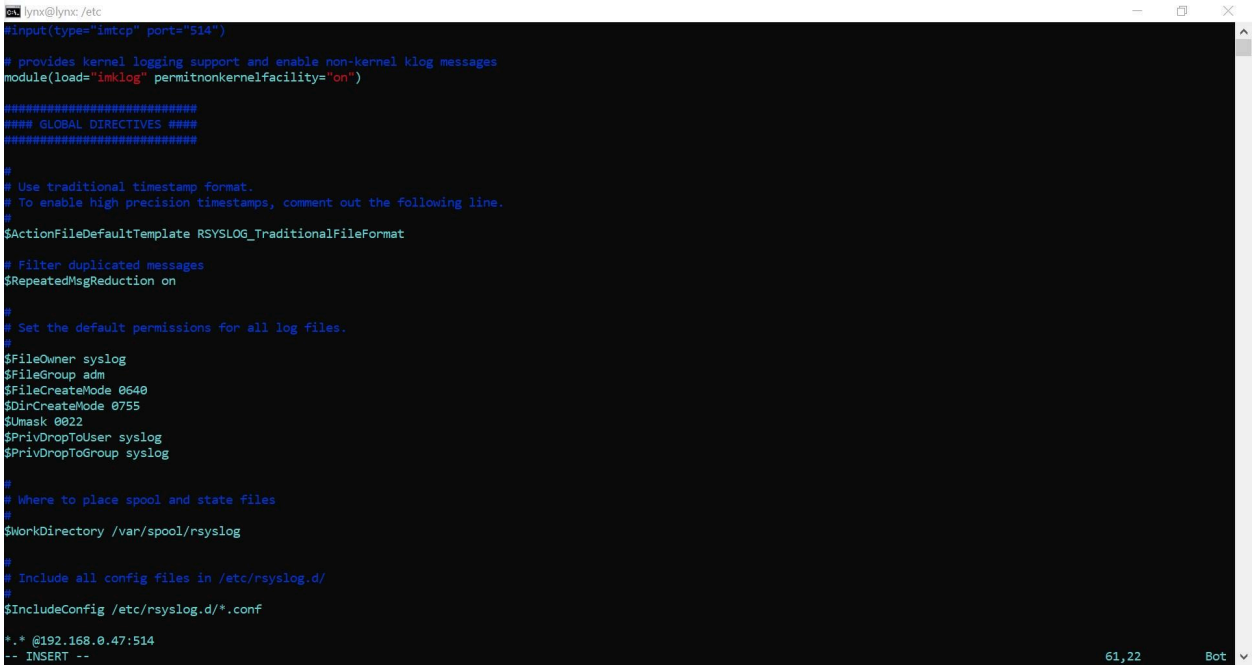
- **`/etc/rsyslog.conf`**: The main configuration file for rsyslog. It defines global directives, module loading, and rules for how to handle and where to route log messages.

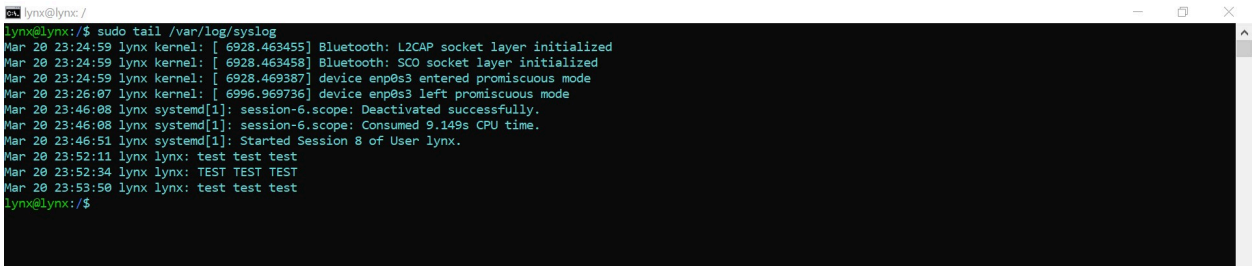


- **`/etc/rsyslog.d/`**: A directory that can contain additional configuration files. Files in this directory are included in the configuration in alphabetical order, allowing for modular configuration setups.

Task 1. Configure Syslog

Configure Syslog to send to Host OS

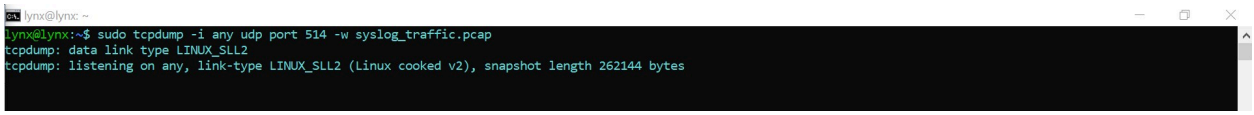




Task 1. Tcpdump

Task 2. Using tcpdump, detect syslog traffic by running the following command:

```
sudo tcpdump -i any udp port 514 -w syslog_traffic.pcap
```



Here's a breakdown of the command:

- sudo: Runs tcpdump with superuser privileges, which are usually required for capturing packets.

- -i any: Specifies the network interface on which to capture the traffic. Using any listens on all network interfaces.
- udp port 514: Filters the capture to only include UDP traffic on port 514, the default port for syslog messages.
- -w syslog_traffic.pcap: Writes the captured packets to a file named syslog_traffic.pcap instead of displaying them on the screen.

This command captures all syslog traffic across all network interfaces and saves it to a file for later analysis. You can then use tools like Wireshark or even tcpdump itself to read and analyze the captured data.