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Lab - Gather System Information After an Incident

Objectives

- Collect system information after an incident has occurred.
- View logs for potential intrusions.

Background / Scenario

When an incident occurs in an organization, people responsible must know how to respond. An organization needs to develop an incident response plan and put together a Computer Security Incident Response Team (CSIRT) to manage the response. In this lab, you will gather system information and review logs after an incident has occurred. Doing these tasks immediately after the incident is important because any data residing in RAM will be gone when the system is shut down.

Required Resources

PC with the **CSE-LABVM** installed in VirtualBox

Instructions

Step 1: Open a terminal window in the CSE-LABVM.

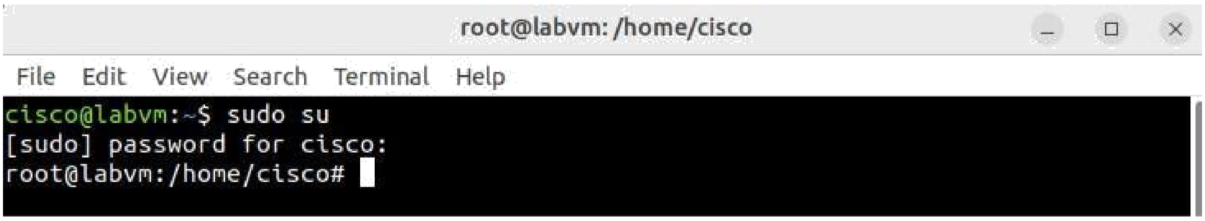
a. Launch the **CSE-LABVM**.
b. Double-click the **Terminal** icon to open a terminal.

Step 2: Collect volatile information of the compromised system.

In this step, you will create a file called **report.txt** that includes a variety of system information that can be used for incident analysis. This report can then be transferred to a USB drive, emailed, or uploaded to a cloud server to preserve the information. Then the system can be taken down.

a. Switch to the root user with the **sudo su** command. Enter **password** as the root password.

```
cisco@labvm:~$ sudo su
[sudo] password for cisco: password
root@labvm:/home/cisco#
```



```
cisco@labvm:~$ sudo su
[sudo] password for cisco:
root@labvm:/home/cisco# 
```

b. Enter the **echo** command, and then specify a heading for a newly created file named **report.txt**. Enter the **cat** command to review the new file.

root@labvm:/home/cisco# ***echo Incident Investigator Report > report.txt***

root@labvm:/home/cisco# ***cat report.txt***

Incident Investigator Report

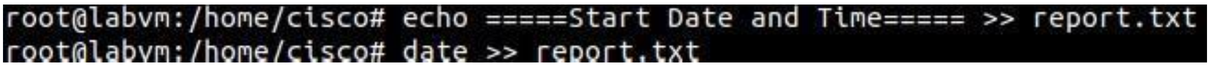
root@labvm:/home/cisco#

c. Enter the **date** command and redirect the date and timestamp to the **report.txt** file. Be sure to use the double angle brackets (**>>**) to append to the **report.txt** file. Otherwise, you will replace the previous content.

Note: To better document the content stored in report.txt, use the **echo** command to add a subheading as shown here for **Start Date and Time**. Each substep will specify a subheading for you to append before you gather information.

root@labvm:/home/cisco# ***echo =====Start Date and Time===== >> report.txt***

root@labvm:/home/cisco# ***date >> report.txt***

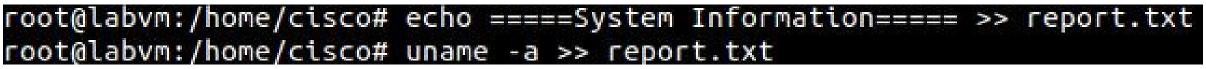


```
root@labvm:/home/cisco# echo =====Start Date and Time===== >> report.txt
root@labvm:/home/cisco# date >> report.txt
```

d. Enter the **uname** command to print system information. Use the **-a** option to append all system information to the **report.txt** file.

root@labvm:/home/cisco# ***echo =====System Information===== >> report.txt***

root@labvm:/home/cisco# ***uname -a >> report.txt***

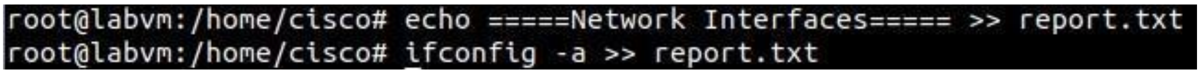


```
root@labvm:/home/cisco# echo =====System Information===== >> report.txt
root@labvm:/home/cisco# uname -a >> report.txt
```

e. Enter the **ifconfig -a** command and append all network interface information to the **report.txt** file.

root@labvm:/home/cisco# ***echo =====Network Interfaces===== >> report.txt***

root@labvm:/home/cisco# ***ifconfig -a >> report.txt***

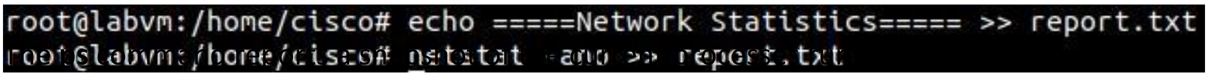


```
root@labvm:/home/cisco# echo =====Network Interfaces===== >> report.txt
root@labvm:/home/cisco# ifconfig -a >> report.txt
```

f. The **netstat** command can collect all the network statistics. Enter the command with the options **-ano** to collect data on all sockets (**-a**), IP addresses instead of domain names (**-n**), and information related to networking times (**-o**). Append the output to the **report.txt** file.

root@labvm:/home/cisco# ***echo =====Network Statistics===== >> report.txt***

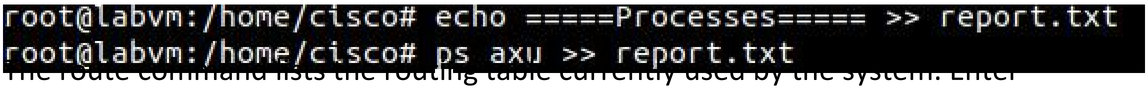
root@labvm:/home/cisco# ***netstat -ano >> report.txt***



```
root@labvm:/home/cisco# echo =====Network Statistics===== >> report.txt
root@labvm:/home/cisco# netstat -ano >> report.txt
```

g. Enter the command with the options **-axu** to list every process running on the system (**-a** and **-x**) and in a user-oriented format (**-u**). Append the output to the **report.txt** file. *root@labvm:/home/cisco#* ***echo =====Processes===== >> report.txt***

root@labvm:/home/cisco# ***ps axu >> report.txt***

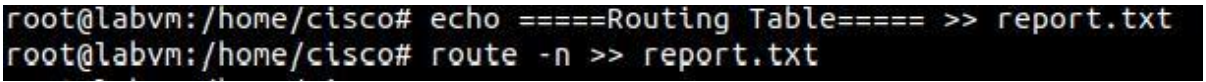


```
root@labvm:/home/cisco# echo =====Processes===== >> report.txt
root@labvm:/home/cisco# ps axu >> report.txt
```

h. The route command lists the routing table currently used by the system. Enter the command with the option **-n** to list IP addresses instead of trying to determine host names. Append the output to the **report.txt** file.

root@labvm:/home/cisco# ***echo =====Routing Table===== >> report.txt***

root@labvm:/home/cisco# ***route -n >> report.txt***

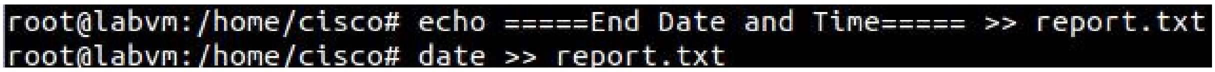


```
root@labvm:/home/cisco# echo =====Routing Table===== >> report.txt
root@labvm:/home/cisco# route -n >> report.txt
```

i. Enter the **date** command and append the date and timestamp to the end of the file to complete the report.

root@labvm:/home/cisco# ***echo =====End Date and Time===== >> report.txt***

root@labvm:/home/cisco# ***date >> report.txt***



```
root@labvm:/home/cisco# echo =====End Date and Time===== >> report.txt
root@labvm:/home/cisco# date >> report.txt
```

j. Use the **cat** command and pipe the output to the **less** command to view **report.txt** one page or line at a time. Press the **spacebar** to scroll down by page or press **Enter** to scroll down by a single line. Type **q** when finished.

root@labvm:/home/cisco# ***cat report.txt |***

less *Incident Investigator Report*

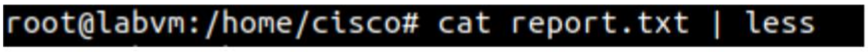
=====Start Date and Time===== Wed

24 Mar 2021 05:06:53 PM UTC

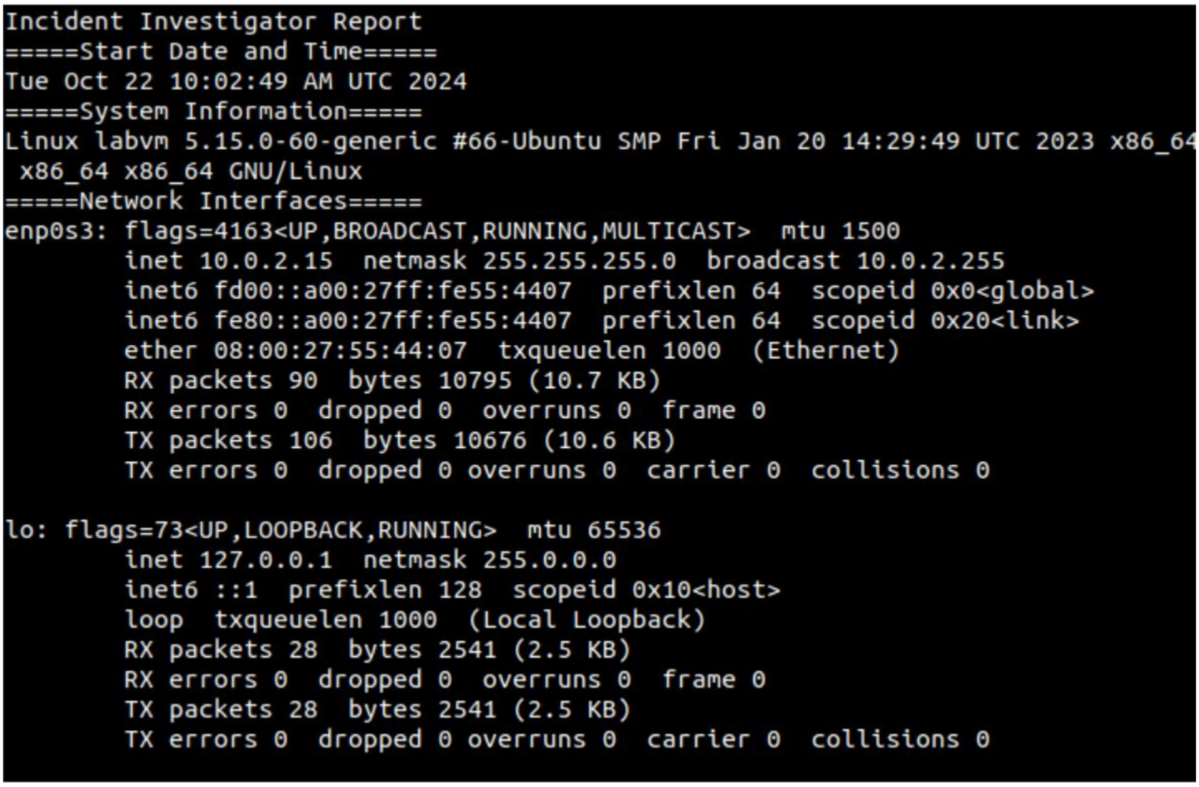
=====System Information=====

```
Linux labvm 5.4.0-67-generic #75-Ubuntu SMP Fri Feb 19 18:03:38 UTC 2021 x86_64
x86_64 x86_64 GNU/Linux

=====Network Interfaces=====

enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500

        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255

        inet6 fe80::a00:27ff:feb5:4bb0 prefixlen 64 scopeid 0x20<link>

        ether 08:00:27:b5:4b:b0 txqueuelen 1000 (Ethernet) RX packets

        47719 bytes 36618515 (36.6 MB)

        RX errors 0 dropped 0 overruns 0 frame 0

        TX packets 31406 bytes 3590109 (3.5 MB)

        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0


lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536 inet

        127.0.0.1 netmask 255.0.0.0

        inet6 ::1 prefixlen 128 scopeid 0x10<host>

        loop  txqueuelen 1000  (Local Loopback)

        RX packets 2292 bytes 244651 (244.6 KB)

        RX errors 0 dropped 0 overruns 0 frame 0

        TX packets 2292 bytes 244651 (244.6 KB)

        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0


=====Network Statistics=====

Active Internet connections (servers and established)

<output omitted>

unix 3      [ ]      STREAM      CONNECTED       22100

unix 3      [ ]      STREAM      CONNECTED       18249

=====Processes=====

USER           PID %CPU %MEM   VSZ            RSS TTYSTAT START  TIME COMMAND

root         1    0.00.5 101896 10768 ?          Ss  Mar23  0:03 /sbin/init

root         2    0.00.0       0    0 ?      S    Mar23      0:00 [kthreadd]

root         3    0.00.0       0    0 ?      I<    Mar23      0:00 [rcu_gp]
```

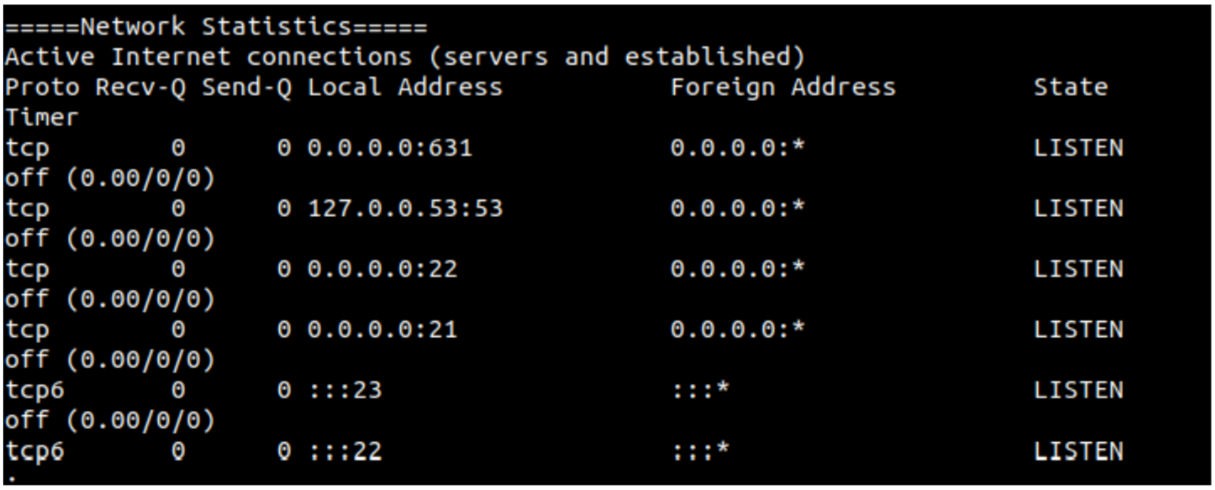
```
<output omitted>
root        5319  0.0   0.0         0   0 ?        I   16:31  0:00 [kworker/0:2-events]
root        5490  0.0  0.1 11492 3332 pts/1     R+     17:06   0:00 ps axu
=====Routing Table=====
Kernel IP routing table
Destination      Gateway         Genmask       Flags Metric Ref   Use Iface
0.0.0.0         10.0.2.2        0.0.0.0         UG     100      0      0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0     U   0         0      0 enp0s3
10.0.2.2        0.0.0.0         255.255.255.255 UH     100   0         0 enp0s3
=====End Date and Time=====
Wed 24 Mar 2021 05:06:53 PM UTC
(END) q
root@labvm:/home/cisco#
```



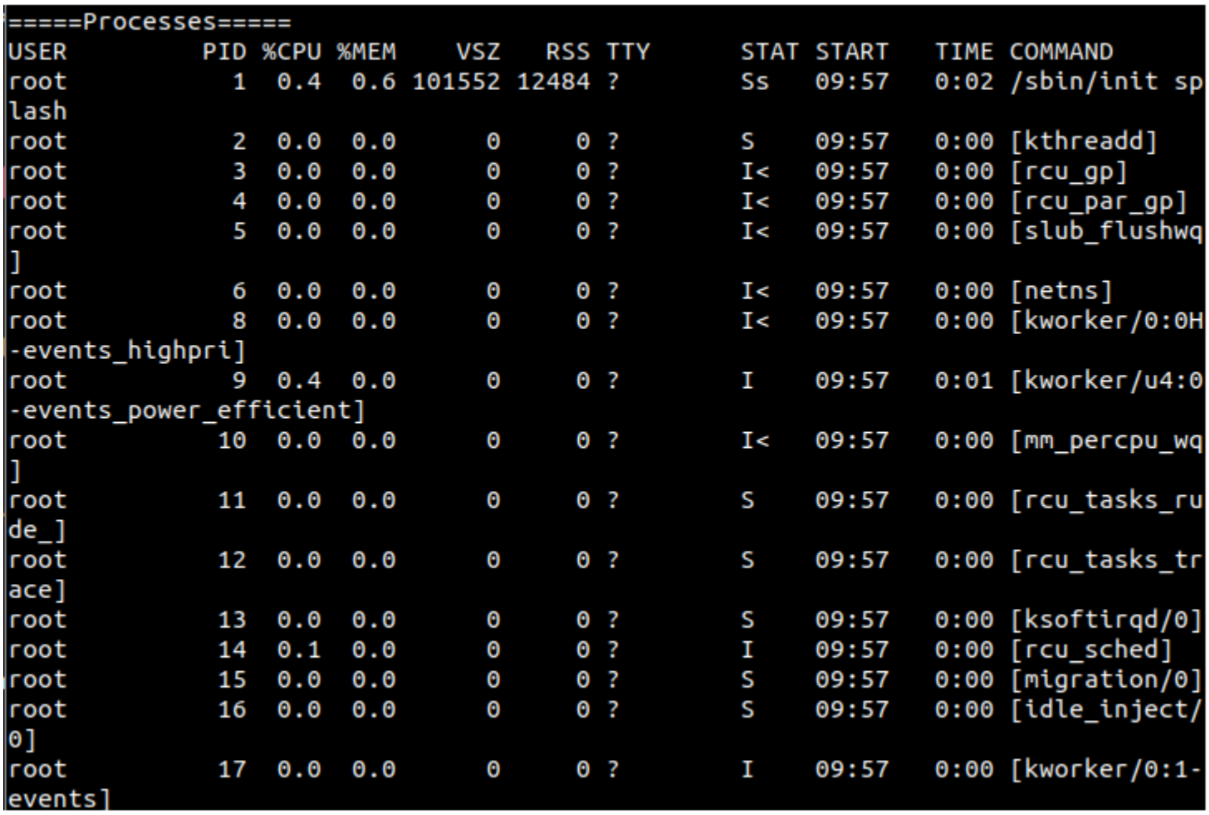
```
root@labvm:/home/cisco# cat report.txt | less
```



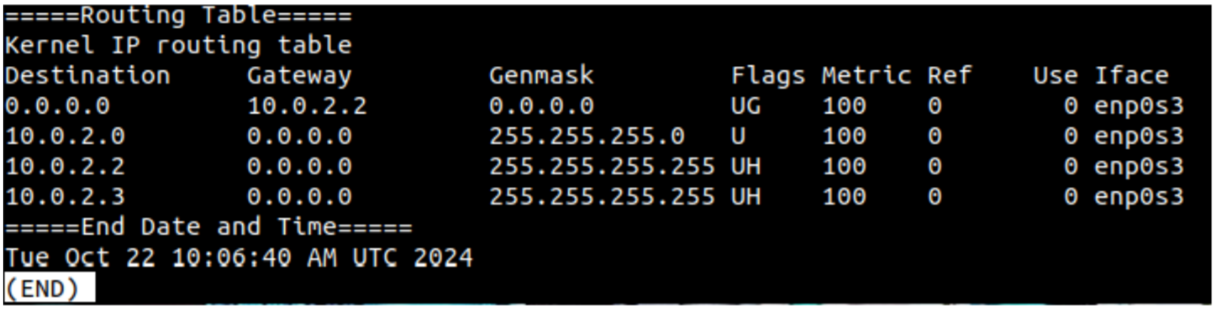
```
Incident Investigator Report
=====Start Date and Time=====
Tue Oct 22 10:02:49 AM UTC 2024
=====System Information=====
Linux labvm 5.15.0-60-generic #66-Ubuntu SMP Fri Jan 20 14:29:49 UTC 2023 x86_64
 x86_64 x86_64 GNU/Linux
=====Network Interfaces=====
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255
        inet6 fd00::a00:27ff:fe55:4407  prefixlen 64  scopeid 0x0<global>
        inet6 fe80::a00:27ff:fe55:4407  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:55:44:07  txqueuelen 1000  (Ethernet)
        RX packets 90  bytes 10795 (10.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 106  bytes 10676 (10.6 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 28  bytes 2541 (2.5 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 28  bytes 2541 (2.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```



```
=====Network Statistics=====
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Timer
tcp        0      0 0.0.0.0:631             0.0.0.0:*               LISTEN
off (0.00/0/0)
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
off (0.00/0/0)
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
off (0.00/0/0)
tcp        0      0 0.0.0.0:21              0.0.0.0:*               LISTEN
off (0.00/0/0)
tcp6       0      0 :::23                   :::*                    LISTEN
off (0.00/0/0)
tcp6       0      0 :::22                   :::*                    LISTEN
```



```
=====Processes=====
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.4  0.6 101552 12484 ?        Ss   09:57   0:02 /sbin/init sp
lash
root           2  0.0  0.0      0     0 ?        S    09:57   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   09:57   0:00 [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   09:57   0:00 [rcu_par_gp]
root           5  0.0  0.0      0     0 ?        I<   09:57   0:00 [slub_flushwq
]
root           6  0.0  0.0      0     0 ?        I<   09:57   0:00 [netns]
root           8  0.0  0.0      0     0 ?        I<   09:57   0:00 [kworker/0:0H
-events_highpri]
root           9  0.4  0.0      0     0 ?        I    09:57   0:01 [kworker/u4:0
-events_power_efficient]
root          10  0.0  0.0      0     0 ?        I<   09:57   0:00 [mm_percpu_wq
]
root          11  0.0  0.0      0     0 ?        S    09:57   0:00 [rcu_tasks_ru
de_]
root          12  0.0  0.0      0     0 ?        S    09:57   0:00 [rcu_tasks_tr
ace]
root          13  0.0  0.0      0     0 ?        S    09:57   0:00 [ksoftirqd/0]
root          14  0.1  0.0      0     0 ?        I    09:57   0:00 [rcu_sched]
root          15  0.0  0.0      0     0 ?        S    09:57   0:00 [migration/0]
root          16  0.0  0.0      0     0 ?        S    09:57   0:00 [idle_inject/
0]
root          17  0.0  0.0      0     0 ?        I    09:57   0:00 [kworker/0:1-
events]
```



```
=====Routing Table=====
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         10.0.2.2        0.0.0.0         UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0         255.255.255.0   U     100    0        0 enp0s3
10.0.2.2        0.0.0.0         255.255.255.255 UH    100    0        0 enp0s3
10.0.2.3        0.0.0.0         255.255.255.255 UH    100    0        0 enp0s3
=====End Date and Time=====
Tue Oct 22 10:06:40 AM UTC 2024
(END)
```

Step 3: Analyze different log files and learn their importance.

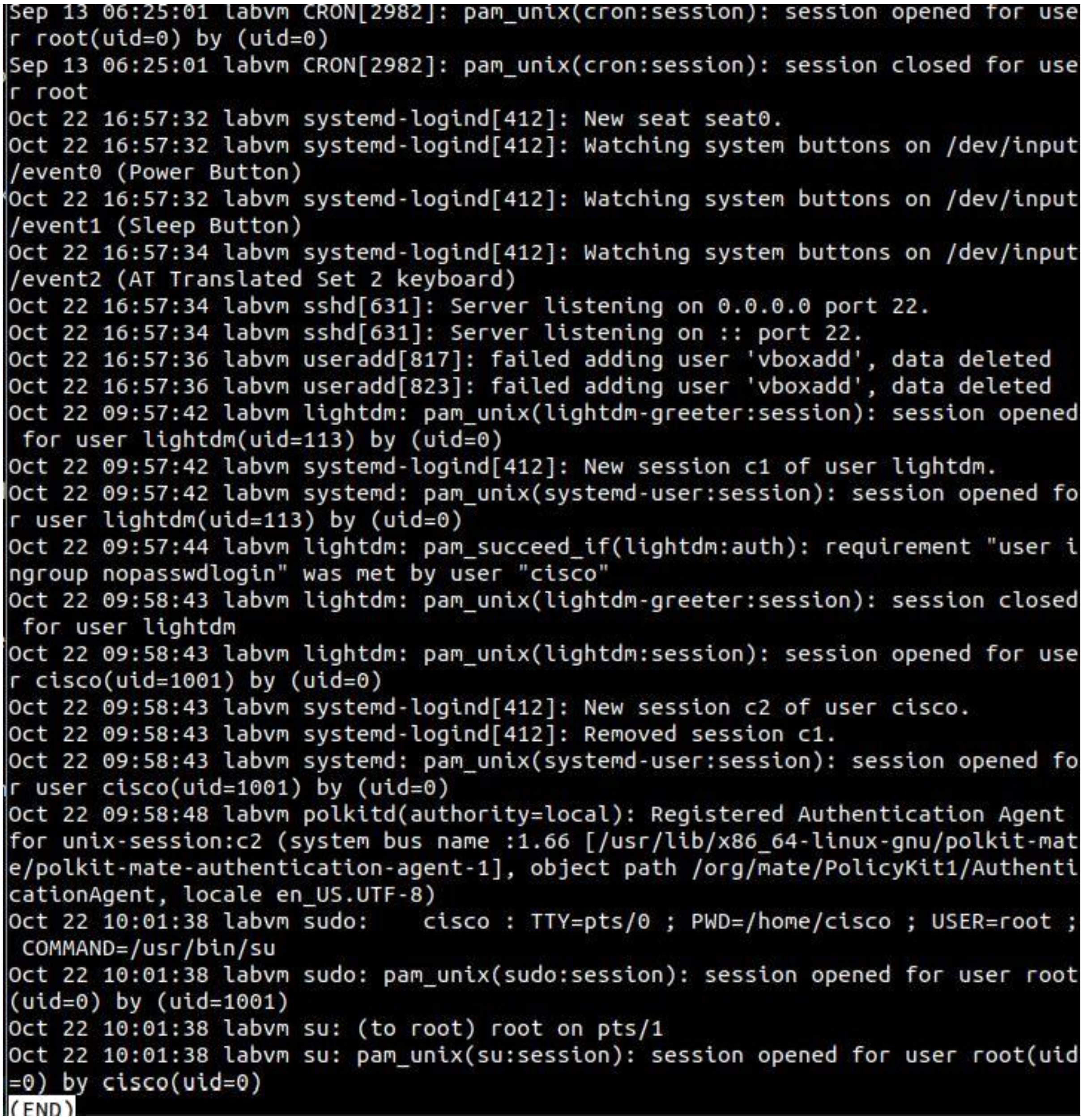
In addition to capturing information stored in RAM, the system also maintains a variety of logs that you should review after an incident. These log files can also be appended to your **report.txt** file or stored separately off the system in the event the system needs to be wiped. Logs of particular interest include, but are not limited to, the following:

- auth.log - logs system authorization information
- btmp.log - logs failed login attempts
- wtmp.log - logs who is currently logged into the system

a. Use the **cat** command to view the auth.log and pipe it to the **less** command. Press the **spacebar** to scroll down by page or press **Enter** to scroll down by a single line. Type **q** when finished. Your output will be different.

```
root@labvm:/home/cisco# cat /var/log/auth.log | less

Mar 18 21:43:57 labvm sshd[375]: Server listening on 0.0.0.0 port 22.

Mar 18 21:43:57 labvm sshd[375]: Server listening on :: port 22.

Mar 18 21:43:57 labvm systemd-logind[366]: New seat seat0.

Mar 18 21:43:57 labvm systemd-logind[366]: Watching system buttons
on /dev/input/event0 (Power Button)

Mar 18 21:43:57 labvm systemd-logind[366]: Watching system buttons
on /dev/input/event1 (Sleep Button)

Mar 18 21:43:57 labvm systemd-logind[366]: Watching system buttons
on /dev/input/event2 (AT Translated Set 2 keyboard)

Mar 18 21:43:59 labvm sshd[408]: error: kex_exchange_identification: Connection
closed by remote host

Mar 18 21:43:59 labvm sshd[407]: Accepted password for cisco from 10.0.2.2 port
57067 ssh2

Mar 18 21:43:59 labvm sshd[407]: pam_unix(sshd:session): session opened for user
cisco by (uid=0)

Mar 18 21:43:59 labvm systemd-logind[366]: New session 1 of user cisco.

<output omitted>

(END) q

root@labvm:/home/cisco#
```

```
root@labvm:/home/cisco# cat /var/log/auth.log | less
```



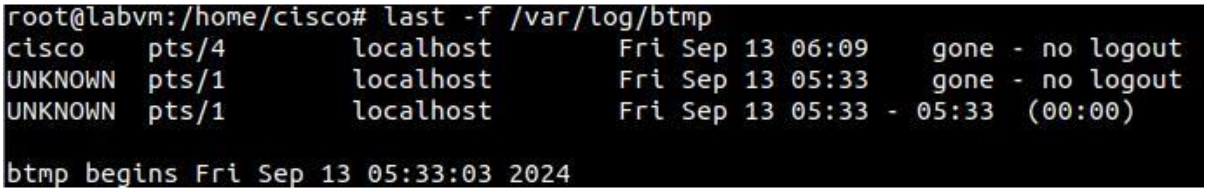
```
Sep 13 06:25:01 labvm CRON[2982]: pam_unix(cron:session): session opened for use
r root(uid=0) by (uid=0)
Sep 13 06:25:01 labvm CRON[2982]: pam_unix(cron:session): session closed for use
r root
Oct 22 16:57:32 labvm systemd-logind[412]: New seat seat0.
Oct 22 16:57:32 labvm systemd-logind[412]: Watching system buttons on /dev/input
/event0 (Power Button)
Oct 22 16:57:32 labvm systemd-logind[412]: Watching system buttons on /dev/input
/event1 (Sleep Button)
Oct 22 16:57:34 labvm systemd-logind[412]: Watching system buttons on /dev/input
/event2 (AT Translated Set 2 keyboard)
Oct 22 16:57:34 labvm sshd[631]: Server listening on 0.0.0.0 port 22.
Oct 22 16:57:34 labvm sshd[631]: Server listening on :: port 22.
Oct 22 16:57:36 labvm useradd[817]: failed adding user 'vboxadd', data deleted
Oct 22 16:57:36 labvm useradd[823]: failed adding user 'vboxadd', data deleted
Oct 22 09:57:42 labvm lightdm: pam_unix(lightdm-greeter:session): session opened
 for user lightdm(uid=113) by (uid=0)
Oct 22 09:57:42 labvm systemd-logind[412]: New session c1 of user lightdm.
Oct 22 09:57:42 labvm systemd: pam_unix(systemd-user:session): session opened fo
r user lightdm(uid=113) by (uid=0)
Oct 22 09:57:44 labvm lightdm: pam_succeed_if(lightdm:auth): requirement "user i
ngroup nopasswdlogin" was met by user "cisco"
Oct 22 09:58:43 labvm lightdm: pam_unix(lightdm-greeter:session): session closed
 for user lightdm
Oct 22 09:58:43 labvm lightdm: pam_unix(lightdm:session): session opened for use
r cisco(uid=1001) by (uid=0)
Oct 22 09:58:43 labvm systemd-logind[412]: New session c2 of user cisco.
Oct 22 09:58:43 labvm systemd-logind[412]: Removed session c1.
Oct 22 09:58:43 labvm systemd: pam_unix(systemd-user:session): session opened fo
r user cisco(uid=1001) by (uid=0)
Oct 22 09:58:48 labvm polkitd(authority=local): Registered Authentication Agent
for unix-session:c2 (system bus name :1.66 [/usr/lib/x86_64-linux-gnu/polkit-mat
e/polkit-mate-authentication-agent-1], object path /org/mate/PolicyKit1/Authenti
cationAgent, locale en_US.UTF-8)
Oct 22 10:01:38 labvm sudo:    cisco : TTY=pts/0 ; PWD=/home/cisco ; USER=root ;
 COMMAND=/usr/bin/su
Oct 22 10:01:38 labvm sudo: pam_unix(sudo:session): session opened for user root
(uid=0) by (uid=1001)
Oct 22 10:01:38 labvm su: (to root) root on pts/1
Oct 22 10:01:38 labvm su: pam_unix(su:session): session opened for user root(uid
=0) by cisco(uid=0)
(END)
```

b. The **last** command shows a listing of last logged in users. Enter the command with the **- f** option to specify the log file. The **btmp** log file shows failed login attempts. Your output will be different.

```
root@labvm:/home/cisco# last -f /var/log/btmp

UNKNOWN  tty6                Thu Mar 18 21:47    gone - no logout

UNKNOWN  tty4                Thu Mar 18 21:47    gone - no logout

UNKNOWN  tty3                Thu Mar 18 21:47    gone - no logout

cisco    tty1            Thu Mar 18  21:47   gone - no logout

cisco    tty1            Thu Mar 18  21:47 - 21:47   (00:00)
```

btmp begins Thu Mar 18 21:47:05 2021

root@labvm:/home/cisco#



```
root@labvm:/home/cisco# last -f /var/log/btmp
cisco    pts/4        localhost        Fri Sep 13 06:09    gone - no logout
UNKNOWN  pts/1        localhost        Fri Sep 13 05:33    gone - no logout
UNKNOWN  pts/1        localhost        Fri Sep 13 05:33 - 05:33  (00:00)

btmp begins Fri Sep 13 05:33:03 2024
```

c. Enter the **last** command again specifying the **wtmp** file to show who is currently connected to the system. Your output will be different.

root@labvm:/home/cisco# ***last -f /var/log/wtmp***

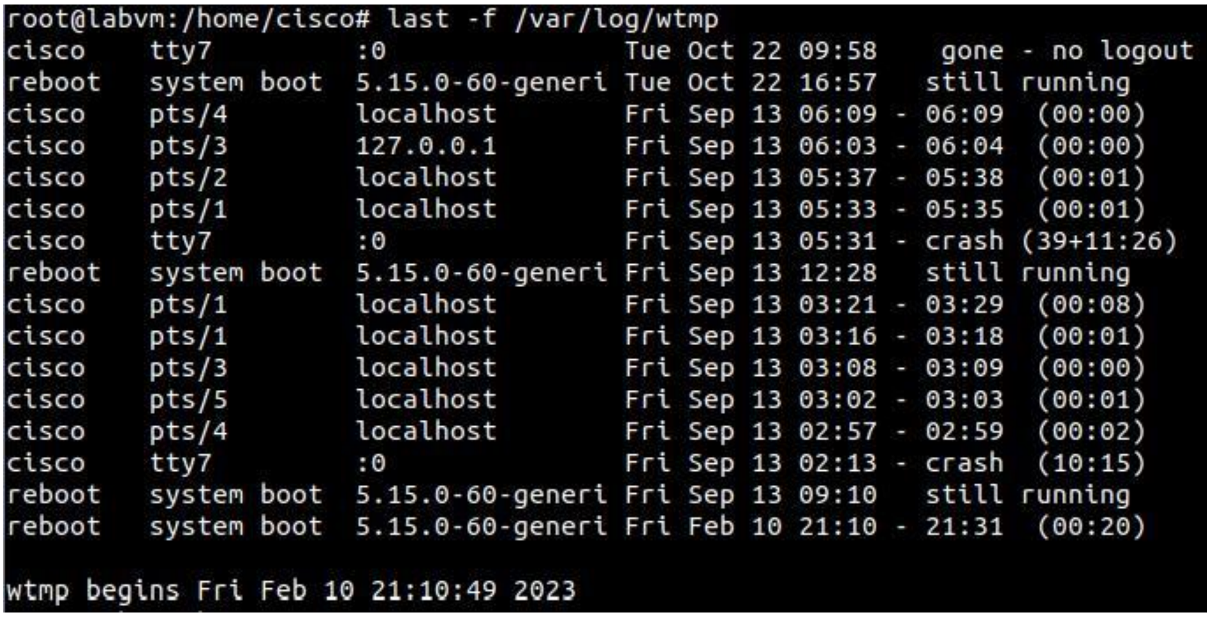
cisco tty7 :0 Tue Mar 23 19:38 gone - no logout

reboot system boot 5.4.0-67-generic Tue Mar 23 14:38 still running

cisco tty2 Thu Mar 18 21:47 - 21:47 (00:00)

reboot system boot 5.4.0-67-generic Thu Mar 18 21:43 - 22:02 (00:18)

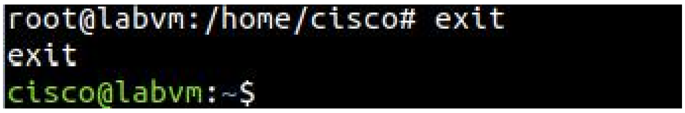
wtmp begins Thu Mar 18 21:43:54 2021



```
root@labvm:/home/cisco# last -f /var/log/wtmp
cisco    tty7         :0               Tue Oct 22 09:58    gone - no logout
reboot   system boot  5.15.0-60-generi Tue Oct 22 16:57   still running
cisco    pts/4        localhost        Fri Sep 13 06:09 - 06:09  (00:00)
cisco    pts/3        127.0.0.1        Fri Sep 13 06:03 - 06:04  (00:00)
cisco    pts/2        localhost        Fri Sep 13 05:37 - 05:38  (00:01)
cisco    pts/1        localhost        Fri Sep 13 05:33 - 05:35  (00:01)
cisco    tty7         :0               Fri Sep 13 05:31 - crash (39+11:26)
reboot   system boot  5.15.0-60-generi Fri Sep 13 12:28   still running
cisco    pts/1        localhost        Fri Sep 13 03:21 - 03:29  (00:08)
cisco    pts/1        localhost        Fri Sep 13 03:16 - 03:18  (00:01)
cisco    pts/3        localhost        Fri Sep 13 03:08 - 03:09  (00:00)
cisco    pts/5        localhost        Fri Sep 13 03:02 - 03:03  (00:01)
cisco    pts/4        localhost        Fri Sep 13 02:57 - 02:59  (00:02)
cisco    tty7         :0               Fri Sep 13 02:13 - crash  (10:15)
reboot   system boot  5.15.0-60-generi Fri Sep 13 09:10   still running
reboot   system boot  5.15.0-60-generi Fri Feb 10 21:10 - 21:31  (00:20)

wtmp begins Fri Feb 10 21:10:49 2023
```

d. Enter the **exit** command to switch back to the cisco user. *root@labvm:/home/cisco#* ***exit***

cisco@labvm:~$



```
root@labvm:/home/cisco# exit
exit
cisco@labvm:~$
```