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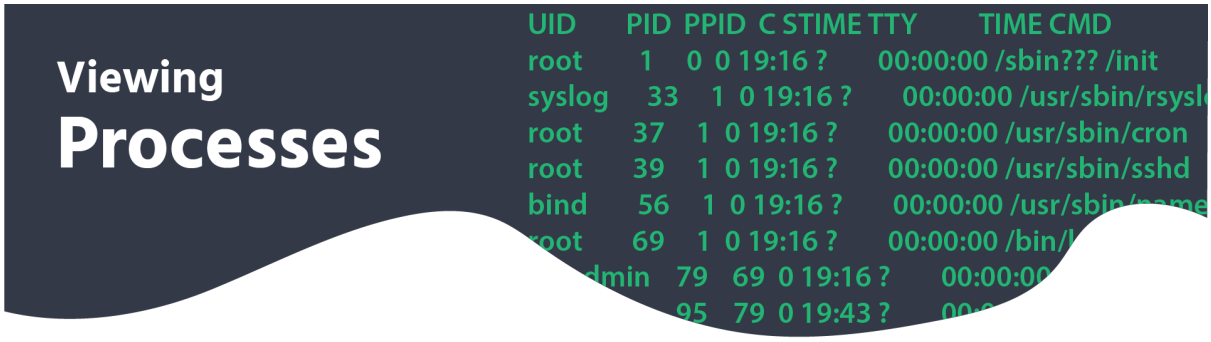

Viewing Processes

Running a command results in something called a *process*. In the Linux operating system, processes are executed with the privileges of the user who executes the command. This allows for processes to be limited to certain capabilities based upon the user identity.

Although there are exceptions, generally the operating system will differentiate users based upon whether they are the administrator. Typically regular users, like the `sysadmin` user, cannot control another user's processes. Users who have administrative privileges, like the `root` account, can control any user processes, including stopping any user process.

The `ps` command can be used to list processes.

```
ps [OPTIONS]
```

```
sysadmin@localhost:~$ ps
  PID TTY          TIME CMD
   80 pts/0        00:00:00 bash
   94 pts/0        00:00:00 ps
```

The `ps` command will display the processes that are running in the current terminal by default. In the example above, the bottom line is the process created by the execution of the `ps` command. The output includes the following columns of information:

- `PID`: The process identifier, which is unique to the process. This information is useful for controlling the process by its ID number.
- `TTY`: The name of the terminal where the process is running. This information is useful for distinguishing between different processes that have the same name.

- `TIME`: The total amount of processor time used by the process. Typically, this information isn't used by regular users.
- `CMD`: The command that started the process.

Instead of viewing just the processes running in the current terminal, users may want to view every process running on the system. The `-e` option will display every process:

```
sysadmin@localhost:~$ ps -e
  PID TTY          TIME CMD
    1 pts/0        00:00:00 init
   33 ?            00:00:00 rsyslogd
   37 ?            00:00:00 cron
   39 ?            00:00:00 sshd
   56 ?            00:00:00 named
   69 pts/0        00:00:00 login
   79 pts/0        00:00:00 bash
   94 pts/0        00:00:00 ps
```

Typically, the `-f` option is also used as it provides more detail in the output of the command, including options and arguments. Look for the `ps` command on the last line, the `CMD` column now includes the options used:

```
sysadmin@localhost:~$ ps -ef
UID        PID  PPID  C STIME TTY          TIME CMD
root         1     0  0 19:16 pts/0        00:00:00 /sbin??? /init
syslog      33     1  0 19:16 ?            00:00:00 /usr/sbin/rsyslogd
root        37     1  0 19:16 ?            00:00:00 /usr/sbin/cron
root        39     1  0 19:16 ?            00:00:00 /usr/sbin/sshd
bind        56     1  0 19:16 ?            00:00:00 /usr/sbin/named -u bind
root        69     1  0 19:16 pts/0        00:00:00 /bin/login -f
sysadmin    79    69  0 19:16 pts/0        00:00:00 -bash
sysadmin    95    79  0 19:43 pts/0        00:00:00 ps -ef
```

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