KERNEL MANAGEMENT

The kernel is the operating system .It performs all the core task like managing memory and disk access it will connect to all the hardware that makes your system. It gives you the multitasking and multi user support .It handles all the communication with all the devices like CD ROM USB drive .Basically user sends the request signal that go through the kernel to the device .Based on different different hardware the configuration of the kernel will very .Suppose you have to add a new device to the system then you have to change the kernel support for the specific devices. you can download the binary version of the kernel or you can download the source code and compile it. Its now the job of the system administrator to worry for the code of the kernel but you must know how to add and remove kernel module and detect if any kernel module not working or malfunctioning .And he must know how to compile and add new kernel to the system

kernel sets up several presses some process are internal to the kernel. We can see the internal process the with this command

=> **ps aux | egrep '\['**

```
[root@localhost ~]# ps aux | egrep '\['
root          2  0.0  0.0      0     0 ?        S    16:11   0:00 [kthreadd]
root          3  0.0  0.0      0     0 ?        S    16:11   0:00 [ksoftirqd/0]
root          5  0.0  0.0      0     0 ?        S<   16:11   0:00 [kworker/0:0H]
root          6  0.0  0.0      0     0 ?        S    16:11   0:00 [kworker/u256:0]
root          7  0.0  0.0      0     0 ?        S    16:11   0:00 [migration/0]
root          8  0.0  0.0      0     0 ?        S    16:11   0:00 [rcu_bh]
root          9  0.0  0.0      0     0 ?        R    16:11   0:02 [rcu_sched]
root         10  0.0  0.0      0     0 ?        S<   16:11   0:00 [lru-add-drain]
root         11  0.0  0.0      0     0 ?        S    16:11   0:00 [watchdog/0]
root         13  0.0  0.0      0     0 ?        S    16:11   0:00 [kdevtmpfs]
root         14  0.0  0.0      0     0 ?        S<   16:11   0:00 [netns]
root         15  0.0  0.0      0     0 ?        S    16:11   0:00 [khungtaskd]
root         16  0.0  0.0      0     0 ?        S<   16:11   0:00 [writeback]
root         17  0.0  0.0      0     0 ?        S<   16:11   0:00 [kintegrityd]
root         18  0.0  0.0      0     0 ?        S<   16:11   0:00 [bioset]
root         19  0.0  0.0      0     0 ?        S<   16:11   0:00 [bioset]
root         20  0.0  0.0      0     0 ?        S<   16:11   0:00 [bioset]
root         21  0.0  0.0      0     0 ?        S<   16:11   0:00 [kblockd]
root         22  0.0  0.0      0     0 ?        S<   16:11   0:00 [md]
root         23  0.0  0.0      0     0 ?        S<   16:11   0:00 [edac-poller]
root         24  0.0  0.0      0     0 ?        S<   16:11   0:00 [watchdogd]
root         30  0.0  0.0      0     0 ?        S    16:11   0:00 [kswapd0]
root         31  0.0  0.0      0     0 ?        SN   16:11   0:00 [ksmd]
```

this process are all kernel process.Some of this process are very important for the system administrator to know.

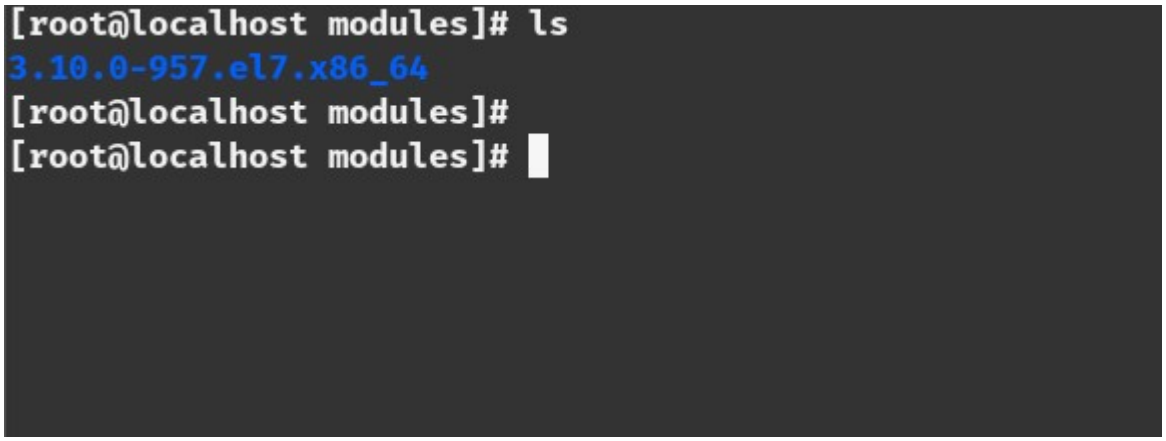
For example

‘kthreadd’ manages the kernel thread
‘md/0’ manages the raid subsystem
‘kswapd’ manages the swap space available for the system

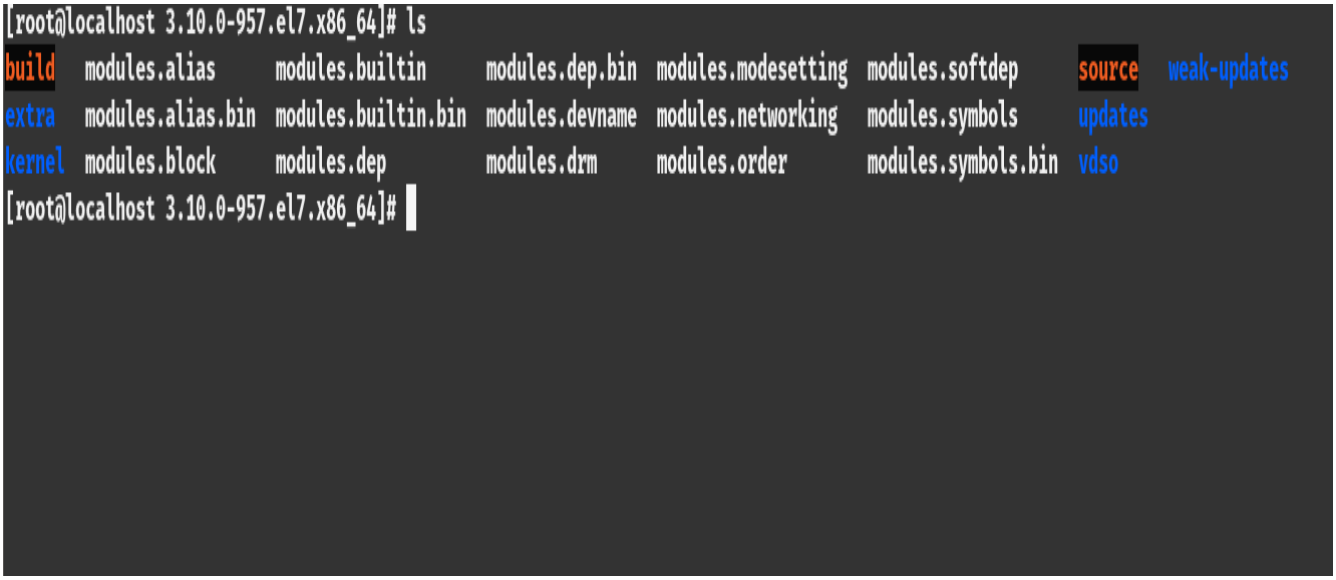
[this generally don’t impact the system administrator .some times the system can misbehave and can occur memory overflow if it happens you will see the kswapd process on the top of the process list which you can find in the **‘top’** command]

Kernel Modules:

kernel modules lies in the directory under '**/lib/modules**'
=> **cd /lib/modules**



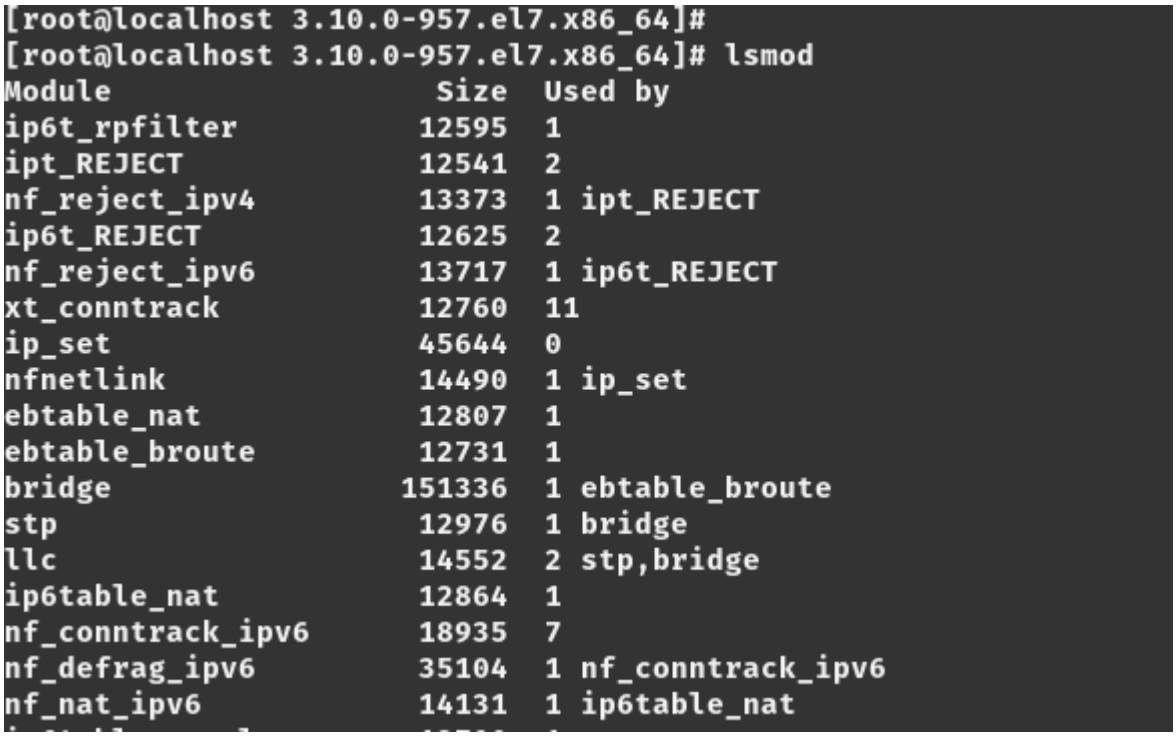
in this directory there can be multiple directory .each directory for each kernel .Under this directory there are a lot of files that can be for different different devices.



kernel module varies depending on the hardware manufacturer modules loaded by the kernel at the boot time. you can manage which driver will be loaded and which driver will not.

To find which model is loaded we use the '**lsmod**' command.[you have to be a root user for that]

=>**lsmod**



To add any kernel modules we use the '**modprobe**' command for example if we want to add the blue tooth module to the system this command is used

=>modeprobe bluetooth

```
[root@localhost 3.10.0-957.el7.x86_64]#
[root@localhost 3.10.0-957.el7.x86_64]# modprobe bluetooth
[root@localhost 3.10.0-957.el7.x86_64]#
```

Synthetic File System

There are two different type of file system. one is the the real file system that lies on some disk. like '**/root', '/boot'** this are the real file system.

There are another file system that are fake file system that are created by the kernel .Its useful for the system administrator to access the internal variable within the kernel. one of the file system is '**/proc**'. This is meant for process information. Inside the directory there are a lot of directory with numbers.

```
tanvirrahman@pop-os:/proc
> ls
1     1082  1234  1370  151   1771  1981  2072  2168  24    3     42    514   838       diskstats     locks         sysrq-trigger
10    1098  1237  1372  1516  1777  1994  2073  217   240   30    43    52    845       dma           mdstat        sysvipc
1001  11    1243  1373  152   1780  1996  2074  2179  2408  31    437   53    846       driver        meminfo       thread-self
1002  1101  1250  1374  16    1781  2     2079  2180  241   32    44    539   868       execdomains   misc          timer_list
1004  1130  1291  1375  1617  1794  20    208   2188  242   327   45    54    869       fb            modules       tty
1011  1143  13    1380  163   1798  2000  2081  2197  243   33    452   55    884       filesystems   mounts        uptime
1019  1147  1306  1381  1647  18    2002  2085  22    244   3362  453   56    897       fs            mtrr          version
1023  1149  1311  1383  1654  1800  2004  2089  2202  2447  34    46    581   898       interrupts    net           version_signature
1024  1150  1314  1385  1666  1812  2015  209   2268  2465  35    460   586   9         iomem         pagetypeinfo  vmallocinfo
1025  1151  1318  1387  1673  1815  2019  2095  2280  2468  350   463   59    902       ioports       partitions    vmnet
1028  1152  1319  1389  1680  183   2027  2098  23    2483  36    47    6     acpi      irq           pressure      vmstat
1034  1153  1335  1395  1683  184   2036  21    2300  25    37    477   60    asound    kallsyms      sched_debug   zoneinfo
1035  1154  1338  1398  1690  19    2040  2102  2312  2524  378   48    61    buddyinfo kcore         schedstat
1036  1155  1341  14    17    1911  2045  2106  2326  2530  379   49    697   bus       keys          scsi
1037  1180  1345  1400  172   1914  2048  2108  2349  2558  38    5     699   cgroups   key-users     self
1047  12    1357  1412  1725  1919  2053  2111  236   2567  39    50    7     cmdline   kmsg          slabinfo
1055  1201  1358  1454  1733  1935  2058  2115  237   26    396   502   8     consoles  kpagecgroup   softirqs
1073  1220  1362  15    1766  1940  2062  2116  238   27    4     505   825   cpuinfo   kpagecount    stat
1079  1221  1363  150   1768  1942  2066  2118  2385  28    40    51    835   crypto    kpageflags    swaps
1080  1232  1368  1503  1769  1965  2070  2133  239   29    41    512   837   devices   loadavg       sys
```

thease are all process id.process id 1 is the init process.so if you fo to the **‘/proc/1’** it will show you the detail of that process.

Another synthetic file system is ‘**/sys’** although it works with the devices but the main target is the same which is accessing the settings of the kernel.