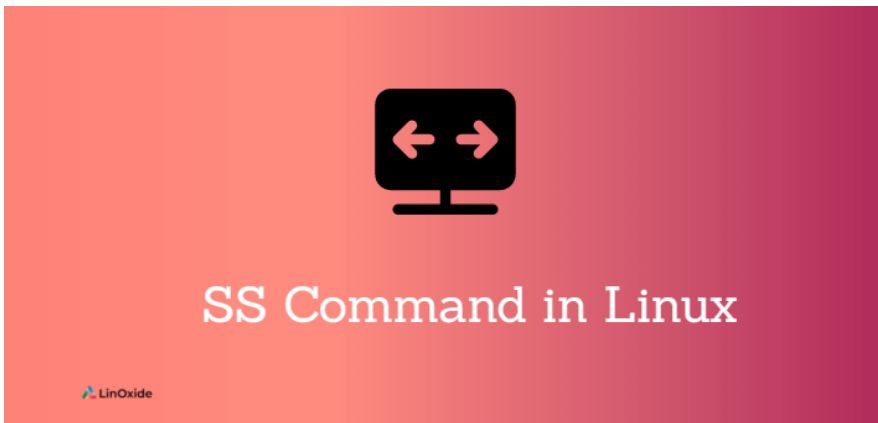




SS Command in Linux with Useful Examples

By Bobbin Zachariah | Updated September 24, 2021 | Commands



The `ss` tool is a CLI command used to display information about the network socket in Linux. The `ss` stands for socket statistics. It is a similar tool to `netstat`, which can display more information such as TCP and state information.

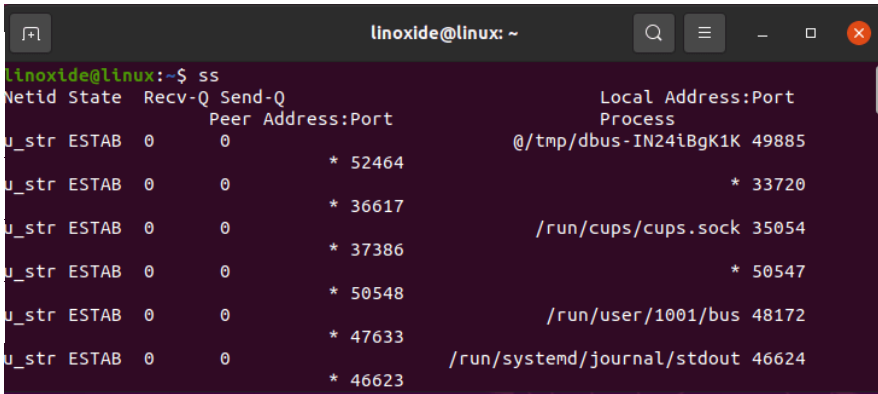
The `ss` tool comes with the `iproute2` package. It can display stats for PACKET, TCP, UDP, DCCP, RAW, and Unix domain sockets.

In this tutorial, we learn **`ss` command** in Linux with useful examples.

1. List network connection

The ss command without any options list all open non-listening sockets (e.g. TCP/UNIX/UDP) that have established connection.

```
$ ss
```



```
linoxide@linux: ~  
linoxide@linux:~$ ss  
Netid State Recv-Q Send-Q Peer Address:Port Local Address:Port Process  
u_str ESTAB 0 0 * 52464 @/tmp/dbus-IN24iBgK1K 49885  
u_str ESTAB 0 0 * 36617 * 33720  
u_str ESTAB 0 0 * 37386 /run/cups/cups.sock 35054  
u_str ESTAB 0 0 * 50548 * 50547  
u_str ESTAB 0 0 * 47633 /run/user/1001/bus 48172  
u_str ESTAB 0 0 * 46623 /run/systemd/journal/stdout 46624
```

1. Netid: It displays the types of sockets.
2. State: It displays the state of a socket if it is Established (ESTAB), Unconnected (UNCONN), or, Listening (LISTEN).
3. Recv-Q: It displays the number of received packets in the queue.
4. Send-Q: It displays the number of sent packets in the queue.
5. Local address:port : It displays the address of local machine and port.
6. Peer address:port : It displays the address of remote machine and port.

You can obtain more detailed information by using the ss command in conjunction with options. You can also select multiple options at the same time.

ss command syntax:

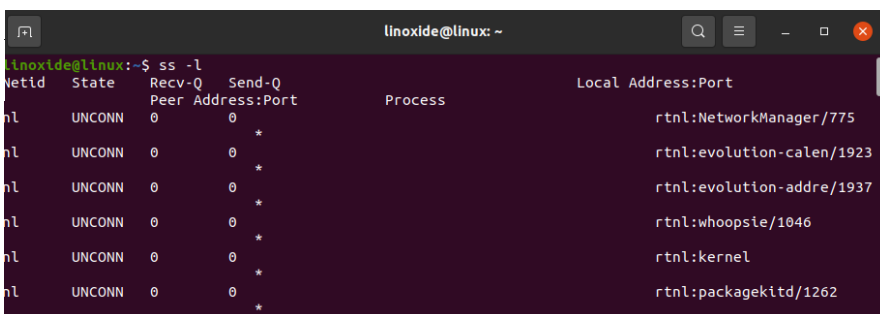
```
$ ss [Option]
```

```
$ ss [Option1] [Option2] [Option3]
```

2. List listening sockets

To display the list of listening sockets using `-l` or `--listen` option.

```
$ ss -l
```



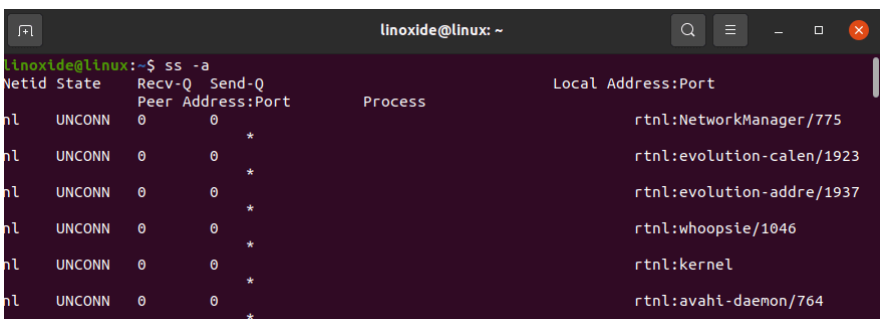
```
linuxide@linux:~$ ss -l
```

| Netid | State | Recv-Q | Send-Q | Peer Address:Port | Local Address:Port | Process |
|-------|--------|--------|--------|-------------------|--------------------|---------------------------|
| nl | UNCONN | 0 | 0 | * | | rtnl:NetworkManager/775 |
| nl | UNCONN | 0 | 0 | * | | rtnl:evolution-calen/1923 |
| nl | UNCONN | 0 | 0 | * | | rtnl:evolution-addre/1937 |
| nl | UNCONN | 0 | 0 | * | | rtnl:whoopsie/1046 |
| nl | UNCONN | 0 | 0 | * | | rtnl:kernel |
| nl | UNCONN | 0 | 0 | * | | rtnl:packagekitd/1262 |

3. List all the sockets

You can list all listening and non-listening network connections using the `-a` or `-all` option.

```
$ ss -a
```



```
linuxide@linux:~$ ss -a
```

| Netid | State | Recv-Q | Send-Q | Peer Address:Port | Local Address:Port | Process |
|-------|--------|--------|--------|-------------------|--------------------|---------------------------|
| nl | UNCONN | 0 | 0 | * | | rtnl:NetworkManager/775 |
| nl | UNCONN | 0 | 0 | * | | rtnl:evolution-calen/1923 |
| nl | UNCONN | 0 | 0 | * | | rtnl:evolution-addre/1937 |
| nl | UNCONN | 0 | 0 | * | | rtnl:whoopsie/1046 |
| nl | UNCONN | 0 | 0 | * | | rtnl:kernel |
| nl | UNCONN | 0 | 0 | * | | rtnl:avahi-daemon/764 |

4. List TCP Connection

To display the TCP socket connection, use the `-t` or `--tcp` option.

```
$ ss -t
```



```
linoxide@linux: ~  
linoxide@linux:~$ ss -t  
State      Recv-Q    Send-Q    Local Address:Port    Peer Address:Port  
Process  
ESTAB      0          0          192.168.18.151:40122    44.235.246.155:https  
ESTAB      0          0          192.168.18.151:60470    44.235.94.69:https  
ESTAB      0          0          192.168.18.151:57236    117.18.237.29:http  
ESTAB      0          0          192.168.18.151:38746    142.250.196.3:http  
ESTAB      0          0          192.168.18.151:48610    142.250.196.2:https  
ESTAB      0          0          192.168.18.151:49320    104.18.164.34:https
```

To display the list of **all the TCP connections**, you can use the `-a` and `-t` options. This includes all states of the socket.

```
$ ss -at
```

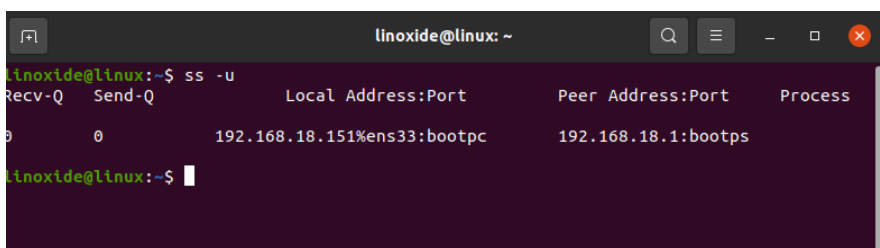
To display the TCP connection for all the listening states, combine `-l` and `-t` options.

```
$ ss -alt
```

5. List UDP Connection

To display the UDP socket connection, use `-u` or `--udp` option.

```
$ ss -u
```



```
linoxide@linux: ~  
linoxide@linux:~$ ss -u  
Recv-Q    Send-Q    Local Address:Port    Peer Address:Port    Process  
0          0          192.168.18.151:bootpc  192.168.18.1:bootps  
linoxide@linux:~$
```

To display the **list of all the UDP connections**, use `-a` and `-u` options. This includes all states of the socket.

```
$ ss -au
```

You can combine `-l` and `-u` to display the UDP connection for **all the listening states**.

```
$ ss -lu
```

6. List Unix Sockets

To display all the Unix sockets, you can use the `ss` command along with `-f unix` or `-x`.

```
$ ss -f unix
```



```
linoxide@linux: ~  
linoxide@linux:~$ ss -f unix  
Netid  State  Recv-Q  Send-Q  Peer Address:Port  Local Address:Port  Process  
u_str  ESTAB  0        0        * 58601                * 58602  
u_str  ESTAB  0        0        * 52464                @/tmp/dbus-IN24iBgK1K 49885  
u_str  ESTAB  0        0        * 33720                * 33720  
u_str  ESTAB  0        0        * 36617                /run/user/1001/bus 57427  
u_str  ESTAB  0        0        * 54675                /run/cups/cups.sock 35054  
u_str  ESTAB  0        0        * 37386                * 61512  
u_str  ESTAB  0        0        * 61513
```

7. List Raw Sockets

To display all the Raw sockets, you can use `-w` or `--raw` option.

```
$ ss -w
```



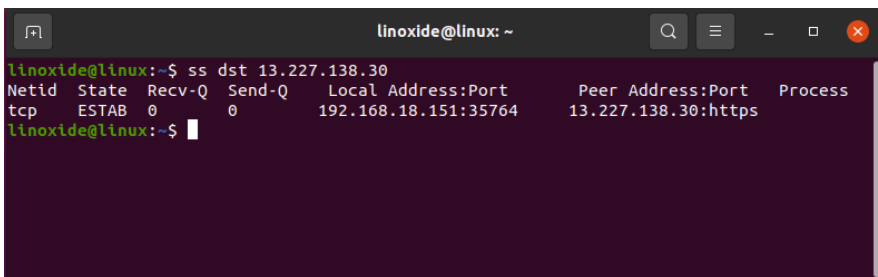
```
linoxide@linux: ~  
linoxide@linux:~$ ss --raw  
Recv-Q Send-Q Local Address:Port Peer Address:Port Process  
0 0 *:ipv6-icmp *:*
```

8. List connection of an IP address

We can use ss command to display the list connection of a specific destination or source IP address.

For example to list connection of destination IP address:

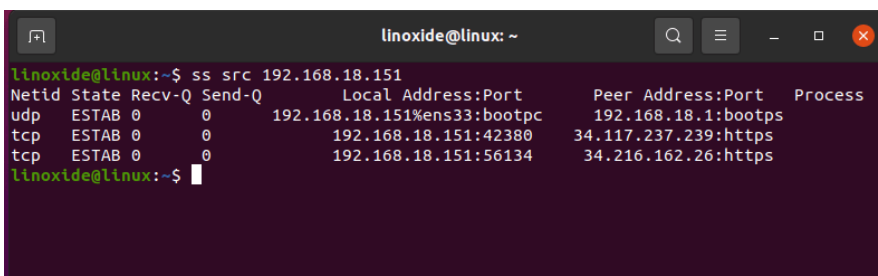
```
$ ss dst 13.227.138.30
```



```
linoxide@linux: ~  
linoxide@linux:~$ ss dst 13.227.138.30  
Netid State Recv-Q Send-Q Local Address:Port Peer Address:Port Process  
tcp ESTAB 0 0 192.168.18.151:35764 13.227.138.30:https  
linoxide@linux:~$
```

For example to list connection of source IP address:

```
$ ss src 192.168.18.151
```



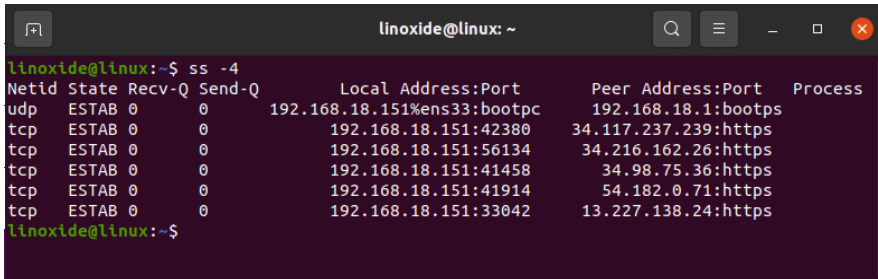
```
linoxide@linux: ~  
linoxide@linux:~$ ss src 192.168.18.151  
Netid State Recv-Q Send-Q Local Address:Port Peer Address:Port Process  
udp ESTAB 0 0 192.168.18.151:ens33:bootpc 192.168.18.1:bootps  
tcp ESTAB 0 0 192.168.18.151:42380 34.117.237.239:https  
tcp ESTAB 0 0 192.168.18.151:56134 34.216.162.26:https  
linoxide@linux:~$
```

9. List IPv4 and IPv6 Socket Connection

If you want to display the list of IPv4 socket connections use -4 option and -6 to display the list of IPv6 socket connections.

To display IPv4 socket connection list:

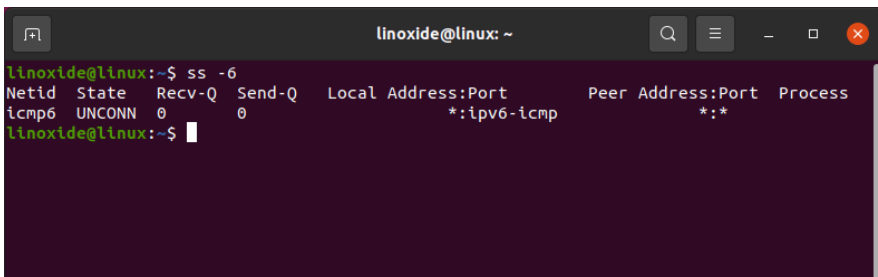
```
$ ss -4
```



```
linoxide@linux: ~  
linoxide@linux:~$ ss -4  
Netid State Recv-Q Send-Q Local Address:Port Peer Address:Port Process  
udp ESTAB 0 0 192.168.18.151:ens33:bootpc 192.168.18.1:bootps  
tcp ESTAB 0 0 192.168.18.151:42380 34.117.237.239:https  
tcp ESTAB 0 0 192.168.18.151:56134 34.216.162.26:https  
tcp ESTAB 0 0 192.168.18.151:41458 34.98.75.36:https  
tcp ESTAB 0 0 192.168.18.151:41914 54.182.0.71:https  
tcp ESTAB 0 0 192.168.18.151:33042 13.227.138.24:https  
linoxide@linux:~$
```

To display the IPv6 socket connection list:

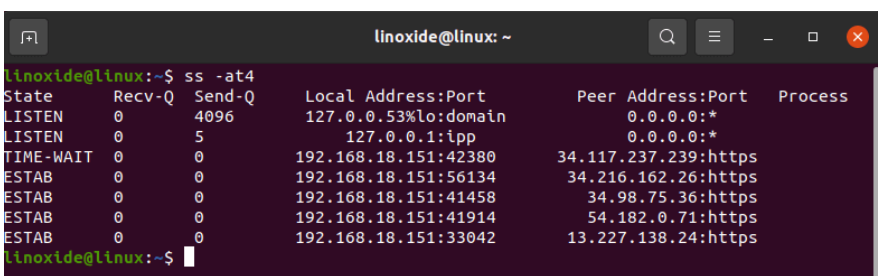
```
$ ss -6
```



```
linoxide@linux: ~  
linoxide@linux:~$ ss -6  
Netid State Recv-Q Send-Q Local Address:Port Peer Address:Port Process  
icmp6 UNCONN 0 0 *:ipv6-icmp *:*
```

To list all the IPv4 TCP connections, you can use the following example.

```
$ ss -at4
```

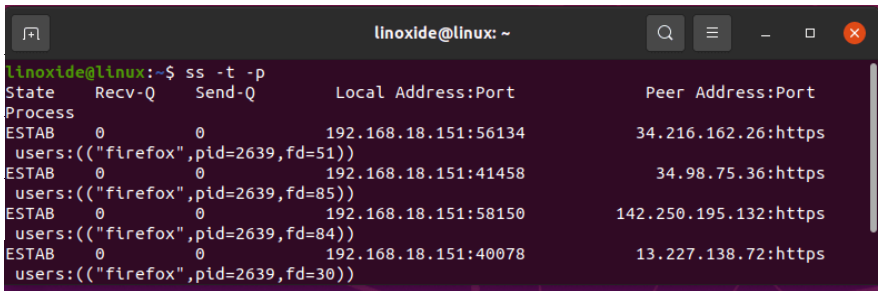


```
linoxide@linux: ~  
linoxide@linux:~$ ss -at4  
State Recv-Q Send-Q Local Address:Port Peer Address:Port Process  
LISTEN 0 4096 127.0.0.53%lo:domain 0.0.0.0:*  
LISTEN 0 5 127.0.0.1:ipp 0.0.0.0:*  
TIME-WAIT 0 0 192.168.18.151:42380 34.117.237.239:https  
ESTAB 0 0 192.168.18.151:56134 34.216.162.26:https  
ESTAB 0 0 192.168.18.151:41458 34.98.75.36:https  
ESTAB 0 0 192.168.18.151:41914 54.182.0.71:https  
ESTAB 0 0 192.168.18.151:33042 13.227.138.24:https  
linoxide@linux:~$
```

10. Identify processes

You can find the **processes of sockets** using the `-p` option along with the `ss` command. To identify the process, you will need `sudo` permission.

```
$ sudo ss -t -p
```



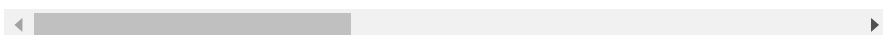
```
linoxide@linux: ~
linoxide@linux:~$ sudo ss -t -p
State      Recv-Q    Send-Q    Local Address:Port    Peer Address:Port
Process
ESTAB      0          0          192.168.18.151:56134    34.216.162.26:https
users:(("firefox",pid=2639,fd=51))
ESTAB      0          0          192.168.18.151:41458    34.98.75.36:https
users:(("firefox",pid=2639,fd=85))
ESTAB      0          0          192.168.18.151:58150    142.250.195.132:https
users:(("firefox",pid=2639,fd=84))
ESTAB      0          0          192.168.18.151:40078    13.227.138.72:https
users:(("firefox",pid=2639,fd=30))
```

11. List Connection with no hostname resolution

To resolve the numeric address/ports use `-r` (resolve) option. Whereas the `-n` option does not try to resolve service names.

Here in the example, you can see the difference between the two:

```
$ ss -tn
State Recv-Q Send-Q Local Address:Port Peer
ESTAB 0      0      74.208.235.196:22 48.19
$ ss -tr
State Recv-Q Send-Q Local Address:Port
ESTAB 0      64      li82-186.members.linode.c
$
```



12. Filter by Connection

Let's check few examples of how to apply filters to output specific information.

To filter TCP connection with state listening, type:

```
$ ss -t state listening
```

To display established ssh port connections:

```
$ ss -tr state established '( dport = :22 or sp
```



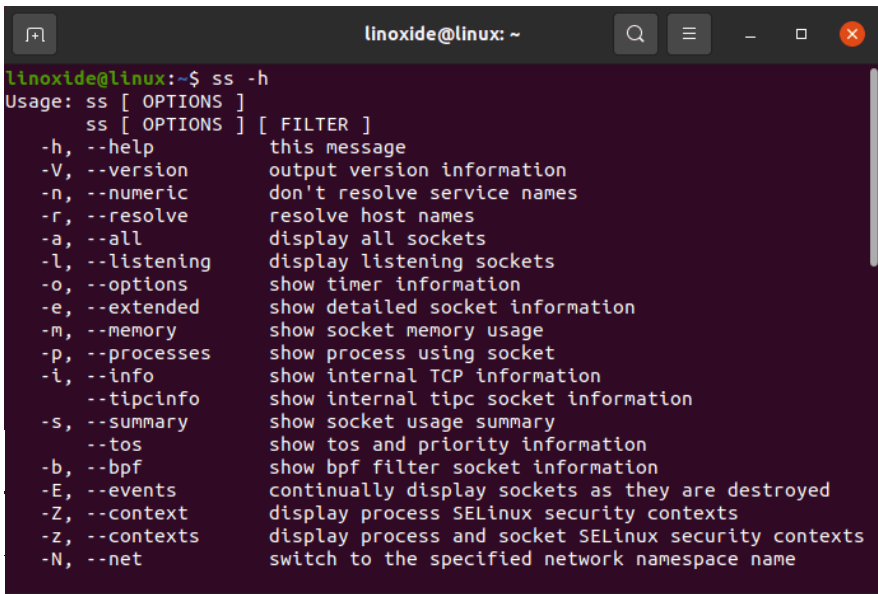
You can also the traditional way of grep command to filter. Here I am displaying all the TCP connections which are listening in the state:

```
$ ss -at | grep LISTEN
```

ss command options

The ss command provides various options to control the output to be displayed as per your requirement. You can use -h or --help along with the ss command to view the basic options available with the ss command-utility.

```
$ ss -h
```

A terminal window titled 'linoxide@linux: ~' showing the help output for the 'ss' command. The output lists various options and their descriptions, such as '-h, --help' for this message, '-V, --version' for output version information, and '-n, --numeric' for not resolving service names. The window has a dark background and standard Linux terminal window controls at the top.

```
linoxide@linux:~$ ss -h
Usage: ss [ OPTIONS ]
       ss [ OPTIONS ] [ FILTER ]
-h, --help                this message
-V, --version              output version information
-n, --numeric              don't resolve service names
-r, --resolve              resolve host names
-a, --all                  display all sockets
-l, --listening            display listening sockets
-o, --options              show timer information
-e, --extended             show detailed socket information
-m, --memory               show socket memory usage
-p, --processes            show process using socket
-i, --info                 show internal TCP information
    --tipcinfo             show internal tipc socket information
-s, --summary              show socket usage summary
    --tos                  show tos and priority information
-b, --bpf                  show bpf filter socket information
-E, --events               continually display sockets as they are destroyed
-Z, --context              display process SELinux security contexts
-z, --contexts             display process and socket SELinux security contexts
-N, --net                  switch to the specified network namespace name
```

ss vs netstat command

The ss tool is included under iproute2 package and its default in most Linux distributions. To have netstat you need to install net-tools, which is already deprecated.

The ss command is much faster as it fetches directly from the kernel. The ss is not a complete replacement of netstat, some of the netstat command is replaced by ip command.

Conclusion

In this tutorial, we learned about the ss command with some useful examples. You can refer [ss command man page](#) for more information.

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