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### ***Rocky Enterprise Linux 9.2 Manual Pages on command 'ss.8'***

**\$ man ss.8**

SS(8) System Manager's Manual SS(8)

NAME

ss - another utility to investigate sockets

SYNOPSIS

ss [options] [ FILTER ]

DESCRIPTION

ss is used to dump socket statistics. It allows showing information similar to netstat. It can display more TCP and state information than other tools.

OPTIONS

When no option is used ss displays a list of open non-listening sockets (e.g. TCP/UNIX/UDP) that have established connection.

-h, --help

Show summary of options.

-V, --version

Output version information.

-H, --no-header

Suppress header line.

-O, --oneline

Print each socket's data on a single line.

-n, --numeric

Do not try to resolve service names. Show exact bandwidth values, instead of human-readable.

-r, --resolve

Try to resolve numeric address/ports.

-a, --all

Display both listening and non-listening (for TCP this means established connections) sockets.

-l, --listening

Display only listening sockets (these are omitted by default).

-o, --options

Show timer information. For TCP protocol, the output format is:

timer:(<timer\_name>,<expire\_time>,<retrans>)

<timer\_name>

the name of the timer, there are five kind of timer names:

retrans : means one of these timers: TCP retrans timer, TCP early retrans timer and tail loss probe timer

keepalive: tcp keep alive timer

timewait: timewait stage timer

persist: zero window probe timer

unknown: none of the above timers

<expire\_time>

how long time the timer will expire

<retrans>

how many times the retransmission occurred

-e, --extended

Show detailed socket information. The output format is:

uid:<uid\_number> ino:<inode\_number> sk:<cookie>

<uid\_number>

the user id the socket belongs to

<inode\_number>

the socket's inode number in VFS

<cookie>

an uuid of the socket

-m, --memory

Show socket memory usage. The output format is:

```
skmem:(r<rmem_alloc>,rb<rcv_buf>,t<wmem_alloc>,tb<snd_buf>,  
      f<fwd_alloc>,w<wmem_queued>,o<opt_mem>,  
      bl<back_log>,d<sock_drop>)
```

<rmem\_alloc>

the memory allocated for receiving packet

<rcv\_buf>

the total memory can be allocated for receiving packet

<wmem\_alloc>

the memory used for sending packet (which has been sent to layer 3)

<snd\_buf>

the total memory can be allocated for sending packet

<fwd\_alloc>

the memory allocated by the socket as cache, but not used for receiving/sending packet yet. If need memory to send/receive packet, the memory in this cache will be used before allocate additional memory.

<wmem\_queued>

The memory allocated for sending packet (which has not been sent to layer 3)

<opt\_mem>

The memory used for storing socket option, e.g., the key for TCP MD5 signature

<back\_log>

The memory used for the sk backlog queue. On a process context, if the process is receiving packet, and a new packet is received, it will be put into the sk backlog

queue, so it can be received by the process immediately

<sock\_drop>

the number of packets dropped before they are de-multiplexed into the socket

-p, --processes

Show process using socket.

-T, --threads

Show thread using socket. Implies -p. -p.

-i, --info

Show internal TCP information. Below fields may appear:

ts show string "ts" if the timestamp option is set

sack show string "sack" if the sack option is set

ecn show string "ecn" if the explicit congestion notification option is set

ecnseen

show string "ecnseen" if the saw ecn flag is found in received packets

fastopen

show string "fastopen" if the fastopen option is set

cong\_alg

the congestion algorithm name, the default congestion algorithm is "cubic"

wscale:<snd\_wscale>:<rcv\_wscale>

if window scale option is used, this field shows the send scale factor and receive scale factor

rto:<icsk\_rto>

tcp re-transmission timeout value, the unit is milliseconds

backoff:<icsk\_backoff>

used for exponential backoff re-transmission, the actual re-transmission timeout value is  $icsk\_rto \ll ic\_sk\_backoff$

rtt:<rtt>/<rttvar>

rtt is the average round trip time, rttvar is the mean

deviation of rtt, their units are millisecond

ato:<ato>

ack timeout, unit is millisecond, used for delay ack mode

mss:<mss>

max segment size

cwnd:<cwnd>

congestion window size

pmtu:<pmtu>

path MTU value

ssthresh:<ssthresh>

tcp congestion window slow start threshold

bytes\_acked:<bytes\_acked>

bytes acked

bytes\_received:<bytes\_received>

bytes received

segs\_out:<segs\_out>

segments sent out

segs\_in:<segs\_in>

segments received

send <send\_bps>bps

egress bps

lastsnd:<lastsnd>

how long time since the last packet sent, the unit is  
millisecond

lastrcv:<lastrcv>

how long time since the last packet received, the unit is  
millisecond

lastack:<lastack>

how long time since the last ack received, the unit is  
millisecond

pacing\_rate <pacing\_rate>bps/<max\_pacing\_rate>bps

the pacing rate and max pacing rate

rcv\_space:<rcv\_space>

a helper variable for TCP internal auto tuning socket re?

ceive buffer

tcp-ulp-mptcp flags:[MmBbJjecv] token:<rem\_token(rem\_id)/loc\_to?

ken(loc\_id)> seq:<sn> sfseq:<ssn> ssnoff:<off> maplen:<maplen>

MPTCP subflow information

--tos Show ToS and priority information. Below fields may appear:

tos IPv4 Type-of-Service byte

tclass IPv6 Traffic Class byte

class\_id

Class id set by net\_cls cgroup. If class is zero this

shows priority set by SO\_PRIORITY.

--cgroup

Show cgroup information. Below fields may appear:

cgroup Cgroup v2 pathname. This pathname is relative to the  
mount point of the hierarchy.

--tipcinfo

Show internal tipc socket information.

-K, --kill

Attempts to forcibly close sockets. This option displays  
sockets that are successfully closed and silently skips  
sockets that the kernel does not support closing. It sup?  
ports IPv4 and IPv6 sockets only.

-s, --summary

Print summary statistics. This option does not parse  
socket lists obtaining summary from various sources. It  
is useful when amount of sockets is so huge that parsing  
/proc/net/tcp is painful.

-E, --events

Continually display sockets as they are destroyed

-Z, --context

As the -p option but also shows process security context.

If the -T option is used, also shows thread security con?

text.

For netlink(7) sockets the initiating process context is displayed as follows:

1. If valid pid show the process context.
2. If destination is kernel (pid = 0) show kernel initial context.
3. If a unique identifier has been allocated by the kernel or netlink user, show context as "unavailable". This will generally indicate that a process has more than one netlink socket active.

-z, --contexts

As the -Z option but also shows the socket context. The socket context is taken from the associated inode and is not the actual socket context held by the kernel. Sockets are typically labeled with the context of the creating process, however the context shown will reflect any policy role, type and/or range transition rules applied, and is therefore a useful reference.

-N NSNAME, --net=NSNAME

Switch to the specified network namespace name.

-b, --bpf

Show socket classic BPF filters (only administrators are allowed to get these information).

-4, --ipv4

Display only IP version 4 sockets (alias for -f inet).

-6, --ipv6

Display only IP version 6 sockets (alias for -f inet6).

-0, --packet

Display PACKET sockets (alias for -f link).

-t, --tcp

Display TCP sockets.

-u, --udp

Display UDP sockets.

-d, --dccp

Display DCCP sockets.

-w, --raw

Display RAW sockets.

-x, --unix

Display Unix domain sockets (alias for -f unix).

-S, --sctp

Display SCTP sockets.

--tipc Display tipc sockets (alias for -f tipc).

--vsock

Display vsock sockets (alias for -f vsock).

--xdp Display XDP sockets (alias for -f xdp).

-M, --mptcp

Display MPTCP sockets.

--inet-sockopt

Display inet socket options.

-f FAMILY, --family=FAMILY

Display sockets of type FAMILY. Currently the following families are supported: unix, inet, inet6, link, netlink, vsock, tipc, xdp.

-A QUERY, --query=QUERY, --socket=QUERY

List of socket tables to dump, separated by commas. The following identifiers are understood: all, inet, tcp, udp, raw, unix, packet, netlink, unix\_dgram, unix\_stream, unix\_seqpacket, packet\_raw, packet\_dgram, dccp, sctp, tipc, vsock\_stream, vsock\_dgram, xdp, mptcp. Any item in the list may optionally be prefixed by an exclamation mark (!) to exclude that socket table from being dumped.

-D FILE, --diag=FILE

Do not display anything, just dump raw information about TCP sockets to FILE after applying filters. If FILE is - stdout is used.

-F FILE, --filter=FILE



Read filter information from FILE. Each line of FILE is interpreted like single command line option. If FILE is - stdin is used.

`FILTER := [ state STATE-FILTER ] [ EXPRESSION ]`

Please take a look at the official documentation for de? tails regarding filters.

## STATE-FILTER

STATE-FILTER allows one to construct arbitrary set of states to match.

Its syntax is sequence of keywords state and exclude followed by identifier of state.

Available identifiers are:

All standard TCP states: established, syn-sent, syn-recv, fin-wait-1, fin-wait-2, time-wait, closed, close-wait, last-ack, listening and closing.

all - for all the states

connected - all the states except for listening and closed

synchronized - all the connected states except for syn-sent

bucket - states, which are maintained as minisockets, i.e.

time-wait and syn-recv

big - opposite to bucket

## EXPRESSION

EXPRESSION allows filtering based on specific criteria. EXPRESSION

consists of a series of predicates combined by boolean operators. The

possible operators in increasing order of precedence are or (or | or

||), and (or & or &&), and not (or !). If no operator is between con?

secutive predicates, an implicit and operator is assumed. Subexpres?

sions can be grouped with "(" and ")".

The following predicates are supported:

`{dst|src} [=] HOST`

Test if the destination or source matches HOST. See HOST SYNTAX for details.

`{dport|sport} [OP] [FAMILY:]PORT`

Compare the destination or source port to PORT. OP can be any of

"<", "<=", "=", "!=", ">=" and ">". Following normal arithmetic rules. FAMILY and PORT are as described in HOST SYNTAX below.

dev [=|!] DEVICE

Match based on the device the connection uses. DEVICE can either be a device name or the index of the interface.

fwmark [=|!] MASK

Matches based on the fwmark value for the connection. This can either be a specific mark value or a mark value followed by a "/" and a bitmask of which bits to use in the comparison. For example "fwmark = 0x01/0x03" would match if the two least significant bits of the fwmark were 0x01.

cgroup [=|!] PATH

Match if the connection is part of a cgroup at the given path.

autobound

Match if the port or path of the source address was automatically allocated (rather than explicitly specified).

Most operators have aliases. If no operator is supplied "=" is assumed.

Each of the following groups of operators are all equivalent:

? == eq

? != ne neq

? > gt

? < lt

? >= ge geq

? <= le leq

? ! not

? | || or

? & && and

## HOST SYNTAX

The general host syntax is [FAMILY:]ADDRESS[:PORT].

FAMILY must be one of the families supported by the -f option. If not given it defaults to the family given with the -f option, and if that is also missing, will assume either inet or inet6. Note that all host conditions in the expression should either all be the same family or be

only inet and inet6. If there is some other mixture of families, the results will probably be unexpected.

The form of ADDRESS and PORT depends on the family used. "\*" can be used as a wildcard for either the address or port. The details for each family are as follows:

unix ADDRESS is a glob pattern (see fnmatch(3)) that will be matched case-insensitively against the unix socket's address. Both path and abstract names are supported. Unix addresses do not support a port, and "\*" cannot be used as a wildcard.

link ADDRESS is the case-insensitive name of an Ethernet protocol to match. PORT is either a device name or a device index for the desired link device, as seen in the output of ip link.

netlink

ADDRESS is a descriptor of the netlink family. Possible values come from /etc/iproute2/nl\_protos. PORT is the port id of the socket, which is usually the same as the owning process id. The value "kernel" can be used to represent the kernel (port id of 0).

vsock ADDRESS is an integer representing the CID address, and PORT is the port.

inet and inet6

ADDRESS is an ip address (either v4 or v6 depending on the family) or a DNS hostname that resolves to an ip address of the required version. An ipv6 address must be enclosed in "[" and "]" to disambiguate the port separator. The address may additionally have a prefix length given in CIDR notation (a slash followed by the prefix length in bits). PORT is either the numerical socket port, or the service name for the port to match.

## USAGE EXAMPLES

```
ss -t -a
```

Display all TCP sockets.

```
ss -t -a -Z
```

Display all TCP sockets with process SELinux security contexts.

```
ss -u -a
```

Display all UDP sockets.

```
ss -o state established '( dport = :ssh or sport = :ssh )'
```

Display all established ssh connections.

```
ss -x src /tmp/.X11-unix/*
```

Find all local processes connected to X server.

```
ss -o state fin-wait-1 '( sport = :http or sport = :https ) dst  
193.233.7/24
```

List all the tcp sockets in state FIN-WAIT-1 for our apache to  
network 193.233.7/24 and look at their timers.

```
ss -a -A 'all,!tcp'
```

List sockets in all states from all socket tables but TCP.

#### SEE ALSO

ip(8),

RFC 793 - <https://tools.ietf.org/rfc/rfc793.txt> (TCP states)

#### AUTHOR

ss was written by Alexey Kuznetsov, <kuznet@ms2.inr.ac.ru>.

This manual page was written by Michael Prokop <mika@grml.org> for the  
Debian project (but may be used by others).

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