

**NAME**

**netstat** - show network status and statistics

**SYNOPSIS**

**netstat** [-j *jail*] [--libxo] [-46AaCLnPRSTWx] [-f *protocol\_family*] [-p *protocol*]

**netstat -i** | **-I** *interface*

[-j *jail*] [--libxo] [-46abdhnW] [-f *address\_family*] [-M *core*] [-N *system*]

**netstat -w** *wait*

[-j *jail*] [--libxo] [-I *interface*] [-46d] [-M *core*] [-N *system*] [-q *howmany*]

**netstat -s**

[-j *jail*] [--libxo] [-46sz] [-f *protocol\_family*] [-p *protocol*] [-M *core*] [-N *system*]

**netstat -i** | **-I** *interface* -s

[-j *jail*] [--libxo] [-46s] [-f *protocol\_family*] [-p *protocol*] [-M *core*] [-N *system*]

**netstat -m**

[-j *jail*] [--libxo] [-M *core*] [-N *system*]

**netstat -B**

[-j *jail*] [--libxo] [-z] [-I *interface*]

**netstat -r**

[-j *jail*] [--libxo] [-46nW] [-F *fibnum*] [-f *address\_family*]

**netstat -rs**

[-j *jail*] [--libxo] [-s] [-M *core*] [-N *system*]

**netstat -g**

[-j *jail*] [--libxo] [-46W] [-f *address\_family*]

**netstat -gs**

[-j *jail*] [--libxo] [-46s] [-f *address\_family*] [-M *core*] [-N *system*]

**netstat -Q**

[-j *jail*] [--libxo]

**DESCRIPTION**

The **netstat** command shows the contents of various network-related data structures. The arguments passed determine which of the below output formats the command uses.

**netstat** [-**46AaCLnRSTWx**] [-**f** *protocol\_family* | -**p** *protocol*] [-**j** *jail*]

Display a list of active sockets (protocol control blocks) for each network protocol.

The default display for active sockets shows the local and remote addresses, send and receive queue sizes (in bytes), protocol, and the internal state of the protocol. Address formats are of the form "host.port" or "network.port" if a socket's address specifies a network but no specific host address. When known, the host and network addresses are displayed symbolically according to the databases *hosts(5)* and *networks(5)*, respectively. If a symbolic name for an address is unknown, or if the **-n** option is specified, the address is printed numerically, according to the address family. For more information regarding the Internet IPv4 "dot format", refer to *inet(3)*. Unspecified, or "wildcard", addresses and ports appear as "\*".

**--libxo**

Generate output via *libxo(3)* in a selection of different human and machine readable formats. See *xo\_parse\_args(3)* for details on command line arguments.

- 4** Show IPv4 only. See *GENERAL OPTIONS*.
- 6** Show IPv6 only. See *GENERAL OPTIONS*.
- A** Show the address of a protocol control block (PCB) associated with a socket; used for debugging.
- a** Show the state of all sockets; normally sockets used by server processes are not shown.
- c** Show the used TCP stack for each session.
- C** Show the congestion control algorithm and diagnostic information of TCP sockets.
- L** Show the size of the various listen queues. The first count shows the number of unaccepted connections, the second count shows the amount of unaccepted incomplete connections, and the third count is the maximum number of queued connections.
- n** Do not resolve numeric addresses and port numbers to names. See *GENERAL OPTIONS*.
- P** Display the log ID for each socket.

- R**    Display the flowid and flowtype for each socket. flowid is a 32 bit hardware specific identifier for each flow. flowtype defines which protocol fields are hashed to produce the id. A complete listing is available in *sys/mbuf.h* under `M_HASHTYPE_*`.
- S**    Show network addresses as numbers (as with **-n**) but show ports symbolically.
- T**    Display diagnostic information from the TCP control block. Fields include the number of packets requiring retransmission, received out-of-order, and those advertising a zero-sized window.
- W**    Avoid truncating addresses even if this causes some fields to overflow.
- x**    Display socket buffer and TCP timer statistics for each internet socket.

The **-x** flag causes **netstat** to output all the information recorded about data stored in the socket buffers. The fields are:

R-HIWA	Receive buffer high water mark, in bytes.
S-HIWA	Send buffer high water mark, in bytes.
R-LOWA	Receive buffer low water mark, in bytes.
S-LOWA	Send buffer low water mark, in bytes.
R-BCNT	Receive buffer byte count.
S-BCNT	Send buffer byte count.
R-BMAX	Maximum bytes that can be used in the receive buffer.
S-BMAX	Maximum bytes that can be used in the send buffer.
rexmt	Time, in seconds, to fire Retransmit Timer, or 0 if not armed.
persist	Time, in seconds, to fire Retransmit Persistence, or 0 if not armed.
keep	Time, in seconds, to fire Keep Alive, or 0 if not armed.
2msl	Time, in seconds, to fire 2*msl TIME_WAIT Timer, or 0 if not armed.
delack	Time, in seconds, to fire Delayed ACK Timer, or 0 if not armed.
rcvtime	Time, in seconds, since last packet received.

**-f** *protocol\_family*

Filter by *protocol\_family*. See *GENERAL OPTIONS*.

**-p** *protocol*

Filter by *protocol*. See *GENERAL OPTIONS*.

**-j** *jail*    Run inside a jail. See *GENERAL OPTIONS*.

**netstat -i** | **-I** *interface* [**-4***abdhnW*] [**-f** *address\_family*] [**-M** *core*] [**-N** *system*] [**-j** *jail*]

Show the state of all network interfaces or a single *interface* which have been auto-configured (interfaces statically configured into a system, but not located at boot time are not shown). An asterisk ("\*") after an interface name indicates that the interface is "down".

When **netstat** is invoked with **-i** (all interfaces) or **-I** *interface*, it provides a table of cumulative statistics regarding packets transferred, errors, and collisions. The network addresses of the interface and the maximum transmission unit ("mtu") are also displayed. If both **-i** and **-I** are specified, **-I** overrides any instances of **-i**.

**-4** Show IPv4 only. See *GENERAL OPTIONS*.

**-6** Show IPv6 only. See *GENERAL OPTIONS*.

**-a** Multicast addresses currently in use are shown for each Ethernet interface and for each IP interface address. Multicast addresses are shown on separate lines following the interface address with which they are associated.

**-b** Show the number of bytes in and out.

**-d** Show the number of dropped packets.

**-h** Print all counters in human readable form.

**-n** Do not resolve numeric addresses and port numbers to names. See *GENERAL OPTIONS*.

**-W** Avoid truncating addresses even if this causes some fields to overflow. See *GENERAL OPTIONS*. However, in most cases field widths are determined automatically with the **-i** option, and this option has little effect.

**-f** *protocol\_family*

Filter by *protocol\_family*. See *GENERAL OPTIONS*.

**-j** *jail* Run inside a jail. See *GENERAL OPTIONS*.

**netstat -w** *wait* [**-I** *interface*] [**-46d**] [**-M** *core*] [**-N** *system*] [**-q** *howmany*] [**-j** *jail*]

At intervals of *wait* seconds, display the information regarding packet traffic on all configured network interfaces or a single *interface*.

When **netstat** is invoked with the **-w** option and a *wait* interval argument, it displays a running count of statistics related to network interfaces. An obsolescent version of this option used a numeric parameter with no option, and is currently supported for backward compatibility. By default, this display summarizes information for all interfaces. Information for a specific interface may be displayed with the **-I** *interface* option.

**-I** *interface*

Only show information regarding *interface*

**-4** Show IPv4 only. See *GENERAL OPTIONS*.

**-6** Show IPv6 only. See *GENERAL OPTIONS*.

**-d** Show the number of dropped packets.

**-M** Use an alternative core. See *GENERAL OPTIONS*.

**-N** Use an alternative kernel image. See *GENERAL OPTIONS*.

**-q** Exit after *howmany* outputs.

**-j** *jail* Run inside a jail. See *GENERAL OPTIONS*.

**netstat -s [-46sz] [-f *protocol\_family* | -p *protocol*] [-M *core*] [-N *system*] [-j *jail*]**

Display system-wide statistics for each network protocol.

**-4** Show IPv4 only. See *GENERAL OPTIONS*.

**-6** Show IPv6 only. See *GENERAL OPTIONS*.

**-s** If **-s** is repeated, counters with a value of zero are suppressed.

**-z** Reset statistic counters after displaying them.

**-f** *protocol\_family*

Filter by *protocol\_family*. See *GENERAL OPTIONS*.

**-p** *protocol*

Filter by *protocol*. See *GENERAL OPTIONS*.

**-M** Use an alternative core. See *GENERAL OPTIONS*.

**-N** Use an alternative kernel image See *GENERAL OPTIONS*.

**-j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -i | -I interface -s [-46s] [-f protocol\_family | -p protocol] [-M core] [-N system] [-j jail]**  
Display per-interface statistics for each network protocol. If both **-i** and **-I** are specified, **-I** overrides any instances of **-i**.

**-4** Show IPv4 only See *GENERAL OPTIONS*.

**-6** Show IPv6 only See *GENERAL OPTIONS*.

**-s** If **-s** is repeated, counters with a value of zero are suppressed.

**-f protocol\_family**  
Filter by *protocol\_family*. See *GENERAL OPTIONS*.

**-p protocol**  
Filter by *protocol*. See *GENERAL OPTIONS*.

**-M** Use an alternative core See *GENERAL OPTIONS*.

**-N** Use an alternative kernel image See *GENERAL OPTIONS*.

**-j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -m [-M core] [-N system] [-j jail]**  
Show statistics recorded by the memory management routines (mbuf(9)). The network manages a private pool of memory buffers.

**-M** Use an alternative core See *GENERAL OPTIONS*.

**-N** Use an alternative kernel image See *GENERAL OPTIONS*.

**-j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -B [-z] [-I interface] [-j jail]**  
Show statistics about bpf(4) peers. This includes information like how many packets have been

matched, dropped and received by the bpf device, also information about current buffer sizes and device states.

The bpf(4) flags displayed when **netstat** is invoked with the **-B** option represent the underlying parameters of the bpf peer. Each flag is represented as a single lower case letter. The mapping between the letters and flags in order of appearance are:

- p Set if listening promiscuously
- i BIOCMEDIATE has been set on the device
- f BIOCGHDCMPLT status: source link addresses are being filled automatically
- s BIOCGSEESSENT status: see packets originating locally and remotely on the interface.
- a Packet reception generates a signal
- l BIOLOCK status: descriptor has been locked

For more information about these flags, please refer to bpf(4).

**-z** Reset statistic counters after displaying them.

**-j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -r [-46AnW] [-F fibnum] [-f address\_family] [-M core] [-N system] [-j jail]**

Display the contents of routing tables.

When **netstat** is invoked with the routing table option **-r**, it lists the available routes and their status. Each route consists of a destination host or network, and a gateway to use in forwarding packets. The flags field shows a collection of information about the route stored as binary choices. The individual flags are discussed in more detail in the route(8) and route(4) manual pages. The mapping between letters and flags is:

1	RTF_PROTO1	Protocol specific routing flag #1
2	RTF_PROTO2	Protocol specific routing flag #2
3	RTF_PROTO3	Protocol specific routing flag #3
B	RTF_BLACKHOLE	Just discard pkts (during updates)
b	RTF_BROADCAST	The route represents a broadcast address
D	RTF_DYNAMIC	Created dynamically (by redirect)
G	RTF_GATEWAY	Destination requires forwarding by intermediary
H	RTF_HOST	Host entry (net otherwise)
L	RTF_LLINFO	Valid protocol to link address translation
M	RTF_MODIFIED	Modified dynamically (by redirect)
R	RTF_REJECT	Host or net unreachable

S	RTF_STATIC	Manually added
U	RTF_UP	Route usable
X	RTF_XRESOLVE	External daemon translates proto to link address

Direct routes are created for each interface attached to the local host; the gateway field for such entries shows the address of the outgoing interface. The refcnt field gives the current number of active uses of the route. Connection oriented protocols normally hold on to a single route for the duration of a connection while connectionless protocols obtain a route while sending to the same destination. The use field provides a count of the number of packets sent using that route. The interface entry indicates the network interface utilized for the route.

- 4** Show IPv4 only. See *GENERAL OPTIONS*.
- 6** Show IPv6 only. See *GENERAL OPTIONS*.
- n** Do not resolve numeric addresses and port numbers to names. See *GENERAL OPTIONS*.
- W** Show the path MTU for each route, and print interface names with a wider field size.
- F** Display the routing table with the number *fibnum*. If the specified *fibnum* is -1 or **-F** is not specified, the default routing table is displayed.
- f** Display the routing table for a particular *address\_family*.
- M** Use an alternative core See *GENERAL OPTIONS*.
- N** Use an alternative kernel image See *GENERAL OPTIONS*.
- j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -rs [-s] [-M core] [-N system] [-j jail]**

Display routing statistics.

- s** If **-s** is repeated, counters with a value of zero are suppressed.
- M** Use an alternative core See *GENERAL OPTIONS*.
- N** Use an alternative kernel image See *GENERAL OPTIONS*.



**-j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -g [-46W] [-f address\_family] [-M core] [-N system] [-j jail]**

Display the contents of the multicast virtual interface tables, and multicast forwarding caches. Entries in these tables will appear only when the kernel is actively forwarding multicast sessions. This option is applicable only to the **inet** and **inet6** address families.

**-4** Show IPv4 only See *GENERAL OPTIONS*.

**-6** Show IPv6 only See *GENERAL OPTIONS*.

**-W** Avoid truncating addresses even if this causes some fields to overflow.

**-f protocol\_family**  
Filter by *protocol\_family*. See *GENERAL OPTIONS*.

**-M** Use an alternative core See *GENERAL OPTIONS*.

**-N** Use an alternative kernel image See *GENERAL OPTIONS*.

**-j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -gs [-46s] [-f address\_family] [-M core] [-N system] [-j jail]**

Show multicast routing statistics.

**-4** Show IPv4 only See *GENERAL OPTIONS*.

**-6** Show IPv6 only See *GENERAL OPTIONS*.

**-s** If **-s** is repeated, counters with a value of zero are suppressed.

**-f protocol\_family**  
Filter by *protocol\_family*. See *GENERAL OPTIONS*.

**-M** Use an alternative core See *GENERAL OPTIONS*.

**-N** Use an alternative kernel image See *GENERAL OPTIONS*.

**-j jail** Run inside a jail. See *GENERAL OPTIONS*.

**netstat -Q [-j jail]**

Show netisr(9) statistics. The flags field shows available ISR handlers:

C	NETISR_SNP_FLAGS_M2CPUID	Able to map mbuf to cpu id
D	NETISR_SNP_FLAGS_DRAINEDCPU	Has queue drain handler
F	NETISR_SNP_FLAGS_M2FLOW	Able to map mbuf to flow id
<b>-j jail</b> Run inside a jail. See <i>GENERAL OPTIONS</i> .		

**GENERAL OPTIONS**

Some options have the general meaning:

**-4** Is shorthand for **-f inet** (Show only IPv4)

**-6** Is shorthand for **-f inet6** (Show only IPv6)

**-f address\_family, -p protocol**

Limit display to those records of the specified *address\_family* or a single *protocol*. The following address families and protocols are recognized:

<i>Family</i>	<i>Protocols</i>
<b>inet</b> (AF_INET)	<b>divert, icmp, igmp, ip, ipsec, pim, sctp, tcp, udp</b>
<b>inet6</b> (AF_INET6)	<b>icmp6, ip6, ipsec6, rip6, sctp, tcp, udp</b>
<b>pfkey</b> (PF_KEY)	<b>pfkey</b>
<b>netgraph, ng</b> (AF_NETGRAPH)	<b>ctrl, data</b>
<b>unix</b> (AF_UNIX)	
<b>link</b> (AF_LINK)	

The program will complain if *protocol* is unknown or if there is no statistics routine for it.

**-M** Extract values associated with the name list from the specified core instead of the default */dev/kmem*.

**-N** Extract the name list from the specified system instead of the default, which is the kernel image the system has booted from.

**-n** Show network addresses and ports as numbers. Normally **netstat** attempts to resolve addresses and ports, and display them symbolically.

**-W** Wider output; expand address fields, etc, to avoid truncation. Non-numeric values such as domain names may still be truncated; use the **-n** option if necessary to avoid ambiguity.

**-j jail**

Perform the actions inside the *jail*. This allows network state to be accessed even if the **netstat** binary is not available in the *jail*.

**EXAMPLES**

Show packet traffic information (packets, bytes, errors, packet drops, etc) for interface re0 updated every 2 seconds and exit after 5 outputs:

```
$ netstat -w 2 -q 5 -I re0
```

Show statistics for ICMP on any interface:

```
$ netstat -s -p icmp
```

Show routing tables:

```
$ netstat -r
```

Same as above, but without resolving numeric addresses and port numbers to names:

```
$ netstat -rn
```

**SEE ALSO**

fstat(1), nfsstat(1), procstat(1), ps(1), sockstat(1), libxo(3), xo\_parse\_args(3), bpf(4), inet(4), route(4), unix(4), hosts(5), networks(5), protocols(5), services(5), iostat(8), route(8), vmstat(8), mbuf(9)

**HISTORY**

The **netstat** command appeared in 4.2BSD.

IPv6 support was added by WIDE/KAME project.

**BUGS**

The notion of errors is ill-defined.