

**NAME**

**ps** – report a snapshot of the current processes.

**SYNOPSIS**

**ps** [*options*]

**DESCRIPTION**

**ps** displays information about a selection of the active processes. If you want a repetitive update of the selection and the displayed information, use **top** instead.

This version of **ps** accepts several kinds of options:

- 1 UNIX options, which may be grouped and must be preceded by a dash.
- 2 BSD options, which may be grouped and must not be used with a dash.
- 3 GNU long options, which are preceded by two dashes.

Options of different types may be freely mixed, but conflicts can appear. There are some synonymous options, which are functionally identical, due to the many standards and **ps** implementations that this **ps** is compatible with.

Note that **ps -aux** is distinct from **ps aux**. The POSIX and UNIX standards require that **ps -aux** print all processes owned by a user named *x*, as well as printing all processes that would be selected by the **-a** option. If the user named *x* does not exist, this **ps** may interpret the command as **ps aux** instead and print a warning. This behavior is intended to aid in transitioning old scripts and habits. It is fragile, subject to change, and thus should not be relied upon.

By default, **ps** selects all processes with the same effective user ID (*euid=EUID*) as the current user and associated with the same terminal as the invoker. It displays the process ID (*pid=PID*), the terminal associated with the process (*tname=TTY*), the cumulated CPU time in *[DD-]hh:mm:ss* format (*time=TIME*), and the executable name (*ucmd=CMD*). Output is unsorted by default.

The use of BSD-style options will add process state (*stat=STAT*) to the default display and show the command args (*args=COMMAND*) instead of the executable name. You can override this with the **PS\_FORMAT** environment variable. The use of BSD-style options will also change the process selection to include processes on other terminals (TTYs) that are owned by you; alternately, this may be described as setting the selection to be the set of all processes filtered to exclude processes owned by other users or not on a terminal. These effects are not considered when options are described as being "identical" below, so **-M** will be considered identical to **Z** and so on.

Except as described below, process selection options are additive. The default selection is discarded, and then the selected processes are added to the set of processes to be displayed. A process will thus be shown if it meets any of the given selection criteria.

**EXAMPLES**

To see every process on the system using standard syntax:

```
ps -e  
ps -ef  
ps -eF  
ps -ely
```

To see every process on the system using BSD syntax:

```
ps ax  
ps axu
```

To print a process tree:

```
ps -ejH  
ps axjf
```

To get info about threads:

```
ps -eLf  
ps axms
```

To get security info:

```
ps -eo euser,ruser,suser,fuser,f,comm,label
ps axZ
ps -eM
```

To see every process running as root (real & effective ID) in user format:

```
ps -U root -u root u
```

To see every process with a user-defined format:

```
ps -eo pid,tid,class,rtprio,ni,pri,psr,pcpu,stat,wchan:14,comm
ps axo stat,euid,ruid,tt,tpgid,sses,pgrp,ppid,pid,pcpu,comm
ps -Ao pid,tt,user,fname,tmout,f,wchan
```

Print only the process IDs of syslogd:

```
ps -C syslogd -o pid=
```

Print only the name of PID 42:

```
ps -q 42 -o comm=
```

## SIMPLE PROCESS SELECTION

- a** Lift the BSD-style "only yourself" restriction, which is imposed upon the set of all processes when some BSD-style (without "-") options are used or when the **ps** personality setting is BSD-like. The set of processes selected in this manner is in addition to the set of processes selected by other means. An alternate description is that this option causes **ps** to list all processes with a terminal (tty), or to list all processes when used together with the **x** option.
- A** Select all processes. Identical to **-e**.
- a** Select all processes except both session leaders (see *getsid(2)*) and processes not associated with a terminal.
- d** Select all processes except session leaders.
- deselect**  
Select all processes except those that fulfill the specified conditions (negates the selection). Identical to **-N**.
- e** Select all processes. Identical to **-A**.
- g** Really all, even session leaders. This flag is obsolete and may be discontinued in a future release. It is normally implied by the **a** flag, and is only useful when operating in the sunos4 personality.
- N** Select all processes except those that fulfill the specified conditions (negates the selection). Identical to **--deselect**.
- T** Select all processes associated with this terminal. Identical to the **t** option without any argument.
- r** Restrict the selection to only running processes.
- x** Lift the BSD-style "must have a tty" restriction, which is imposed upon the set of all processes when some BSD-style (without "-") options are used or when the **ps** personality setting is BSD-like. The set of processes selected in this manner is in addition to the set of processes selected by other means. An alternate description is that this option causes **ps** to list all processes owned by you (same EUID as **ps**), or to list all processes when used together with the **a** option.

## PROCESS SELECTION BY LIST

These options accept a single argument in the form of a blank-separated or comma-separated list. They can be used multiple times. For example: **ps -p "1 2" -p 3,4**

**-123** Identical to **--pid 123**.

**123** Identical to **--pid 123**.

**-C cmdlist**

Select by command name. This selects the processes whose executable name is given in *cmdlist*.

NOTE: The command name is not the same as the command line. Previous versions of procs and

the kernel truncated this command name to 15 characters. This limitation is no longer present in both. If you depended on matching only 15 characters, you may no longer get a match.

**-G *grplist***

Select by real group ID (RGID) or name. This selects the processes whose real group name or ID is in the *grplist* list. The real group ID identifies the group of the user who created the process, see *getgid(2)*.

**-g *grplist***

Select by session OR by effective group name. Selection by session is specified by many standards, but selection by effective group is the logical behavior that several other operating systems use. This **ps** will select by session when the list is completely numeric (as sessions are). Group ID numbers will work only when some group names are also specified. See the **-s** and **--group** options.

**--Group *grplist***

Select by real group ID (RGID) or name. Identical to **-G**.

**--group *grplist***

Select by effective group ID (EGID) or name. This selects the processes whose effective group name or ID is in *grplist*. The effective group ID describes the group whose file access permissions are used by the process (see *getegid(2)*). The **-g** option is often an alternative to **--group**.

**p *pidlist***

Select by process ID. Identical to **-p** and **--pid**.

**-p *pidlist***

Select by PID. This selects the processes whose process ID numbers appear in *pidlist*. Identical to **p** and **--pid**.

**--pid *pidlist***

Select by process ID. Identical to **-p** and **p**.

**--ppid *pidlist***

Select by parent process ID. This selects the processes with a parent process ID in *pidlist*. That is, it selects processes that are children of those listed in *pidlist*.

**q *pidlist***

Select by process ID (quick mode). Identical to **-q** and **--quick-pid**.

**-q *pidlist***

Select by PID (quick mode). This selects the processes whose process ID numbers appear in *pidlist*. With this option **ps** reads the necessary info only for the pids listed in the *pidlist* and doesn't apply additional filtering rules. The order of pids is unsorted and preserved. No additional selection options, sorting and forest type listings are allowed in this mode. Identical to **q** and **--quick-pid**.

**--quick-pid *pidlist***

Select by process ID (quick mode). Identical to **-q** and **q**.

**-s *sesslist***

Select by session ID. This selects the processes with a session ID specified in *sesslist*.

**--sid *sesslist***

Select by session ID. Identical to **-s**.

**t *ttylist*** Select by tty. Nearly identical to **-t** and **--tty**, but can also be used with an empty *ttylist* to indicate the terminal associated with **ps**. Using the **T** option is considered cleaner than using **t** with an empty *ttylist*.

**-t *ttylist***

Select by tty. This selects the processes associated with the terminals given in *ttylist*. Terminals (ttys, or screens for text output) can be specified in several forms: */dev/ttyS1*, *ttyS1*, *S1*. A plain

"-" may be used to select processes not attached to any terminal.

**--tty** *ttylist*

Select by terminal. Identical to **-t** and **t**.

**U** *userlist*

Select by effective user ID (EUID) or name. This selects the processes whose effective user name or ID is in *userlist*. The effective user ID describes the user whose file access permissions are used by the process (see *geteuid(2)*). Identical to **-u** and **--user**.

**-U** *userlist*

Select by real user ID (RUID) or name. It selects the processes whose real user name or ID is in the *userlist* list. The real user ID identifies the user who created the process, see *getuid(2)*.

**-u** *userlist*

Select by effective user ID (EUID) or name. This selects the processes whose effective user name or ID is in *userlist*.

The effective user ID describes the user whose file access permissions are used by the process (see *geteuid(2)*). Identical to **U** and **--user**.

**--User** *userlist*

Select by real user ID (RUID) or name. Identical to **-U**.

**--user** *userlist*

Select by effective user ID (EUID) or name. Identical to **-u** and **U**.

## OUTPUT FORMAT CONTROL

These options are used to choose the information displayed by **ps**. The output may differ by personality.

**-c** Show different scheduler information for the **-l** option.

**--context**

Display security context format (for SELinux).

**-f** Do full-format listing. This option can be combined with many other UNIX-style options to add additional columns. It also causes the command arguments to be printed. When used with **-L**, the NLWP (number of threads) and LWP (thread ID) columns will be added. See the **c** option, the format keyword **args**, and the format keyword **comm**.

**-F** Extra full format. See the **-f** option, which **-F** implies.

**--format** *format*

user-defined format. Identical to **-o** and **o**.

**j** BSD job control format.

**-j** Jobs format.

**l** Display BSD long format.

**-l** Long format. The **-y** option is often useful with this.

**-M** Add a column of security data. Identical to **Z** (for SELinux).

**O** *format*

is preloaded **o** (overloaded). The BSD **O** option can act like **-O** (user-defined output format with some common fields predefined) or can be used to specify sort order. Heuristics are used to determine the behavior of this option. To ensure that the desired behavior is obtained (sorting or formatting), specify the option in some other way (e.g. with **-O** or **--sort**). When used as a formatting option, it is identical to **-O**, with the BSD personality.

**-O** *format*

Like **-o**, but preloaded with some default columns. Identical to **-o pid,format,state,tname,time,command** or **-o pid,format,tname,time,cmd**, see **-o** below.

**o** *format*

Specify user-defined format. Identical to **-o** and **--format**.

**-o** *format*

User-defined format. *format* is a single argument in the form of a blank-separated or comma-separated list, which offers a way to specify individual output columns. The recognized keywords are described in the **STANDARD FORMAT SPECIFIERS** section below. Headers may be renamed (**ps -o pid,ruser=RealUser -o comm=Command**) as desired. If all column headers are empty (**ps -o pid= -o comm=**) then the header line will not be output. Column width will increase as needed for wide headers; this may be used to widen up columns such as **WCHAN** (**ps -o pid,wchan=WIDE-WCHAN-COLUMN -o comm**). Explicit width control (**ps opid, wchan:42,cmd**) is offered too. The behavior of **ps -o pid=X,comm=Y** varies with personality; output may be one column named "X,comm=Y" or two columns named "X" and "Y". Use multiple **-o** options when in doubt. Use the **PS\_FORMAT** environment variable to specify a default as desired; **DefSysV** and **DefBSD** are macros that may be used to choose the default UNIX or BSD columns.

**s** Display signal format.

**u** Display user-oriented format.

**v** Display virtual memory format.

**X** Register format.

**-y** Do not show flags; show rss in place of addr. This option can only be used with **-l**.

**Z** Add a column of security data. Identical to **-M** (for SELinux).

**OUTPUT MODIFIERS**

**c** Show the true command name. This is derived from the name of the executable file, rather than from the argv value. Command arguments and any modifications to them are thus not shown. This option effectively turns the **args** format keyword into the **comm** format keyword; it is useful with the **-f** format option and with the various BSD-style format options, which all normally display the command arguments. See the **-f** option, the format keyword **args**, and the format keyword **comm**.

**--cols** *n*

Set screen width.

**--columns** *n*

Set screen width.

**--cumulative**

Include some dead child process data (as a sum with the parent).

**e** Show the environment after the command.

**f** ASCII art process hierarchy (forest).

**--forest**

ASCII art process tree.

**h** No header. (or, one header per screen in the BSD personality). The **h** option is problematic. Standard BSD **ps** uses this option to print a header on each page of output, but older Linux **ps** uses this option to totally disable the header. This version of **ps** follows the Linux usage of not printing the header unless the BSD personality has been selected, in which case it prints a header on each page of output. Regardless of the current personality, you can use the long options **--headers** and **--no-headers** to enable printing headers each page or disable headers entirely, respectively.

**-H** Show process hierarchy (forest).

**--headers**

Repeat header lines, one per page of output.

**k spec** Specify sorting order. Sorting syntax is `[+|-]key[, [+|-]key[,...]]`. Choose a multi-letter key from the **STANDARD FORMAT SPECIFIERS** section. The "+" is optional since default direction is increasing numerical or lexicographic order. Identical to **--sort**.

Examples:

**ps jaxkuid,-ppid,+pid**

**ps axk comm o comm,args**

**ps kstart\_time -ef**

**--lines n**

Set screen height.

**n** Numeric output for WCHAN and USER (including all types of UID and GID).

**--no-headers**

Print no header line at all. **--no-heading** is an alias for this option.

**O order**

Sorting order (overloaded). The BSD **O** option can act like **-O** (user-defined output format with some common fields predefined) or can be used to specify sort order. Heuristics are used to determine the behavior of this option. To ensure that the desired behavior is obtained (sorting or formatting), specify the option in some other way (e.g. with **-O** or **--sort**).

For sorting, obsolete BSD **O** option syntax is **O**`[+|-]k1[, [+|-]k2[,...]]`. It orders the processes listing according to the multilevel sort specified by the sequence of one-letter short keys *k1*, *k2*, ... described in the **OBSOLETE SORT KEYS** section below. The "+" is currently optional, merely re-iterating the default direction on a key, but may help to distinguish an **O** sort from an **O** format. The "-" reverses direction only on the key it precedes.

**--rows n**

Set screen height.

**S** Sum up some information, such as CPU usage, from dead child processes into their parent. This is useful for examining a system where a parent process repeatedly forks off short-lived children to do work.

**--sort spec**

Specify sorting order. Sorting syntax is `[+|-]key[, [+|-]key[,...]]`. Choose a multi-letter key from the **STANDARD FORMAT SPECIFIERS** section. The "+" is optional since default direction is increasing numerical or lexicographic order. Identical to **k**. For example: **ps jax --sort=uid, -ppid,+pid**

**w** Wide output. Use this option twice for unlimited width.

**-w** Wide output. Use this option twice for unlimited width.

**--width n**

Set screen width.

## THREAD DISPLAY

**H** Show threads as if they were processes.

**-L** Show threads, possibly with LWP and NLWP columns.

**m** Show threads after processes.

**-m** Show threads after processes.

**-T** Show threads, possibly with SPID column.

## OTHER INFORMATION

**--help section**

Print a help message. The *section* argument can be one of *simple*, *list*, *output*, *threads*, *misc*, or *all*. The argument can be shortened to one of the underlined letters as in: `s|l|o|t|m|a`.

- info** Print debugging info.
- L** List all format specifiers.
- V** Print the procps-ng version.
- V** Print the procps-ng version.
- version**  
Print the procps-ng version.

## NOTES

This **ps** works by reading the virtual files in `/proc`. This **ps** does not need to be `setuid kmem` or have any privileges to run. Do not give this **ps** any special permissions.

CPU usage is currently expressed as the percentage of time spent running during the entire lifetime of a process. This is not ideal, and it does not conform to the standards that **ps** otherwise conforms to. CPU usage is unlikely to add up to exactly 100%.

The **SIZE** and **RSS** fields don't count some parts of a process including the page tables, kernel stack, `struct thread_info`, and `struct task_struct`. This is usually at least 20 KiB of memory that is always resident. **SIZE** is the virtual size of the process (code+data+stack).

Processes marked `<defunct>` are dead processes (so-called "zombies") that remain because their parent has not destroyed them properly. These processes will be destroyed by `init(8)` if the parent process exits.

If the length of the username is greater than the length of the display column, the username will be truncated. See the **-o** and **-O** formatting options to customize length.

Commands options such as **ps -aux** are not recommended as it is a confusion of two different standards. According to the POSIX and UNIX standards, the above command asks to display all processes with a TTY (generally the commands users are running) plus all processes owned by a user named *x*. If that user doesn't exist, then **ps** will assume you really meant **ps aux**.

## PROCESS FLAGS

The sum of these values is displayed in the "F" column, which is provided by the **flags** output specifier:

- 1 forked but didn't exec
- 4 used super-user privileges

## PROCESS STATE CODES

Here are the different values that the **s**, **stat** and **state** output specifiers (header "STAT" or "S") will display to describe the state of a process:

- D uninterruptible sleep (usually IO)
- I Idle kernel thread
- R running or runnable (on run queue)
- S interruptible sleep (waiting for an event to complete)
- T stopped by job control signal
- t stopped by debugger during the tracing
- W paging (not valid since the 2.6.xx kernel)
- X dead (should never be seen)
- Z defunct ("zombie") process, terminated but not reaped by its parent

For BSD formats and when the **stat** keyword is used, additional characters may be displayed:

- < high-priority (not nice to other users)
- N low-priority (nice to other users)
- L has pages locked into memory (for real-time and custom IO)
- s is a session leader
- l is multi-threaded (using `CLONE_THREAD`, like NPTL pthreads do)
- +

## OBSOLETE SORT KEYS

These keys are used by the BSD **O** option (when it is used for sorting). The GNU **---sort** option doesn't use these keys, but the specifiers described below in the **STANDARD FORMAT SPECIFIERS** section. Note that the values used in sorting are the internal values **ps** uses and not the "cooked" values used in some of the output format fields (e.g. sorting on **tty** will sort into device number, not according to the terminal name displayed). Pipe **ps** output into the **sort(1)** command if you want to sort the cooked values.

KEY	LONG	DESCRIPTION
c	cmd	simple name of executable
C	pcpu	cpu utilization
f	flags	flags as in long format F field
g	pgrp	process group ID
G	tpgid	controlling tty process group ID
j	cutime	cumulative user time
J	cstime	cumulative system time
k	utime	user time
m	minflt	number of minor page faults
M	majflt	number of major page faults
n	cminflt	cumulative minor page faults
N	cmajflt	cumulative major page faults
o	session	session ID
p	pid	process ID
P	ppid	parent process ID
r	rss	resident set size
R	resident	resident pages
s	size	memory size in kilobytes
S	share	amount of shared pages
t	tty	the device number of the controlling tty
T	start_time	time process was started
U	uid	user ID number
u	user	user name
v	vsize	total VM size in KiB
y	priority	kernel scheduling priority

## AIX FORMAT DESCRIPTORS

This **ps** supports AIX format descriptors, which work somewhat like the formatting codes of *printf(1)* and *printf(3)*. For example, the normal default output can be produced with this: **ps -eo "%p %y %x %c"**. The **NORMAL** codes are described in the next section.

CODE	NORMAL	HEADER
%C	pcpu	%CPU
%G	group	GROUP
%P	ppid	PPID
%U	user	USER
%a	args	COMMAND
%c	comm	COMMAND
%g	rgroup	RGROUP
%n	nice	NI
%p	pid	PID
%r	pgid	PGID
%t	etime	ELAPSED
%u	ruser	RUSER
%x	time	TIME
%y	tty	TTY
%z	vsz	VSZ



## STANDARD FORMAT SPECIFIERS

Here are the different keywords that may be used to control the output format (e.g., with option **-o**) or to sort the selected processes with the GNU-style **--sort** option.

For example: **ps -eo pid,user,args --sort user**

This version of **ps** tries to recognize most of the keywords used in other implementations of **ps**.

The following user-defined format specifiers may contain spaces: **args**, **cmd**, **comm**, **command**, **fname**, **ucmd**, **ucomm**, **lstart**, **bsdstart**, **start**.

Some keywords may not be available for sorting.

CODE	HEADER	DESCRIPTION
<b>%cpu</b>	<b>%CPU</b>	cpu utilization of the process in "##.#" format. Currently, it is the CPU time used divided by the time the process has been running (cputime/realtime ratio), expressed as a percentage. It will not add up to 100% unless you are lucky. (alias <b>pcpu</b> ).
<b>%mem</b>	<b>%MEM</b>	ratio of the process's resident set size to the physical memory on the machine, expressed as a percentage. (alias <b>pmem</b> ).
<b>args</b>	<b>COMMAND</b>	command with all its arguments as a string. Modifications to the arguments may be shown. The output in this column may contain spaces. A process marked <defunct> is partly dead, waiting to be fully destroyed by its parent. Sometimes the process args will be unavailable; when this happens, <b>ps</b> will instead print the executable name in brackets. (alias <b>cmd</b> , <b>command</b> ). See also the <b>comm</b> format keyword, the <b>-f</b> option, and the <b>c</b> option. When specified last, this column will extend to the edge of the display. If <b>ps</b> can not determine display width, as when output is redirected (piped) into a file or another command, the output width is undefined (it may be 80, unlimited, determined by the <b>TERM</b> variable, and so on). The <b>COLUMNS</b> environment variable or <b>--cols</b> option may be used to exactly determine the width in this case. The <b>w</b> or <b>-w</b> option may be also be used to adjust width.
<b>blocked</b>	<b>BLOCKED</b>	mask of the blocked signals, see <i>signal(7)</i> . According to the width of the field, a 32 or 64-bit mask in hexadecimal format is displayed. (alias <b>sig_block</b> , <b>sigmask</b> ).
<b>bsdstart</b>	<b>START</b>	time the command started. If the process was started less than 24 hours ago, the output format is "HH:MM", else it is "Mmm:SS" (where Mmm is the three letters of the month). See also <b>lstart</b> , <b>start</b> , <b>start_time</b> , and <b>stime</b> .
<b>bsdtime</b>	<b>TIME</b>	accumulated cpu time, user + system. The display format is usually "MMM:SS", but can be shifted to the right if the process used more than 999 minutes of cpu time.
<b>c</b>	<b>C</b>	processor utilization. Currently, this is the integer value of the percent usage over the lifetime of the process. (see <b>%cpu</b> ).
<b>caught</b>	<b>CAUGHT</b>	mask of the caught signals, see <i>signal(7)</i> . According to the width of the field, a 32 or 64 bits mask in hexadecimal format is displayed. (alias <b>sig_catch</b> , <b>sigcatch</b> ).

<b>cgname</b>	CGNAME	display name of control groups to which the process belongs.
<b>cgroup</b>	CGROUP	display control groups to which the process belongs.
<b>class</b>	CLS	scheduling class of the process. (alias <b>policy</b> , <b>cls</b> ). Field's possible values are:  – not reported TS SCHED_OTHER FF SCHED_FIFO RR SCHED_RR B SCHED_BATCH ISO SCHED_ISO IDL SCHED_IDLE DLN SCHED_DEADLINE ? unknown value
<b>cls</b>	CLS	scheduling class of the process. (alias <b>policy</b> , <b>cls</b> ). Field's possible values are:  – not reported TS SCHED_OTHER FF SCHED_FIFO RR SCHED_RR B SCHED_BATCH ISO SCHED_ISO IDL SCHED_IDLE DLN SCHED_DEADLINE ? unknown value
<b>cmd</b>	CMD	see <b>args</b> . (alias <b>args</b> , <b>command</b> ).
<b>comm</b>	COMMAND	command name (only the executable name). Modifications to the command name will not be shown. A process marked <defunct> is partly dead, waiting to be fully destroyed by its parent. The output in this column may contain spaces. (alias <b>ucmd</b> , <b>ucomm</b> ). See also the <b>args</b> format keyword, the <b>–f</b> option, and the <b>c</b> option. When specified last, this column will extend to the edge of the display. If <b>ps</b> can not determine display width, as when output is redirected (piped) into a file or another command, the output width is undefined (it may be 80, unlimited, determined by the <b>TERM</b> variable, and so on). The <b>COLUMNS</b> environment variable or <b>–cols</b> option may be used to exactly determine the width in this case. The <b>w</b> or <b>–w</b> option may be also be used to adjust width.
<b>command</b>	COMMAND	See <b>args</b> . (alias <b>args</b> , <b>command</b> ).
<b>cp</b>	CP	per–mill (tenths of a percent) CPU usage. (see <b>%cpu</b> ).
<b>cputime</b>	TIME	cumulative CPU time, "[DD–]hh:mm:ss" format. (alias <b>time</b> ).
<b>cputimes</b>	TIME	cumulative CPU time in seconds (alias <b>times</b> ).
<b>drs</b>	DRS	data resident set size, the amount of physical memory devoted to other than executable code.

<b>egid</b>	EGID	effective group ID number of the process as a decimal integer. (alias <b>gid</b> ).
<b>egroup</b>	EGROUP	effective group ID of the process. This will be the textual group ID, if it can be obtained and the field width permits, or a decimal representation otherwise. (alias <b>group</b> ).
<b>eip</b>	EIP	instruction pointer.
<b>esp</b>	ESP	stack pointer.
<b>etime</b>	ELAPSED	elapsed time since the process was started, in the form [[DD-]hh:]mm:ss.
<b>etimes</b>	ELAPSED	elapsed time since the process was started, in seconds.
<b>euid</b>	EUID	effective user ID (alias <b>uid</b> ).
<b>euser</b>	EUSER	effective user name. This will be the textual user ID, if it can be obtained and the field width permits, or a decimal representation otherwise. The <b>n</b> option can be used to force the decimal representation. (alias <b>uname</b> , <b>user</b> ).
<b>exe</b>	EXE	path to the executable. Useful if path cannot be printed via <b>cmd</b> , <b>comm</b> or <b>args</b> format options.
<b>f</b>	F	flags associated with the process, see the <b>PROCESS FLAGS</b> section. (alias <b>flag</b> , <b>flags</b> ).
<b>fgid</b>	FGID	filesystem access group ID. (alias <b>fsgid</b> ).
<b>fgroup</b>	FGROUP	filesystem access group ID. This will be the textual group ID, if it can be obtained and the field width permits, or a decimal representation otherwise. (alias <b>fsgroup</b> ).
<b>flag</b>	F	see <b>f</b> . (alias <b>f</b> , <b>flags</b> ).
<b>flags</b>	F	see <b>f</b> . (alias <b>f</b> , <b>flag</b> ).
<b>fname</b>	COMMAND	first 8 bytes of the base name of the process's executable file. The output in this column may contain spaces.
<b>fuid</b>	FUID	filesystem access user ID. (alias <b>fsuid</b> ).
<b>fuser</b>	FUSER	filesystem access user ID. This will be the textual user ID, if it can be obtained and the field width permits, or a decimal representation otherwise.
<b>gid</b>	GID	see <b>egid</b> . (alias <b>egid</b> ).
<b>group</b>	GROUP	see <b>egroup</b> . (alias <b>egroup</b> ).
<b>ignored</b>	IGNORED	mask of the ignored signals, see <i>signal(7)</i> . According to the width of the field, a 32 or 64 bits mask in hexadecimal format is displayed. (alias <b>sig_ignore</b> , <b>signignore</b> ).

<b>ipcms</b>	IPCNS	Unique inode number describing the namespace the process belongs to. See <i>namespaces(7)</i> .
<b>label</b>	LABEL	security label, most commonly used for SELinux context data. This is for the <i>Mandatory Access Control</i> ("MAC") found on high–security systems.
<b>lstart</b>	STARTED	time the command started. See also <b>bsdstart</b> , <b>start</b> , <b>start_time</b> , and <b>stime</b> .
<b>lsession</b>	SESSION	displays the login session identifier of a process, if systemd support has been included.
<b>luid</b>	LUID	displays Login ID associated with a process.
<b>lwp</b>	LWP	light weight process (thread) ID of the dispatchable entity (alias <b>spid</b> , <b>tid</b> ). See <b>tid</b> for additional information.
<b>lxc</b>	LXC	The name of the lxc container within which a task is running. If a process is not running inside a container, a dash ('–') will be shown.
<b>machine</b>	MACHINE	displays the machine name for processes assigned to VM or container, if systemd support has been included.
<b>maj_flt</b>	MAJFLT	The number of major page faults that have occurred with this process.
<b>min_flt</b>	MINFLT	The number of minor page faults that have occurred with this process.
<b>mntns</b>	MNTNS	Unique inode number describing the namespace the process belongs to. See <i>namespaces(7)</i> .
<b>netns</b>	NETNS	Unique inode number describing the namespace the process belongs to. See <i>namespaces(7)</i> .
<b>ni</b>	NI	nice value. This ranges from 19 (nicest) to –20 (not nice to others), see <i>nice(1)</i> . (alias <b>nice</b> ).
<b>nice</b>	NI	see <b>ni</b> .(alias <b>ni</b> ).
<b>nlwp</b>	NLWP	number of lwps (threads) in the process. (alias <b>thcount</b> ).
<b>numa</b>	NUMA	The node associated with the most recently used processor. A –1 means that NUMA information is unavailable.
<b>nwchan</b>	WCHAN	address of the kernel function where the process is sleeping (use <b>wchan</b> if you want the kernel function name). Running tasks will display a dash ('–') in this column.
<b>ouid</b>	OWNER	displays the Unix user identifier of the owner of the session of a process, if systemd support has been included.
<b>pcpu</b>	%CPU	see <b>%cpu</b> . (alias <b>%cpu</b> ).

<b>pending</b>	PENDING	mask of the pending signals. See <i>signal(7)</i> . Signals pending on the process are distinct from signals pending on individual threads. Use the <b>m</b> option or the <b>-m</b> option to see both. According to the width of the field, a 32 or 64 bits mask in hexadecimal format is displayed. (alias <b>sig</b> ).
<b>pgid</b>	PGID	process group ID or, equivalently, the process ID of the process group leader. (alias <b>pgrp</b> ).
<b>pgrp</b>	PGRP	see <b>pgid</b> . (alias <b>pgid</b> ).
<b>pid</b>	PID	a number representing the process ID (alias <b>tgid</b> ).
<b>pidns</b>	PIDNS	Unique inode number describing the namespace the process belongs to. See <i>namespaces(7)</i> .
<b>pmem</b>	%MEM	see <b>%mem</b> . (alias <b>%mem</b> ).
<b>policy</b>	POL	scheduling class of the process. (alias <b>class</b> , <b>cls</b> ). Possible values are:  – not reported TS SCHED_OTHER FF SCHED_FIFO RR SCHED_RR B SCHED_BATCH ISO SCHED_ISO IDL SCHED_IDLE DLN SCHED_DEADLINE ? unknown value
<b>ppid</b>	PPID	parent process ID.
<b>pri</b>	PRI	priority of the process. Higher number means lower priority.
<b>psr</b>	PSR	processor that process is currently assigned to.
<b>rgid</b>	RGID	real group ID.
<b>rgroup</b>	RGROUP	real group name. This will be the textual group ID, if it can be obtained and the field width permits, or a decimal representation otherwise.
<b>rss</b>	RSS	resident set size, the non-swapped physical memory that a task has used (in kilobytes). (alias <b>rssize</b> , <b>rsz</b> ).
<b>rssize</b>	RSS	see <b>rss</b> . (alias <b>rss</b> , <b>rsz</b> ).
<b>rsz</b>	RSZ	see <b>rss</b> . (alias <b>rss</b> , <b>rssize</b> ).
<b>rtprio</b>	RTPRIO	realtime priority.
<b>ruid</b>	RUID	real user ID.
<b>ruser</b>	RUSER	real user ID. This will be the textual user ID, if it can be obtained and the field width permits, or a decimal representation otherwise.

<b>s</b>	S	minimal state display (one character). See section <b>PROCESS STATE CODES</b> for the different values. See also <b>stat</b> if you want additional information displayed. (alias <b>state</b> ).
<b>sched</b>	SCH	scheduling policy of the process. The policies SCHED_OTHER (SCHED_NORMAL), SCHED_FIFO, SCHED_RR, SCHED_BATCH, SCHED_ISO, SCHED_IDLE and SCHED_DEADLINE are respectively displayed as 0, 1, 2, 3, 4, 5 and 6.
<b>seat</b>	SEAT	displays the identifier associated with all hardware devices assigned to a specific workplace, if systemd support has been included.
<b>sess</b>	SESS	session ID or, equivalently, the process ID of the session leader. (alias <b>session</b> , <b>sid</b> ).
<b>sgi_p</b>	P	processor that the process is currently executing on. Displays "*" if the process is not currently running or runnable.
<b>sgid</b>	SGID	saved group ID. (alias <b>svgid</b> ).
<b>sgroup</b>	SGROUP	saved group name. This will be the textual group ID, if it can be obtained and the field width permits, or a decimal representation otherwise.
<b>sid</b>	SID	see <b>sess</b> . (alias <b>sess</b> , <b>session</b> ).
<b>sig</b>	PENDING	see <b>pending</b> . (alias <b>pending</b> , <b>sig_pend</b> ).
<b>sigcatch</b>	CAUGHT	see <b>caught</b> . (alias <b>caught</b> , <b>sig_catch</b> ).
<b>sigignore</b>	IGNORED	see <b>ignored</b> . (alias <b>ignored</b> , <b>sig_ignore</b> ).
<b>sigmask</b>	BLOCKED	see <b>blocked</b> . (alias <b>blocked</b> , <b>sig_block</b> ).
<b>size</b>	SIZE	approximate amount of swap space that would be required if the process were to dirty all writable pages and then be swapped out. This number is very rough!
<b>slice</b>	SLICE	displays the slice unit which a process belongs to, if systemd support has been included.
<b>spid</b>	SPID	see <b>lwp</b> . (alias <b>lwp</b> , <b>tid</b> ).
<b>stackp</b>	STACKP	address of the bottom (start) of stack for the process.
<b>start</b>	STARTED	time the command started. If the process was started less than 24 hours ago, the output format is "HH:MM:SS", else it is " Mmm dd" (where Mmm is a three-letter month name). See also <b>lstart</b> , <b>bsdstart</b> , <b>start_time</b> , and <b>stime</b> .
<b>start_time</b>	START	starting time or date of the process. Only the year will be displayed if the process was not started the same year <b>ps</b> was invoked, or "MmmDD" if it was not started the same day, or "HH:MM" otherwise. See also <b>bsdstart</b> , <b>start</b> , <b>lstart</b> , and <b>stime</b> .

<b>stat</b>	STAT	multi-character process state. See section <b>PROCESS STATE CODES</b> for the different values meaning. See also <b>s</b> and <b>state</b> if you just want the first character displayed.
<b>state</b>	S	see <b>s</b> . (alias <b>s</b> ).
<b>stime</b>	STIME	see <b>start_time</b> . (alias <b>start_time</b> ).
<b>suid</b>	SUID	saved user ID. (alias <b>svuid</b> ).
<b>supgid</b>	SUPGID	group ids of supplementary groups, if any. See <b>getgroups(2)</b> .
<b>supgrp</b>	SUPGRP	group names of supplementary groups, if any. See <b>getgroups(2)</b> .
<b>user</b>	SUSER	saved user name. This will be the textual user ID, if it can be obtained and the field width permits, or a decimal representation otherwise. (alias <b>svuser</b> ).
<b>svgid</b>	SVGID	see <b>sgid</b> . (alias <b>sgid</b> ).
<b>svuid</b>	SVUID	see <b>suid</b> . (alias <b>suid</b> ).
<b>sz</b>	SZ	size in physical pages of the core image of the process. This includes text, data, and stack space. Device mappings are currently excluded; this is subject to change. See <b>vsz</b> and <b>rss</b> .
<b>tgid</b>	TGID	a number representing the thread group to which a task belongs (alias <b>pid</b> ). It is the process ID of the thread group leader.
<b>thcount</b>	THCNT	see <b>nlwp</b> . (alias <b>nlwp</b> ). number of kernel threads owned by the process.
<b>tid</b>	TID	the unique number representing a dispatchable entity (alias <b>lwp</b> , <b>spid</b> ). This value may also appear as: a process ID ( <b>pid</b> ); a process group ID ( <b>pgrp</b> ); a session ID for the session leader ( <b>sid</b> ); a thread group ID for the thread group leader ( <b>tgid</b> ); and a tty process group ID for the process group leader ( <b>tpgid</b> ).
<b>time</b>	TIME	cumulative CPU time, "[DD-]HH:MM:SS" format. (alias <b>cputime</b> ).
<b>times</b>	TIME	cumulative CPU time in seconds (alias <b>cputimes</b> ).
<b>tname</b>	TTY	controlling tty (terminal). (alias <b>tt</b> , <b>tty</b> ).
<b>tpgid</b>	TPGID	ID of the foreground process group on the tty (terminal) that the process is connected to, or -1 if the process is not connected to a tty.
<b>trs</b>	TRS	text resident set size, the amount of physical memory devoted to executable code.
<b>tt</b>	TT	controlling tty (terminal). (alias <b>tname</b> , <b>tty</b> ).
<b>tty</b>	TT	controlling tty (terminal). (alias <b>tname</b> , <b>tt</b> ).
<b>ucmd</b>	CMD	see <b>comm</b> . (alias <b>comm</b> , <b>ucomm</b> ).

<b>ucomm</b>	COMMAND	see <b>comm</b> . (alias <b>comm</b> , <b>ucmd</b> ).
<b>uid</b>	UID	see <b>eid</b> . (alias <b>eid</b> ).
<b>uname</b>	USER	see <b>eser</b> . (alias <b>eser</b> , <b>user</b> ).
<b>unit</b>	UNIT	displays unit which a process belongs to, if systemd support has been included.
<b>user</b>	USER	see <b>eser</b> . (alias <b>eser</b> , <b>uname</b> ).
<b>userns</b>	USERNS	Unique inode number describing the namespace the process belongs to. See <i>namespaces(7)</i> .
<b>utsns</b>	UTSNS	Unique inode number describing the namespace the process belongs to. See <i>namespaces(7)</i> .
<b>uunit</b>	UUNIT	displays user unit which a process belongs to, if systemd support has been included.
<b>vsize</b>	VSZ	see <b>vsz</b> . (alias <b>vsz</b> ).
<b>vsz</b>	VSZ	virtual memory size of the process in KiB (1024–byte units). Device mappings are currently excluded; this is subject to change. (alias <b>vsize</b> ).
<b>wchan</b>	WCHAN	name of the kernel function in which the process is sleeping, a "-" if the process is running, or a "*" if the process is multi-threaded and <b>ps</b> is not displaying threads.

## ENVIRONMENT VARIABLES

The following environment variables could affect **ps**:

### COLUMNS

Override default display width.

### LINES

Override default display height.

### PS\_PERSONALITY

Set to one of posix, old, linux, bsd, sun, digital... (see section **PERSONALITY** below).

### CMD\_ENV

Set to one of posix, old, linux, bsd, sun, digital... (see section **PERSONALITY** below).

### I\_WANT\_A\_BROKEN\_PS

Force obsolete command line interpretation.

### LC\_TIME

Date format.

### PS\_COLORS

Not currently supported.

### PS\_FORMAT

Default output format override. You may set this to a format string of the type used for the **-o** option. The **DefSysV** and **DefBSD** values are particularly useful.



**POSIXLY\_CORRECT**

Don't find excuses to ignore bad "features".

**POSIX2**

When set to "on", acts as **POSIXLY\_CORRECT**.

**UNIX95**

Don't find excuses to ignore bad "features".

**\_XPG**

Cancel **CMD\_ENV=irix** non-standard behavior.

In general, it is a bad idea to set these variables. The one exception is **CMD\_ENV** or

**PS\_PERSONALITY**, which could be set to Linux for normal systems. Without that setting, **ps** follows the useless and bad parts of the Unix98 standard.

**PERSONALITY**

390	like the OS/390 OpenEdition <b>ps</b>
aix	like AIX <b>ps</b>
bsd	like FreeBSD <b>ps</b> (totally non-standard)
compaq	like Digital Unix <b>ps</b>
debian	like the old Debian <b>ps</b>
digital	like Tru64 (was Digital Unix, was OSF/1) <b>ps</b>
gnu	like the old Debian <b>ps</b>
hp	like HP-UX <b>ps</b>
hpux	like HP-UX <b>ps</b>
irix	like Irix <b>ps</b>
linux	***** <b>recommended</b> *****
old	like the original Linux <b>ps</b> (totally non-standard)
os390	like OS/390 Open Edition <b>ps</b>
posix	standard
s390	like OS/390 Open Edition <b>ps</b>
sco	like SCO <b>ps</b>
sgi	like Irix <b>ps</b>
solaris2	like Solaris 2+ (SunOS 5) <b>ps</b>
sunos4	like SunOS 4 (Solaris 1) <b>ps</b> (totally non-standard)
svr4	standard
sysv	standard
tru64	like Tru64 (was Digital Unix, was OSF/1) <b>ps</b>
unix	standard
unix95	standard
unix98	standard

**SEE ALSO**

**pgrep(1)**, **pstree(1)**, **top(1)**, **proc(5)**.

**STANDARDS**

This **ps** conforms to:

- 1 Version 2 of the Single Unix Specification
- 2 The Open Group Technical Standard Base Specifications, Issue 6
- 3 IEEE Std 1003.1, 2004 Edition
- 4 X/Open System Interfaces Extension [UP XSI]
- 5 ISO/IEC 9945:2003

**AUTHOR**

**ps** was originally written by Branko Lankester (lankeste@fwi.uva.nl). Michael K. Johnson (johnsonm@redhat.com) re-wrote it significantly to use the proc filesystem, changing a few things in the process. Michael Shields (mjshield@nyx.cs.du.edu) added the pid-list feature. Charles Blake (cblake@bbn.com) added multi-level sorting, the dirent-style library, the device name-to-number mmaped database, the

approximate binary search directly on System.map, and many code and documentation cleanups. David Mossberger–Tang wrote the generic BFD support for psupdate. Albert Cahalan <albert@users.sf.net> rewrote ps for full Unix98 and BSD support, along with some ugly hacks for obsolete and foreign syntax. Please send bug reports to <procps@freelists.org>. No subscription is required or suggested.

**NAME**

**man** – macros to format man pages

**SYNOPSIS**

**groff -Tascii -man file ...**

**groff -Tps -man file ...**

**man** [*section*] *title*

**DESCRIPTION**

This manual page explains the **groff an.tmac** macro package (often called the **man** macro package). This macro package should be used by developers when writing or porting man pages for Linux. It is fairly compatible with other versions of this macro package, so porting man pages should not be a major problem (exceptions include the NET-2 BSD release, which uses a totally different macro package called **mdoc**; see **mdoc(7)**).

Note that NET-2 BSD **mdoc** man pages can be used with **groff** simply by specifying the **-mdoc** option instead of the **-man** option. Using the **-mandoc** option is, however, recommended, since this will automatically detect which macro package is in use.

For conventions that should be employed when writing man pages for the Linux *man-pages* package, see **man-pages(7)**.

**Title line**

The first command in a man page (after comment lines, that is, lines that start with **.\')** should be

**.TH** *title section date source manual*

For details of the arguments that should be supplied to the **TH** command, see **man-pages(7)**.

Note that BSD **mdoc**-formatted pages begin with the **Dd** command, not the **TH** command.

**Sections**

Sections are started with **.SH** followed by the heading name.

The only mandatory heading is **NAME**, which should be the first section and be followed on the next line by a one-line description of the program:

**.SH** **NAME**  
item \- description

It is extremely important that this format is followed, and that there is a backslash before the single dash which follows the item name. This syntax is used by the **mandb(8)** program to create a database of short descriptions for the **whatis(1)** and **apropos(1)** commands. (See **lexgrog(1)** for further details on the syntax of the **NAME** section.)

For a list of other sections that might appear in a manual page, see **man-pages(7)**.

**Fonts**

The commands to select the type face are:

**.B** Bold

**.BI** Bold alternating with italics (especially useful for function specifications)

**.BR**

Bold alternating with Roman (especially useful for referring to other manual pages)

**.I** Italics

**.IB** Italics alternating with bold

**.IR** Italics alternating with Roman

**.RB**

Roman alternating with bold

**.RI** Roman alternating with italics

**.SB** Small alternating with bold

**.SM**

Small (useful for acronyms)

Traditionally, each command can have up to six arguments, but the GNU implementation removes this limitation (you might still want to limit yourself to 6 arguments for portability's sake). Arguments are delimited by spaces. Double quotes can be used to specify an argument which contains spaces. For the macros that produce alternating type faces, the arguments will be printed next to each other without intervening spaces, so that the **.BR** command can be used to specify a word in bold followed by a mark of punctuation in Roman. If no arguments are given, the command is applied to the following line of text.

### Other macros and strings

Below are other relevant macros and predefined strings. Unless noted otherwise, all macros cause a break (end the current line of text). Many of these macros set or use the "prevailing indent." The "prevailing indent" value is set by any macro with the parameter *i* below; macros may omit *i* in which case the current prevailing indent will be used. As a result, successive indented paragraphs can use the same indent without respecifying the indent value. A normal (nonindented) paragraph resets the prevailing indent value to its default value (0.5 inches). By default, a given indent is measured in ens; try to use ens or ems as units for indents, since these will automatically adjust to font size changes. The other key macro definitions are:

### Normal paragraphs

**.LP** Same as **.PP** (begin a new paragraph).

**.P** Same as **.PP** (begin a new paragraph).

**.PP** Begin a new paragraph and reset prevailing indent.

### Relative margin indent

**.RS** *i* Start relative margin indent: moves the left margin *i* to the right (if *i* is omitted, the prevailing indent value is used). A new prevailing indent is set to 0.5 inches. As a result, all following paragraph(s) will be indented until the corresponding **.RE**.

**.RE** End relative margin indent and restores the previous value of the prevailing indent.

### Indented paragraph macros

**.HP** *i* Begin paragraph with a hanging indent (the first line of the paragraph is at the left margin of normal paragraphs, and the rest of the paragraph's lines are indented).

**.IP** *x i* Indented paragraph with optional hanging tag. If the tag *x* is omitted, the entire following paragraph is indented by *i*. If the tag *x* is provided, it is hung at the left margin before the following indented paragraph (this is just like **.TP** except the tag is included with the command instead of being on the following line). If the tag is too long, the text after the tag will be moved down to the next line (text will not be lost or garbled). For bulleted lists, use this macro with \(\bu (bullet) or \(\em (em dash) as the tag, and for numbered lists, use the number or letter followed by a period as the tag; this simplifies translation to other formats.

**.TP** *i* Begin paragraph with hanging tag. The tag is given on the next line, but its results are like those of the **.IP** command.

### Hypertext link macros

**.UR** *url*

Insert a hypertext link to the URI (URL) *url*, with all text up to the following **.UE** macro as the link text.

**.UE** [*trailer*]

Terminate the link text of the preceding **.UR** macro, with the optional *trailer* (if present, usually a closing parenthesis and/or end-of-sentence punctuation) immediately following. For non-HTML output devices (e.g., **man -Tutf8**), the link text is followed by the URL in angle brackets; if there is no link text, the URL is printed as its own link text, surrounded by angle brackets. (Angle

brackets may not be available on all output devices.) For the HTML output device, the link text is hyperlinked to the URL; if there is no link text, the URL is printed as its own link text.

These macros have been supported since GNU Troff 1.20 (2009-01-05) and Heirloom Doctools Troff since 160217 (2016-02-17).

### Miscellaneous macros

- .DT**                      Reset tabs to default tab values (every 0.5 inches); does not cause a break.
- .PD** *d*                    Set inter-paragraph vertical distance to *d* (if omitted, *d*=0.4v); does not cause a break.
- .SS** *t*                    Subheading *t* (like **.SH**, but used for a subsection inside a section).

### Predefined strings

The **man** package has the following predefined strings:

- \\*R**            Registration Symbol: ®
- \\*S**            Change to default font size
- \\*(Tm**          Trademark Symbol: ™
- \\*(lq**          Left angled double quote: “
- \\*(rq**          Right angled double quote: ”

### Safe subset

Although technically **man** is a troff macro package, in reality a large number of other tools process man page files that don't implement all of troff's abilities. Thus, it's best to avoid some of troff's more exotic abilities where possible to permit these other tools to work correctly. Avoid using the various troff preprocessors (if you must, go ahead and use **tbl**(1), but try to use the **IP** and **TP** commands instead for two-column tables). Avoid using computations; most other tools can't process them. Use simple commands that are easy to translate to other formats. The following troff macros are believed to be safe (though in many cases they will be ignored by translators): **\'**, **..**, **ad**, **bp**, **br**, **ce**, **de**, **ds**, **el**, **ie**, **if**, **fi**, **ft**, **hy**, **ig**, **in**, **na**, **ne**, **nf**, **nh**, **ps**, **so**, **sp**, **ti**, **tr**.

You may also use many troff escape sequences (those sequences beginning with **\**). When you need to include the backslash character as normal text, use **\e**. Other sequences you may use, where *x* or *xx* are any characters and *N* is any digit, include: **\'**, **\**, **\-**, **\.**, **\''**, **\%**, **\\*x**, **\\*(xx**, **\(xx**, **\\$N**, **\nx**, **\n(xx**, **\fx**, and **\f(xx**. Avoid using the escape sequences for drawing graphics.

Do not use the optional parameter for **bp** (break page). Use only positive values for **sp** (vertical space). Don't define a macro (**de**) with the same name as a macro in this or the mdoc macro package with a different meaning; it's likely that such redefinitions will be ignored. Every positive indent (**in**) should be paired with a matching negative indent (although you should be using the **RS** and **RE** macros instead). The condition test (**if,ie**) should only have 't' or 'n' as the condition. Only translations (**tr**) that can be ignored should be used. Font changes (**ft** and the **\f** escape sequence) should only have the values 1, 2, 3, 4, R, I, B, P, or CW (the **ft** command may also have no parameters).

If you use capabilities beyond these, check the results carefully on several tools. Once you've confirmed that the additional capability is safe, let the maintainer of this document know about the safe command or sequence that should be added to this list.

### FILES

*/usr/share/groff/[\*/]tmac/an.tmac*  
*/usr/man/whatis*

### NOTES

By all means include full URLs (or URIs) in the text itself; some tools such as **man2html**(1) can automatically turn them into hypertext links. You can also use the **UR** and **UE** macros to identify links to related information. If you include URLs, use the full URL (e.g., `<http://www.kernel.org>`) to ensure that tools can automatically find the URLs.

Tools processing these files should open the file and examine the first nonwhitespace character. A period (.) or single quote (') at the beginning of a line indicates a troff-based file (such as man or mdoc). A left angle

bracket (<) indicates an SGML/XML-based file (such as HTML or Docbook). Anything else suggests simple ASCII text (e.g., a "catman" result).

Many man pages begin with "\ " followed by a space and a list of characters, indicating how the page is to be preprocessed. For portability's sake to non-troff translators we recommend that you avoid using anything other than **tbl**(1), and Linux can detect that automatically. However, you might want to include this information so your man page can be handled by other (less capable) systems. Here are the definitions of the preprocessors invoked by these characters:

- e** eqn(1)
- g** grap(1)
- p** pic(1)
- r** refer(1)
- t** tbl(1)
- v** vgrind(1)

## BUGS

Most of the macros describe formatting (e.g., font type and spacing) instead of marking semantic content (e.g., this text is a reference to another page), compared to formats like mdoc and DocBook (even HTML has more semantic markings). This situation makes it harder to vary the **man** format for different media, to make the formatting consistent for a given media, and to automatically insert cross-references. By sticking to the safe subset described above, it should be easier to automate transitioning to a different reference page format in the future.

The Sun macro **TX** is not implemented.

## SEE ALSO

**apropos**(1), **groff**(1), **lexgrog**(1), **man**(1), **man2html**(1), **groff\_mdoc**(7), **whatis**(1), **groff\_man**(7), **groff\_www**(7), **man-pages**(7), **mdoc**(7)

## COLOPHON

This page is part of release 5.10 of the Linux *man-pages* project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at <https://www.kernel.org/doc/man-pages/>.