



## Top Linux command line



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## 1 Article purpose

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This article provides the basic information needed to start using the Linux<sup>®</sup> tool: **top**<sup>[1]</sup>.



## 2 Introduction

The following table provides a brief description of the tool, as well as its availability depending on the software packages:

✔: this tool is either present (ready to use or to be activated), or can be integrated and activated on the software package.

✘: this tool is not present and cannot be integrated, or it is present but cannot be activated on the software package.

Tool			STM32MPU Embedded Software distribution			STM32MPU Embedded Software distribution for Android™		
Name	Category	Purpose	Starter Package	Developer Package	Distribution Package	Starter Package	Developer Package	Distribution Package
		The top <sup>[1]</sup> program provides a dynamic real-time view of a running system. It can display system summary information as well as a list of tasks currently being managed by the Linux						



Tool			STM32MPU Embedded Software distribution			STM32MPU Embedded Software distribution for Android™		
Name	Category	Purpose	Starter Package	Developer Package	Distribution Package	Starter Package	Developer Package	Distribution Package
top	Monitoring tools	kernel. The types of system summary information shown and the types, order and size of information displayed for tasks are all user configurable and that configuration can be made persistent across restarts	✔	✔	✔	✔	✔	✔



Tool			STM32MPU Embedded Software distribution			STM32MPU Embedded Software distribution for Android™		
Name	Category	Purpose	Starter Package	Developer Package	Distribution Package	Starter Package	Developer Package	Distribution Package
		. (Extracted from man page <sup>[1]</sup> )						



## 3 Installing the trace and debug tool on your target board

### 3.1 Using the STM32MPU Embedded Software Distribution

**top** is installed by default and is ready to be used with all STM32MPU Embedded Software Packages.

```
Board $> which top
/usr/bin/top
```

It is integrated into the Weston image distribution by using the following meta-st package recipe to enable the procs module:  
*layers/meta-st/meta-st-openstlinux/recipes-st/packagegroups/packagegroup-framework-tools.bb.*

```
RDEPENDS_packagegroup-framework-tools-core = "\
grep          \
util-linux    \
util-linux-lscpu \
procs        \
kbd           \
...          \
```

### 3.2 Using the STM32MPU Embedded Software distribution for Android™

**top** is installed by default and ready to be used with all STM32MPU Embedded Software Packages for Android™.

It comes with the **toybox**:

```
Board $> which top | xargs ls -la
/system/bin/top -> toybox
```



## 4 Getting started

- Displaying individual threads: without this command-line option a summation of all threads in each process is shown

```
Board $> top -H
top - 16:50:23 up 4:31, 1 user, load average: 0.38, 0.38, 0.37
Threads: 130 total, 1 running, 129 sleeping, 0 stopped, 0 zombie
%Cpu(s): 4.3 us, 10.9 sy, 0.0 ni, 84.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 871.9 total, 673.1 free, 107.7 used, 91.2 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 736.6 avail Mem

  PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM    TIME+  COMMAND
 895 root        20   0   2652  1608 1220 R   25.0   0.2   0:00.08 top
    1 root        20   0 24164  4808 3104 S    0.0   0.5   0:17.88 systemd
    2 root        20   0     0     0     0 S    0.0   0.0   0:00.03 kthreadd
    3 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 rcu_gp
    4 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 rcu_par_gp
    6 root         0 -20     0     0     0 I    0.0   0.0   0:00.01 kworker/0:0H-kblockd
    7 root        20   0     0     0     0 I    0.0   0.0   0:00.04 kworker/u4:0-
events_unbound
    8 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 mm_percpu_wq
    9 root        20   0     0     0     0 S    0.0   0.0   0:01.42 ksoftirqd/0
   10 root        20   0     0     0     0 I    0.0   0.0   0:03.19 rcu_preempt
   11 root        20   0     0     0     0 I    0.0   0.0   0:00.00 rcu_sched
   12 root        20   0     0     0     0 I    0.0   0.0   0:00.00 rcu_bh
   13 root        rt    0     0     0     0 S    0.0   0.0   0:00.00 migration/0
   14 root        20   0     0     0     0 S    0.0   0.0   0:00.00 cpuhp/0
   15 root        20   0     0     0     0 S    0.0   0.0   0:00.00 cpuhp/1
   16 root        rt    0     0     0     0 S    0.0   0.0   0:00.00 migration/1
   17 root        20   0     0     0     0 S    0.0   0.0   0:01.64 ksoftirqd/1
   19 root         0 -20     0     0     0 I    0.0   0.0   0:00.07 kworker/1:0H-kblockd
   20 root        20   0     0     0     0 S    0.0   0.0   0:00.04 kdevtmpfs
   21 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 netns
   22 root        20   0     0     0     0 S    0.0   0.0   0:00.00 rcu_tasks_kthre
   24 root        20   0     0     0     0 S    0.0   0.0   0:00.00 oom_reaper
   25 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 writeback
   26 root        20   0     0     0     0 S    0.0   0.0   0:00.00 kcompactd0
   27 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 crypto
   28 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 kblockd
   29 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 ata_sff
   30 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 edac-poller
   31 root        rt    0     0     0     0 S    0.0   0.0   0:00.00 watchdogd
   32 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 rpciod
   33 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 kworker/u5:0
   34 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 xprtiod
   35 root        20   0     0     0     0 S    0.0   0.0   0:00.00 kswapd0
   36 root         0 -20     0     0     0 I    0.0   0.0   0:00.00 nfsiod
```

- Displaying only given PID:

```
Board $> top -p<PID>
```

<PID> can be a given known value, or it could be useful to use the *pidof* macro:

```
Board $> top -p`pidof netdata`
top - 16:59:39 up 4:40, 1 user, load average: 0.46, 0.46, 0.41
Tasks: 1 total, 0 running, 1 sleeping, 0 stopped, 0 zombie
```





```
%Cpu(s):  0.0 us,  2.9 sy,  0.0 ni, 97.1 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   871.9 total,   673.2 free,   107.6 used,   91.2 buff/cache
MiB Swap:    0.0 total,    0.0 free,    0.0 used.  736.6 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR S  %CPU  %MEM    TIME+  COMMAND
  389 root        20   0 131340 15528 2036 S   0.0   1.7   2:39.63 netdata
```

and by adding **-H** option:

```
Board $> top -p`pidof netdata` -H
top - 16:58:15 up 4:39, 1 user, load average: 0.62, 0.48, 0.41
Threads: 12 total, 0 running, 12 sleeping, 0 stopped, 0 zombie
%Cpu(s):  0.3 us,  0.5 sy,  0.0 ni, 99.2 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   871.9 total,   673.1 free,   107.6 used,   91.2 buff/cache
MiB Swap:    0.0 total,    0.0 free,    0.0 used.  736.6 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR S  %CPU  %MEM    TIME+  COMMAND
  407 root        20   0 131340 15528 2036 S   0.3   1.7   1:06.85 netdata
  409 root        20   0 131340 15528 2036 S   0.3   1.7   0:46.08 netdata
  389 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.23 netdata
  406 root        20   0 131340 15528 2036 S   0.0   1.7   0:13.30 netdata
  408 root        20   0 131340 15528 2036 S   0.0   1.7   0:05.31 netdata
  411 root        20   0 131340 15528 2036 S   0.0   1.7   0:03.51 netdata
  412 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.09 netdata
  413 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.08 netdata
  414 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.92 netdata
  418 root        20   0 131340 15528 2036 S   0.0   1.7   0:01.24 netdata
  419 root        20   0 131340 15528 2036 S   0.0   1.7   0:21.12 netdata
  425 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.00 netdata
```

Note that several PIDs can be given by using the following syntax:

```
Board $> top -p<PID1>,<PID2>,<PID3>...
```

- Sorting informations

When the top command result is displayed, type "F", then select a filter: please see **highlighted** part below:

```
Fields Management for window 1:Def, whose current sort field is %CPU
  Navigate with Up/Dn, Right selects for move then <Enter> or Left commits,
  'd' or <Space> toggles display, 's' sets sort. Use 'q' or <Esc> to end!
```

```
* PID      = Process Id
* USER     = Effective User Name
* PR       = Priority
* NI       = Nice Value
* VIRT     = Virtual Image (KiB)
* RES     = Resident Size (KiB)
* SHR     = Shared Memory (KiB)
* S       = Process Status
* %CPU    = CPU Usage
* %MEM    = Memory Usage (RES)
* TIME+  = CPU Time, hundredths
* COMMAND = Command Name/Line
* PPID   = Parent Process pid
* UID    = Effective User Id
* RUID   = Real User Id
* RUSER  = Real User Name
* SUID   = Saved User Id
* SUSER  = Saved User Name

SUPGRPS = Supp Groups Names
TGID    = Thread Group Id
OOMa    = OOMEM Adjustment
OOMs    = OOMEM Score current
ENVIRON = Environment vars
vMj     = Major Faults delta
vMn     = Minor Faults delta
USED    = Res+Swap Size (KiB)
nsIPC   = IPC namespace Inode
nsMNT   = MNT namespace Inode
nsNET   = NET namespace Inode
nsPID   = PID namespace Inode
nsUSER  = USER namespace Inode
nsUTS   = UTS namespace Inode
LXC     = LXC container name
RSan    = RES Anonymous (KiB)
RSfd    = RES File-based (KiB)
RSlk    = RES Locked (KiB)
```



```

GID      = Group Id
GROUP    = Group Name
PGRP     = Process Group Id
TTY      = Controlling Tty
TPGID    = Tty Process Grp Id
SID      = Session Id
nTH      = Number of Threads
P        = Last Used Cpu (SMP)
TIME     = CPU Time
SWAP     = Swapped Size (KiB)
CODE     = Code Size (KiB)
DATA     = Data+Stack (KiB)
nMaj     = Major Page Faults
nMin     = Minor Page Faults
nDRT     = Dirty Pages Count
WCHAN    = Sleeping in Function
Flags    = Task Flags <sched.h>
CGROUPS  = Control Groups
SUPGIDS  = Supp Groups IDs
RSsh     = RES Shared (KiB)
CGNAME   = Control Group name
NU       = Last Used NUMA node

```

- Displaying where threads are sleeping

When the top command result is displayed, type "F", then go to the WCHAN parameter. Type "d" or <space> to toggle the display of this field.

Fields Management for window 1:Def, whose current sort field is %CPU  
 Navigate with Up/Dn, Right selects for move then <Enter> or Left commits,  
 'd' or <Space> toggles display, 's' sets sort. Use 'q' or <Esc> to end!

```

* PID      = Process Id
* USER     = Effective User Name
* PR       = Priority
* NI       = Nice Value
* VIRT     = Virtual Image (KiB)
* RES      = Resident Size (KiB)
* SHR      = Shared Memory (KiB)
* S        = Process Status
* %CPU     = CPU Usage
* %MEM     = Memory Usage (RES)
* TIME+    = CPU Time, hundredths
* COMMAND  = Command Name/Line
PPID      = Parent Process pid
UID       = Effective User Id
RUID      = Real User Id
RUSER     = Real User Name
SUID      = Saved User Id
SUSER     = Saved User Name
GID       = Group Id
GROUP     = Group Name
PGRP      = Process Group Id
TTY       = Controlling Tty
TPGID     = Tty Process Grp Id
SID       = Session Id
nTH       = Number of Threads
P         = Last Used Cpu (SMP)
TIME      = CPU Time
SWAP      = Swapped Size (KiB)
CODE      = Code Size (KiB)
DATA      = Data+Stack (KiB)
nMaj      = Major Page Faults
SUPGRPS   = Supp Groups Names
TGID      = Thread Group Id
OOMa      = OOMEM Adjustment
OOMs      = OOMEM Score current
ENVIRON   = Environment vars
vMj       = Major Faults delta
vMn       = Minor Faults delta
USED      = Res+Swap Size (KiB)
nsIPC     = IPC namespace Inode
nsMNT     = MNT namespace Inode
nsNET     = NET namespace Inode
nsPID     = PID namespace Inode
nsUSER    = USER namespace Inode
nsUTS     = UTS namespace Inode
LXC       = LXC container name
RSan      = RES Anonymous (KiB)
RSfd      = RES File-based (KiB)
RSlk      = RES Locked (KiB)
RSsh      = RES Shared (KiB)
CGNAME    = Control Group name
NU        = Last Used NUMA node

```



```
nMin      = Minor Page Faults
nDRT      = Dirty Pages Count
* WCHAN   = Sleeping in Function
Flags     = Task Flags <sched.h>
CGROUPS   = Control Groups
SUPGIDS   = Supp Groups IDs
```

This option enables the display of wchan.

```
Board $> top -p `pidof netdata`,`pidof python3`
top - 17:19:15 up 5:00, 1 user, load average: 0.47, 0.45, 0.45
Tasks: 2 total, 0 running, 2 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.3 us, 1.0 sy, 0.0 ni, 98.7 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 871.9 total, 672.9 free, 107.8 used, 91.2 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 736.4 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR S  %CPU  %MEM    TIME+  COMMAND  WCHAN
  389 root        20   0 131340 15528 2036 S   0.7   1.7   2:50.72 netdata  sys_pause
  424 root        20   0 43496  14860 5680 S   0.0   1.7   0:33.02 python3  poll_sche+
```

- Showing only one iteration of top and putting it in batch mode (useful for putting in a file)

```
Board $> top -p`pidof netdata` -H -b -n1
top - 17:26:53 up 5:07, 1 user, load average: 0.46, 0.47, 0.45
Threads: 12 total, 0 running, 12 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 2.9 sy, 0.0 ni, 97.1 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 871.9 total, 672.9 free, 107.8 used, 91.2 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 736.5 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR S  %CPU  %MEM    TIME+  COMMAND
  389 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.23 netdata
  406 root        20   0 131340 15528 2036 S   0.0   1.7   0:14.67 netdata
  407 root        20   0 131340 15528 2036 S   0.0   1.7   1:13.64 netdata
  408 root        20   0 131340 15528 2036 S   0.0   1.7   0:05.83 netdata
  409 root        20   0 131340 15528 2036 S   0.0   1.7   0:50.85 netdata
  411 root        20   0 131340 15528 2036 S   0.0   1.7   0:03.92 netdata
  412 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.10 netdata
  413 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.09 netdata
  414 root        20   0 131340 15528 2036 S   0.0   1.7   0:01.00 netdata
  418 root        20   0 131340 15528 2036 S   0.0   1.7   0:01.38 netdata
  419 root        20   0 131340 15528 2036 S   0.0   1.7   0:23.24 netdata
  425 root        20   0 131340 15528 2036 S   0.0   1.7   0:00.00 netdata
```



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## 5 References

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- 1.01.11.2 <http://linux.die.net/man/1/top>

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Central processing unit

Inter-Processor Communication

TeleTYpewriter

symetric multiprocessing