**iostat 命令**

# NAME

iostat - Report Central Processing Unit (CPU) statistics and input/output statistics for devices and partitions.

# SYNOPSIS

iostat [ -c | -d ] [ -k ] [ -t ] [ -V ] [ -x ] [ -n ] [ { device [ ... ] | ALL } ] [ -p [ { device | ALL } ] ] [ interval [ count ] ]

# DESCRIPTION

The iostat command is used for monitoring system input/output device loading by observing the time the devices are active

in relation to their average transfer rates. The iostat command generates reports that can be used to change system con-

figuration to better balance the input/output load between physical disks.

The first report generated by the iostat command provides statistics concerning the time since the system was booted. Each

subsequent report covers the time since the previous report. All statistics are reported each time the iostat command is

run. The report consists of a CPU header row followed by a row of CPU statistics. On multiprocessor systems, CPU statis-

tics are calculated system-wide as averages among all processors. A device header row is displayed followed by a line of

statistics for each device that is configured.

The interval parameter specifies the amount of time in seconds between each report. The first report contains statistics

for the time since system startup (boot). Each subsequent report contains statistics collected during the interval since

the previous report. The count parameter can be specified in conjunction with the interval parameter. If the count parame-

ter is specified, the value of count determines the number of reports generated at interval seconds apart. If the interval

parameter is specified without the count parameter, the iostat command generates reports continuously.

# REPORTS

The iostat command generates two types of reports, the CPU Utilization report and the Device Utilization report.

## CPU Utilization Report

The first report generated by the iostat command is the CPU Utilization Report. For multiprocessor systems, the CPU

values are global averages among all processors. The report has the following format:

%user

Show the percentage of CPU utilization that occurred while executing at the user level (application).

%nice

Show the percentage of CPU utilization that occurred while executing at the user level with nice priority.

%sys

Show the percentage of CPU utilization that occurred while executing at the system level (kernel).

%iowait

Show the percentage of time that the CPU or CPUs were idle during which the system had an outstanding disk

I/O request.

%idle

Show the percentage of time that the CPU or CPUs were idle and the system did not have an outstanding disk

I/O request.

## Device Utilization Report

The second report generated by the iostat command is the Device Utilization Report. The device report provides statistics on a per physical device or partition basis. Block devices for which statistics are to be displayed may be entered on the command line. Partitions may also be entered on the command line providing that option -x is not used. If no device nor partition is entered, then statistics are displayed for every device used by the system,and providing that the kernel maintains statistics for it. If the ALL keyword is given on the command line, then statistics are displayed for every device defined by the system, including those that have never been used. The report may show the following fields, depending on the flags used:

Device:

This column gives the device (or partition) name, which is displayed as hdiskn with 2.2 kernels, for the nth device. It is displayed as devm-n with 2.4 kernels, where m is the major number of the device, and n a distinctive number. With newer kernels, the device name as listed in the /dev directory is displayed.

tps

Indicate the number of transfers per second that were issued to the device. A transfer is an I/O request to the device. Multiple logical requests can be combined into a single I/O request to the device. A transfer is of indeterminate size.

Blk\_read/s

Indicate the amount of data read from the drive expressed in a number of blocks per second. Blocks are equivalent to sectors with 2.4 kernels and newer and therefore have a size of 512 bytes. With older kernels, a block is of indeterminate size.

Blk\_wrtn/s

Indicate the amount of data written to the drive expressed in a number of blocks per second.

Blk\_read

The total number of blocks read.

Blk\_wrtn

The total number of blocks written.

kB\_read/s

Indicate the amount of data read from the drive expressed in kilobytes per second. Data displayed are valid only with kernels 2.4 and newer.

kB\_wrtn/s

Indicate the amount of data written to the drive expressed in kilobytes per second. Data displayed are valid only with kernels 2.4 and newer.

kB\_read

The total number of kilobytes read. Data displayed are valid only with kernels 2.4 and newer.

kB\_wrtn

The total number of kilobytes written. Data displayed are valid only with kernels 2.4 and newer.

rrqm/s

The number of read requests merged per second that were issued to the device.

wrqm/s

The number of write requests merged per second that were issued to the device.

r/s

The number of read requests that were issued to the device per second.

w/s

The number of write requests that were issued to the device per second.

rsec/s

The number of sectors read from the device per second.

wsec/s

The number of sectors written to the device per second.

rkB/s

The number of kilobytes read from the device per second.

wkB/s

The number of kilobytes written to the device per second.

avgrq-sz

The average size (in sectors) of the requests that were issued to the device.

avgqu-sz

The average queue length of the requests that were issued to the device.

await

The average time (in milliseconds) for I/O requests issued to the device to be served. This includes the time spent by the requests in queue and the time spent servicing them.

svctm

The average service time (in milliseconds) for I/O requests that were issued to the device.

%util

Percentage of CPU time during which I/O requests were issued to the device (bandwidth utilization for the device). Device saturation occurs when this value is close to 100%.

## OPTIONS

-c The -c option is exclusive of the -d option and displays only the CPU usage report.

-d The -d option is exclusive of the -c option and displays only the device utilization report.

-k Display statistics in kilobytes per second instead of blocks per second. Data displayed are valid only with ker-

nels 2.4 and newer.

-n Displays the NFS-directory statistic. This option is exclusive ot the -x option.

-p device | ALL

The -p option is exclusive of the -x option and displays statistics for block devices and all their partitions that

are used by the system. If a device name is entered on the command line, then statistics for it and all its parti-

tions are displayed. Last, the ALL keyword indicates that statistics have to be displayed for all the block devices

and partitions defined by the system, including those that have never been used. Note that this option works only

with post 2.5 kernels.

-t Print the time for each report displayed.

-V Print version number and usage then exit.

-x Display extended statistics. This option is exclusive of the -p and -n, and works with post 2.5 kernels since it needs /proc/diskstats file or a mounted sysfs to get the statistics. This option may also work with older kernels (e.g. 2.4) only if extended statistics are available in /proc/partitions (the kernel needs to be patched for that).

# ENVIRONMENT

The iostat command takes into account the following environment variable:

S\_TIME\_FORMAT

If this variable exists and its value is ISO then the current locale will be ignored when printing the date in the

report header. The iostat command will use the ISO 8601 format (YYYY-MM-DD) instead.

# EXAMPLES

iostat

Display a single history since boot report for all CPU and Devices.

iostat -d 2

Display a continuous device report at two second intervals.

iostat -d 2 6

Display six reports at two second intervals for all devices.

iostat -x hda hdb 2 6

Display six reports of extended statistics at two second intervals for devices hda and hdb.

iostat -p sda 2 6

Display six reports at two second intervals for device sda and all its partitions (sda1, etc.)

# BUGS

/proc filesystem must be mounted for iostat to work.

Extended statistics are available only with post 2.5 kernels.

Because of what seems to be a Linux kernel bug, iostat -x may display huge I/O response times (svctm) and a bandwidth uti-

lization (%util) of 100% for some devices. Indeed these devices have a value for the field #9 in /proc/{parti-

tions,diskstats} which is always different from 0, and even negative sometimes. Yet this field should go to zero, since it

gives the number of I/Os currently in progress (it is incremented as requests are submitted, and decremented as they fin-

ish).

# FILES

/proc/stat contains system statistics.

/proc/partitions contains disk statistics (for pre 2.5 kernels that have been patched).

/proc/diskstats contains disks statistics (for post 2.5 kernels).

/sys contains statistics for block devices (post 2.5 kernels).

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# SEE ALSO

sar(1), mpstat(1), vmstat(8)

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