# Table of contents

**Load**
- cswch/s ................................................. 4
- ldavg-1 ldavg-5 ldavg-15 ........................................ 5
- ldavg-1 ................................................. 7
- ldavg-5 ................................................. 9
- ldavg-15 .............................................. 10
- plist-sz ............................................... 11
- proc/s ............................................... 12
- runq-sz ............................................... 13
- %guest ............................................... 14
- %idle ............................................... 15
- %iowait .............................................. 16
- %irq ............................................... 17
- %nice ............................................... 18
- %soft ............................................... 19
- %sys ............................................... 20
- %usr ............................................... 21

**Files**
- dentunusd ........................................ 22
- file-nr ........................................... 23
- inode-nr ........................................... 24
<table>
<thead>
<tr>
<th>Network</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcp-tw</td>
<td></td>
</tr>
<tr>
<td>tcppck</td>
<td></td>
</tr>
<tr>
<td>totsck</td>
<td></td>
</tr>
<tr>
<td>udpsck</td>
<td></td>
</tr>
<tr>
<td>rxkB/s</td>
<td></td>
</tr>
<tr>
<td>rxmcs/s</td>
<td></td>
</tr>
<tr>
<td>rxpck/s</td>
<td></td>
</tr>
<tr>
<td>txfio/s</td>
<td></td>
</tr>
<tr>
<td>txkB/s</td>
<td></td>
</tr>
<tr>
<td>txpck/s</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>35</td>
</tr>
<tr>
<td>%commit</td>
<td></td>
</tr>
<tr>
<td>%memused</td>
<td></td>
</tr>
<tr>
<td>bufpg/s</td>
<td></td>
</tr>
<tr>
<td>cmppg/s</td>
<td></td>
</tr>
<tr>
<td>frmpg/s</td>
<td></td>
</tr>
<tr>
<td>kbuffers</td>
<td></td>
</tr>
<tr>
<td>kbcached</td>
<td></td>
</tr>
<tr>
<td>kcommit</td>
<td></td>
</tr>
<tr>
<td>kmemfree</td>
<td></td>
</tr>
<tr>
<td>kmemused</td>
<td></td>
</tr>
<tr>
<td>I/O</td>
<td>45</td>
</tr>
<tr>
<td>bread/s</td>
<td></td>
</tr>
<tr>
<td>bwrtn/s</td>
<td></td>
</tr>
<tr>
<td>rtps</td>
<td></td>
</tr>
<tr>
<td>tps</td>
<td></td>
</tr>
<tr>
<td>wtps</td>
<td></td>
</tr>
<tr>
<td>%util</td>
<td></td>
</tr>
<tr>
<td>avgqu-sz</td>
<td></td>
</tr>
<tr>
<td>avgq-sz</td>
<td></td>
</tr>
<tr>
<td>await</td>
<td></td>
</tr>
<tr>
<td>rd_sec/s</td>
<td></td>
</tr>
<tr>
<td>svctm</td>
<td></td>
</tr>
<tr>
<td>tps</td>
<td></td>
</tr>
<tr>
<td>wr_sec/s</td>
<td></td>
</tr>
<tr>
<td>Section</td>
<td>58</td>
</tr>
<tr>
<td>---------</td>
<td>----</td>
</tr>
<tr>
<td>Paging</td>
<td></td>
</tr>
<tr>
<td>fault/s</td>
<td>58</td>
</tr>
<tr>
<td>pgfree/s</td>
<td></td>
</tr>
<tr>
<td>pgpgin/s</td>
<td></td>
</tr>
<tr>
<td>pgpgout/s</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>pty-nr</td>
<td></td>
</tr>
<tr>
<td>Swap</td>
<td></td>
</tr>
<tr>
<td>kbswpfree</td>
<td></td>
</tr>
</tbody>
</table>
Load


cswch/s time series

cswch/s - Total number of context switches per second
ldavg-1 - System load average for the last minute. The load average is calculated as the average number of runnable or running tasks (R state), and the number of tasks in uninterruptible sleep (D state) over the specified interval. The exact formula is: $load(t) = n + ((load(t-1)-n)/e^{(interval/(min*60)))}$
• load(t): load average at a time of t
• n: number of threads in running or uninterruptible state
• interval: calculate interval (seconds). 5 seconds in RHEL
• min: average time (minute)

It is a moving average function. See kernel/sched.c:calc_load() for more details on the implementation on RHEL 5 and 6. More recent kernels moved it to kernel/sched/proc.c:calc_load()

ldavg-5 - System load average for the past 5 minutes
ldavg-15 - System load average for the past 15 minutes
ldavg-1 - System load average for the last minute. The load average is calculated as the average number of runnable or running tasks (R state), and the number of tasks in uninterruptible sleep (D state) over the specified interval. The exact formula is: \( \text{load}(t) = n + ((\text{load}(t-1) - n)/e^{(\text{interval}/(\text{min} * 60)))} \)
• $load(t)$: load average at a time of $t$
• $n$: number of threads in running or uninterruptible state
• $interval$: calculate interval (seconds). 5 seconds in RHEL
• $min$: average time (minute)

It is a moving average function. See `kernel/sched.c:calc_load()` for more details on the implementation on RHEL 5 and 6. More recent kernels moved it to `kernel/sched/proc.c:calc_load()`
ldavg-5 - System load average for the past 5 minutes
Load

ldavg-15 - System load average for the past 15 minutes
Load

plist-sz time series

plist-sz - Number of tasks in the task list
proc/s - Total number of tasks created per second
runq-sz - Run queue length (number of tasks waiting for run time)
%guest - Percentage of time spent by the CPU or CPUs to run a virtual processor
%idle - Percentage of time that the CPU or CPUs were idle and the system did not have an outstanding disk I/O request
Load

%iowait time series

%iowait - Percentage of time that the CPU or CPUs were idle during which the system had an outstanding disk I/O request
%irq - Percentage of time spent by the CPU or CPUs to service hardware interrupts
Load

%%nice time series

%nice value

Time

%nice - Percentage of CPU utilization that occurred while executing at the user level with nice priority
%soft - Percentage of time spent by the CPU or CPUs to service software interrupts
%sys - Percentage of CPU utilization that occurred while executing at the system level (kernel). Note that this field does NOT include time spent servicing hardware or software interrupts.
%usr - Percentage of CPU utilization that occurred while executing at the user level (application). Note that this field does NOT include time spent running virtual processors
dentunusd - Number of unused cache entries in the directory cache
file-nr - Number of file handles used by the system
inode-nr - Number of inode handlers used by the system
tcp-tw - Number of TCP sockets in TIME_WAIT state
Network

**tcpsck** - Number of TCP sockets currently in use
totsck - Total number of sockets used by the system
Network

udpsck time series

udpsck value

01-03 00:00 01-03 01:00 01-03 02:00 01-03 03:00 01-03 04:00 01-03 05:00 01-03 06:00 01-03 07:00 01-03 08:00 01-03 09:00 01-03 10:00

udpsck - Number of UDP sockets currently in use
rxkB/s - Total number of kilobytes received per second
Network

rxmcst/s - Number of multicast packets received per second
Network

rxpck/s time series

rxpck/s value

rxpck/s - Total number of packets received per second
Network

Network txfifo/s time series

**txfifo/s** - Number of FIFO overrun errors that happened per second on transmitted packets
txkB/s - Total number of kilobytes transmitted per second
Network

txpck/s time series

- Total number of packets transmitted per second

**txpck/s** - Total number of packets transmitted per second

Crash-A and Crash-B indicate performance issues.
%commit - Percentage of memory needed for current workload in relation to the total amount of memory (RAM+swap). This number may be greater than 100% because the kernel usually overcommits memory.
%memused - Percentage of used memory
Memory

bufpg/s - Number of additional memory pages used as buffers by the system per second. A negative value means fewer pages used as buffers by the system.
campg/s - Number of additional memory pages cached by the system per second. A negative value means fewer pages in the cache.
frmpg/s - Number of memory pages freed by the system per second. A negative value represents a number of pages allocated by the system. Note that a page has a size of 4 kB or 8 kB according to the machine architecture.
kbbuffers - Amount of memory used as buffers by the kernel in kilobytes
Memory

kbcached - Amount of memory used to cache data by the kernel in kilobytes
**kbcommit** - Amount of memory in kilobytes needed for current workload. This is an estimate of how much RAM/swap is needed to guarantee that there never is out of memory.
kbmemfree - Amount of free memory available in kilobytes
**kbmemused** - Amount of used memory in kilobytes. This does not take into account memory used by the kernel itself.
bread/s - Total amount of data read from the devices in 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.
bwrt/s - Total amount of data written to devices in blocks per second
I/O

rtps time series

crash-A

crash-B

**rtps** - Total number of read requests per second issued to physical devices
**tps** - Indicates the number of transfers per second that were issued to the device. Multiple logical requests can be combined into a single I/O request to the device. A transfer is of indeterminate size.
wtpsz - Total number of write requests per second issued to physical devices
I/O

%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%
avgqu-sz - The average queue length of the requests that were issued to the device.
avgrq-sz - The average size (in sectors) 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.
**rd_sec/s** - Number of sectors read from the device. The size of a sector is 512 bytes.
svctm - The average service time (in milliseconds) for I/O requests that were issued to the device. Warning! Do not trust this field any more. This field will be removed in a future sysstat version.
**tps** - Indicates the number of transfers per second that were issued to the device. Multiple logical requests can be combined into a single I/O request to the device. A transfer is of indeterminate size.
wr_sec/s - Number of sectors written to the device. The size of a sector is 512 bytes.
**fault/s** - Number of page faults (major + minor) made by the system per second. This is not a count of page faults that generate I/O, because some page faults can be resolved without I/O.
Paging

Time series graph showing the number of pages placed on the free list by the system per second (

\textbf{pgfree/s} - Number of pages placed on the free list by the system per second)
**Paging**

**pgpgin/s time series**

**pgpgin/s** - Total number of kilobytes the system paged in from disk per second. Note: With old kernels (2.2.x) this value is a number of blocks per second (and not kilobytes)
Paging

pgpgout/s time series

pgpgout/s - Total number of kilobytes the system paged out to disk per second. Note: With old kernels (2.2.x) this value is a number of blocks per second (and not kilobytes)
pty-nr - Number of pseudo-terminals used by the system
**Swap**

The diagram illustrates the `kbswpfree` time series from 01-03 00:00 to 01-03 10:00. It shows the `kbswpfree` value remaining constant at around 4200000 kilobytes throughout the time series.

- **kbswpfree** - Amount of free swap space in kilobytes

The diagram includes annotations for two events:
- **crash-A**
- **crash-B**