

How to Troubleshoot High Disk IO Problems

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Overview

Disk I/O describes how long the read and write operations require on a hard disk. The speed at which your server can read and write information to disk directly affects your server's performance and the performance of cPanel & WHM. Your server's load will increase if the system experiences high disk I/O wait time.

Symptoms of high disk I/O

Problem	Description
High server load	The average system load exceeds 1.
chkserverd notifications	You receive notifications about an offline service or that the system cannot restart a service.
Slow hosted websites	Hosted websites may require more than a minute to load.
Slow delivery of email	The Exim service performs slowly or does not respond. Exim contains a large outbound mail queue.
Slow connection for email	The POP or IMAP services perform slowly or do not respond.
Slow Webmail interfaces	The Webmail interfaces perform slowly or do not respond (for example, Roundcube or Horde).
Slow WHM or cPanel interfaces	The WHM or cPanel interfaces perform slowly when you add email accounts, databases, or other items.

How to determine the disk I/O wait on your server

Use the `top` command to find the average wait time on your server

The `%wa` statistic at the top of the output indicates your server's average disk wait.

```
top - 09:29:11 up 21 days, 2:24, 1 user, load average: 0.55, 0.09, 0.04
Tasks: 161 total, 1 running, 158 sleeping, 1 stopped, 1 zombie
Cpu(s): 1.0%us, 0.5%sy, 1.2%ni, 96.9%id, 0.4%wa, 0.0%hi, 0.0%si, 0.0%st
Mem: 1928048k total, 1872464k used, 55584k free, 214544k buffers
Swap: 4128764k total, 14008k used, 4114756k free, 1250060k cached
```

If the I/O wait percentage is greater than one divided by the number of your CPU cores, the CPU cores **must** wait to process data on hard disk. For example, if the system possesses four CPU cores and the server `%wa` statistic is 8.0, then the actual `%wa` is 2.0. Because the actual `%wa` is larger than 1.0, the CPU cores **must** wait before they can process data on hard disk.

Use the `sar` command to determine the history of your server's disk I/O wait

The `sar` command provides you with the history of the server's load averages. Use this command to determine the times when your server experiences high disk I/O.

▼ [Click to view example output from the sar command ...](#)

```
root@server [~]# sar
Linux 2.6.32-431.29.2.el6.i686 (server.example.com) 10/17/2014 _i686_
(2 CPU)

12:00:01 AM      CPU      %user      %nice      %system      %iowait      %steal
%idle
12:10:01 AM      all        0.84        1.19        0.45        0.30        0.00
97.22
12:20:01 AM      all        0.65        1.06        0.41        0.31        0.00
97.58
12:30:01 AM      all        6.67        1.47        1.60        6.25        0.00
84.02
12:40:01 AM      all        0.63        1.08        0.40        0.33        0.00
97.56
12:50:01 AM      all        0.74        1.94        0.72        1.50        0.00
95.11
01:00:01 AM      all        0.58        1.51        0.41        0.24        0.00
97.25
01:10:01 AM      all        0.71        1.06        0.48        0.58        0.00
97.17
01:20:01 AM      all        0.54        1.06        0.37        0.22        0.00
97.81
01:30:01 AM      all        0.63        1.30        0.41        0.28        0.00
97.37
01:40:01 AM      all        0.58        1.06        0.39        0.21        0.00
97.76
01:50:01 AM      all        0.60        1.06        0.40        0.23        0.00
97.70
02:00:01 AM      all        0.54        1.28        0.39        0.23        0.00
97.55
02:10:01 AM      all        0.71        1.18        0.43        0.40        0.00
97.27
02:20:01 AM      all        0.78        1.08        0.49        0.46        0.00
97.19
02:30:01 AM      all        0.58        1.28        0.49        0.23        0.00
97.43
02:40:01 AM      all        0.64        1.06        0.54        0.31        0.00
97.45
02:50:02 AM      all        0.68        1.07        0.57        0.27        0.00
97.42
03:00:01 AM      all        0.66        1.52        0.55        0.26        0.00
97.00
03:10:01 AM      all        0.74        1.08        0.60        0.28        0.00
97.30
03:20:01 AM      all        0.67        1.06        0.53        0.31        0.00
97.43
03:30:01 AM      all        0.65        1.28        0.57        0.36        0.00
97.14
03:40:01 AM      all        0.61        1.12        0.64        0.70        0.00
96.93
```

03:50:01 AM 97.45	all	0.67	1.06	0.52	0.30	0.00
04:00:01 AM 97.26	all	0.63	1.31	0.51	0.29	0.00
04:10:01 AM 97.51	all	0.68	1.06	0.52	0.23	0.00
04:20:01 AM 97.25	all	0.70	1.20	0.58	0.28	0.00
04:30:01 AM 97.23	all	0.65	1.30	0.52	0.30	0.00
04:40:01 AM 97.32	all	0.74	1.06	0.54	0.33	0.00
04:50:01 AM 97.64	all	0.56	1.08	0.43	0.28	0.00
05:00:01 AM 97.13	all	0.59	1.52	0.47	0.29	0.00
05:10:01 AM 97.46	all	0.70	1.06	0.47	0.30	0.00
05:20:01 AM 97.57	all	0.62	1.07	0.44	0.30	0.00
05:30:01 AM 97.57	all	0.55	1.29	0.40	0.20	0.00
05:40:01 AM 97.71	all	0.56	1.09	0.39	0.25	0.00
05:50:01 AM 97.55	all	0.65	1.07	0.41	0.32	0.00
06:00:01 AM 97.21	all	0.74	1.29	0.43	0.33	0.00
06:10:01 AM 97.56	all	0.65	1.06	0.41	0.31	0.00
06:20:01 AM 97.38	all	0.72	1.19	0.43	0.28	0.00
06:30:01 AM 97.47	all	0.56	1.31	0.40	0.26	0.00
06:40:01 AM 97.63	all	0.61	1.06	0.40	0.29	0.00
06:50:01 AM 97.51	all	0.71	1.06	0.42	0.30	0.00
07:00:01 AM 97.35	all	0.52	1.51	0.39	0.22	0.00
07:10:01 AM 97.44	all	0.74	1.06	0.46	0.30	0.00
07:20:01 AM 97.12	all	0.63	1.23	0.52	0.49	0.00
07:30:01 AM 97.45	all	0.58	1.30	0.40	0.27	0.00
07:40:01 AM 97.80	all	0.56	1.06	0.39	0.19	0.00
07:50:01 AM 97.61	all	0.62	1.06	0.42	0.30	0.00
08:00:01 AM 97.33	all	0.67	1.28	0.41	0.30	0.00
08:10:01 AM	all	0.63	1.06	0.42	0.23	0.00

97.66							
08:20:01 AM	all	0.56	1.20	0.39	0.26	0.00	
97.58							
08:30:01 AM	all	0.59	1.29	0.40	0.27	0.00	
97.45							
08:40:01 AM	all	0.59	1.06	0.38	0.26	0.00	
97.71							
08:50:01 AM	all	0.54	1.06	0.37	0.28	0.00	
97.74							
09:00:01 AM	all	0.60	1.52	0.41	0.23	0.00	
97.25							
09:10:01 AM	all	0.68	1.08	0.42	0.22	0.00	
97.61							
09:20:01 AM	all	0.51	1.06	0.37	0.23	0.00	
97.83							
09:30:01 AM	all	0.65	1.28	0.53	0.51	0.00	
97.02							
09:40:01 AM	all	0.61	1.06	0.39	0.37	0.00	
97.56							
09:50:01 AM	all	0.69	1.05	0.41	0.29	0.00	
97.56							
10:00:01 AM	all	0.61	1.31	0.40	0.27	0.00	
97.41							
10:10:01 AM	all	0.65	1.18	0.42	0.27	0.00	
97.47							
10:20:01 AM	all	0.60	1.06	0.40	0.25	0.00	
97.69							
10:30:01 AM	all	0.52	1.29	0.38	0.20	0.00	
97.61							
10:40:01 AM	all	0.62	1.06	0.40	0.27	0.00	
97.65							
10:50:01 AM	all	0.56	1.08	0.38	0.26	0.00	
97.72							
11:00:01 AM	all	0.61	1.50	0.41	0.28	0.00	
97.20							
11:10:01 AM	all	0.63	1.06	0.39	0.29	0.00	
97.62							
11:20:01 AM	all	0.61	1.06	0.39	0.29	0.00	
97.64							
11:30:01 AM	all	0.55	1.28	0.37	0.29	0.00	
97.51							
11:40:01 AM	all	0.60	1.08	0.40	0.29	0.00	
97.64							
11:50:01 AM	all	0.58	1.06	0.37	0.25	0.00	
97.74							
12:00:01 PM	all	0.55	1.28	0.38	0.22	0.00	
97.57							
12:10:01 PM	all	0.80	1.19	0.45	0.33	0.00	
97.24							
12:20:01 PM	all	0.68	1.06	0.40	0.29	0.00	
97.56							
12:30:01 PM	all	0.52	1.30	0.38	0.29	0.00	
97.51							

12:40:01 PM 97.57	all	0.65	1.06	0.39	0.33	0.00
12:50:01 PM 97.59	all	0.62	1.06	0.41	0.32	0.00
01:00:01 PM 97.28	all	0.55	1.51	0.40	0.26	0.00
01:10:01 PM 97.42	all	0.75	1.06	0.45	0.33	0.00
01:20:01 PM 97.77	all	0.52	1.08	0.39	0.25	0.00
01:30:01 PM	all	0.60	1.28	0.40	0.26	0.00

97.46						
Average:	all	0.71	1.19	0.45	0.38	0.00
97.27						

How to resolve a problem with high disk I/O

Problem	Recommendation
Hard disk specifications with low RPM speed or slow interface technology	Upgrade the hard disk on your server or split the application load between separate hard disks.
No bandwidth available on the hard disk	Upgrade the hard disk on your server or split the application load between separate hard disks.
Write caching is disabled	Enable write caching on the disk.
Degraded RAID array	Check the Raid array for a hardware malfunction. You should test and verify the hardware.
Software RAID array on the server reports busy; CPU uses slow parity calculation	Check the Raid array for a hardware malfunction. You should test and verify the hardware.
Software processes slowly	Upgrade the hard disk on your server or split the application load between separate hard disks.

Direct Memory Access

Direct Memory Access (DMA) improves hard drive and backup speeds. We **strongly** recommend that you enable DMA.

- To enable DMA for a hard drive, run the `hdparm -d1 /dev/hda` command.
- To disable DMA for a hard drive, run the `hdparm -d0 /dev/hda` command.
- To measure a hard drive's transfer rate, run the `hdparm -Tt /dev/hda` command.
- To view a hard drive's enabled options, run the `hdparm /dev/hda` command.
- To view more information about a hard drive, run the `hdparm -i /dev/hda` command.

Note

Some older drives and motherboards have a problem with DMA. Ask your data center, hard drive manufacturer, or motherboard manufacturer whether you can enable DMA on your drives.

Additional documentation

Suggested documentation [For cPanel users](#) [For WHM users](#) [For developers](#)

- [How to Troubleshoot High Disk IO Problems](#)
- [How to Clear a Full Partition](#)
- [How to Clean Unmanaged Log Files](#)
- [How to Manage your Hard Drive Space](#)
- [The cPanel Log Files](#)
- [How to Install WHMCS](#)
- [How to Open a Technical Support Ticket](#)
- [How to Troubleshoot High Disk IO Problems](#)

- [How to Clear a Full Partition](#)
- [How to Clean Unmanaged Log Files](#)
- [How to Manage your Hard Drive Space](#)
- [The cPanel Log Files](#)

- [cPanel API 1 Functions - DiskUsage::showmanager](#)
- [cPanel API 1 Modules - DiskUsage](#)
- [cPanel API 2 Functions - DiskUsage::clearcache](#)
- [cPanel API 2 Functions - DiskUsage::fetch_raw_disk_usage](#)
- [cPanel API 2 Functions - DiskUsage::fetchdiskusagewithextras](#)