

Performance Monitor

Disk Reads/Writes per Second	Measures the Number of I/O's per second (practical limit of 100/sec for a single 10K Rpm disk and 130/sec for a single 15K Rpm disk)
Average Disk/sec Read & Write	Measures disk latency. Numbers will vary, optimal values: 1 - 5 ms for Log (Ideally 1ms or better) 5 - 20 ms for Data (OLTP) <=25 ms for Data (DSS)
Average Disk Bytes/Read & Write	Measures the size of I/O's being issued. Larger I/O tend to have higher latency
Average Disk Queue Length	Hard to interpret due to virtualization of storage. Ideal value <=2 (maybe 4) per physical disk.
Disk Read & Write Bytes/sec	Measure of total disk throughput. Ideally sequential scans should be able to exhaust channel throughput.

Perfmon Counters for SQL Server

- *Memory – Pages/Sec*: To see how much paging my server is doing. This should be close to zero on a dedicated SQL Server. You will see spikes during backups and restores, but this is normal.
- *Network Interface – Bytes Total/sec*: To see how much network activity is going on.
- *PhysicalDisk – % Disk Time – _Total*: To see how busy all the disk drives are.
- *PhysicalDisk – Current Disk Queue Length – _Total*: Also to see how busy the drives are.
- *System – Processor Queue Length*: To see how busy the CPUs are as a whole.
- *System – % Total Processor Time*: To see how busy all the CPUs are.
- *System – Processor Queue Length*: Also see how busy the CPUs are.
- *SQLServer: General Statistics – User Connections*: To see how many connections (and users) are using the server. Keep in mind that one connection does not equal one user. A single user can have more than one connection, and a single connection can have more than one user.
- *SQLServer: Access Methods – Page Splits/sec*: Lets me know if page splits are an issue or not. If so, then that means I need either to increase the fill factor of my indexes, or to rebuild the indexes more often.
- *SQLServer: Buffer Manager – Buffer Cache Hit Ratio*: To find out if I have enough memory in the server. Keep in mind that this ratio is based on the average of the buffer hit cache ratio since the SQL Server service was last restarted, and is not a reflection of the current buffer cache hit ratio.
- *SQLServer: Memory Manager – Target Server Memory (KB)*: To see how much memory SQL Server wants. If this is the same as the SQLServer: Memory Manager – Total Server Memory (KB) counter, then I know that SQL Server has all the memory that it wants.
- *SQLServer: Memory Manager – Total Server Memory (KB)*: To see how much memory SQL Server actual is using. If this is the same as SQLServer: Memory Manager – Target Server Memory (KB), then I know that SQL Server has all the memory that it wants. But if this is smaller, then SQL Server needs more available memory in order to run at its optimum performance.

Determining acceptable values for counters

In general, deciding whether or not performance is acceptable is a subjective judgment that varies significantly with variations in user environments. The values you establish as the baselines for your organization are the best basis for comparison. Nevertheless, the following table containing threshold values for specific counters can help you determine whether values reported by your computer indicate a problem. If System Monitor consistently reports these values, it is likely that bottlenecks exist on your system and you should take action to tune or upgrade the affected resource.

Resource	Object\ Counter	Suggested threshold	Comments
Disk	PhysicalDisk\ % Disk Time	90%	
Disk	PhysicalDisk\ Disk Reads/sec, PhysicalDisk\ Disk Writes/sec	Depends on manufacturer's specifications	Check the specified transfer rate for your disks to verify that this rate doesn't exceed the specifications. In general, Ultra Wide SCSI disks can handle 50 I/O operations per second.
Disk	Physical Disk\ Current Disk Queue Length	Number of spindles plus 2	This is an instantaneous counter; observe its value over several intervals. For an average over time, use Physical Disk\ Avg. Disk Queue Length.
Memory	Memory\ Available Bytes	Less than 4 MB	Research memory usage and add memory if needed.
Memory	Memory\ Pages/sec	20	Research paging activity.
Network	Network Segment\ % Net Utilization	Depends on type of network	You must determine the threshold based on the type of network you are running. For Ethernet networks, for example, 30% is the recommended threshold.
Paging File	Paging File\ % Usage	99%	Review this value in conjunction with Available Bytes and Pages/sec to understand paging activity on your computer.
Processor	Processor\ % Processor Time	85%	Find the process that is using a high percentage of processor time. Upgrade to a faster processor or install an additional processor.
Processor	Processor\ Interrupts/sec	Depends on processor.	A dramatic increase in this counter value without a corresponding increase in system activity indicates a hardware problem. Identify the network adapter causing the interrupts.
Server	Server\ Bytes Total/sec		If the sum of Bytes Total/sec for all servers is roughly equal to the maximum transfer rates of your network, you may need to segment the network. If the value reaches this threshold, consider tuning InitWorkItems or MaxWorkItems in the registry (under HKEY_LOCAL_MACHINE\SYSTEM

			\CurrentControlSet\Services\LanmanServer). For information about modifying the registry, see Registry Editor Help
Server	Server\ Work Item Shortages	3	<p>▼ Caution</p> <ul style="list-style-type: none">• Incorrectly editing the registry may severely damage your system. Before making changes to the registry, you should back up any valued data on the computer.
Server	Server\ Pool Paged Peak	Amount of physical RAM	This value is an indicator of the maximum paging file size and the amount of physical memory.
Server	Server Work Queues\ Queue Length	4	If the value reaches this threshold, there may be a processor bottleneck. This is an instantaneous counter; observe its value over several intervals.
Multiple Processors	System\ Processor Queue Length	2	This is an instantaneous counter; observe its value over several intervals.

For tuning and upgrade suggestions, see [Solving performance problems](#)