SQL Server Perfmon Counters of Interest

Windows Performance / System Monitor (Perfmon)
The Windows Performance Monitor (Perfmon) has been around for a long time. Introduced shortly after Windows NT, Perfmon had been one of the only native Performance Monitoring tools in the Windows toolkit for decades. It has even undergone at least one name change, now being called Windows System Monitor. As time marched on, new tools have been added by Microsoft to the mix. But one aspect of Perfmon makes it worth learning for it professionals – it is ubiquitous. Few other tools in the toolkit offer that reliability and universal access.

About Perfmon counter thresholds
Perfmon is very helpful in diagnosing the root-cause of performance problems on Microsoft SQL server. Since Perfmon makes it easy to visually identify a counter whose value has dramatically changed, it is easy to spot if a particular counter is spiking or dropping. But that is only part of the picture. It is equally important to know which counter or collection of counters will actually aid in diagnosing a performance problem. After all, some counters change because they are the problem, while other changes as a side effect of the problem.

This poster provides you with a great many useful and valuable Perfmon counters and, where possible, a recommended threshold indicating interesting performance. Every Perfmon counter that we cover is important. However, take the threshold recommendations with a grain of salt. It's rare to encounter written recommended thresholds for specific Perfmon counters because:

- Many counter thresholds vary depending on the hardware. A good number from a Perfmon counter today may be a terrible value with tomorrow's constantly improving hardware.
- It takes a lot of experience to find a useful threshold. In other words, coming up with good Perfmon thresholds is hard to do.
- People misunderstand threshold recommendations. Sometimes they fixate on one aspect of a Perfmon counter, but fail to see the bigger picture.
- There are so many exceptions to every Perfmon threshold rule that a subject-matter expert (SME) might put forward that it's sometimes risky to make any recommendation. For example, a long-standing recommendation originating from the very first Windows NT Resource Kit says that disk queue length should not exceed 2-3 times the number of physical disks. But this is only sometimes true because read-ahead activity actually improves performance, while pushing making the disk queue length number look worse.

So while we provide you guidance on Perfmon thresholds where we can, it's important to remember that you may need to look for other counters and at other instrumentation (such as dmvs, wait states, the error logs, and extended events) to help you fully diagnose a particular problem.

Using Perfmon to build a hypothesis
When using Perfmon, keep a couple things in mind. First, record the counter information to a csv file or a SQL server database. But record the information to a server other than the one being monitored. Sample every fifteen seconds, by default, and adjust faster or slower according to your needs. For particularly challenging diagnostics, you may wish to run SQL Profiler and Perfmon concurrently, then correlate their results so you can see which (if any) SQL statement is the root-cause. Finally, the Perfmon counter causing the problem is usually a leading indicator during analysis of the Perfmon graphs. Meaning, the counter that changes first is most often the indicator of the root-cause, while side-effects will be shown in other counters that change a moment or two after the first counter. However, polling frequency can conceal this phenomenon. Consequently, you might wish to adjust the polling frequency or use additional diagnostic instrumentation to vet your hypothesis.

To learn more about Perfmon, check out our in-depth video tutorial on SQLServerPedia at:
www.quest.com/Perfmon

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