(September 17th, 2012)

If you know someone who you think would benefit from being an Insider, feel free to forward this PDF to them so they can sign up here.

Quick Tips for our Insider friends!

Hey Insiders!

This bi-weekly Quick Tips is coming to you from Redmond, where we've been reorganizing our ~~dumping ground~~ house in a major way, preparing a bunch of new courses, and gearing up for some onsite work over the next few months with long-term clients. It's great being at home for a while, but as I'm writing this outside on our deck, the sky is very hazy from the wildfire smoke that's drifted across the Cascades from Eastern Washington.

The Paul's Ponderings this week is inspired by a new consulting offering we've just launched that revolves around Glenn, our resident hardware guru. Many times we see clients that have over-bought hardware they can't use now because of licensing changes, or upgrade in-place on old hardware and suffer performance issues. We've put together a series of hardware analysis and guidance consulting offerings we think will really help people out when choosing new hardware. You can read all about them here.

We've also released our entire 2013 schedule of public classes – see the bottom of the newsletter for all the details.

And in the midst of all this, I've still been reading! The most recent book I've read is Monaldi and Sorti's *Imprimatur*. It follows a group of people who are quarantined in an inn in Rome during a plague outbreak in 1683. Some of the inhabitants discover an underground labyrinth under the streets of Rome and explore them nocturnally and become involved in investigating a grand intrigue. The book is full of historical detail, including some wild medicinal thinking of the day, and I strongly recommend it for history fans.

Please let us know if you liked what you read/saw here and/or have any suggestions for future Quick Tips.

Note: you can get all the prior Insider newsletters here.

Paul's Ponderings

Over the last few years there has been an increase in the number of cores each processor has, especially with AMD processors like the 8- and 12-core "Magny-Cours" Opterons. Along with that, prices have been coming down. So imagine you bought a system with four 12-core processors and then you upgrade to SQL Server 2012 through Software Assurance. And then you notice that workload performance is quite a bit worse and you start to investigate.

Eventually you notice the following entry in the SQL Server error log:

> *SQL Server detected 4 sockets with 12 cores per socket and 12 logical processors per socket 48 total logical processors; using 20 logical processors based on SQL Server licensing. This is an informational message; no user action is required.*

Or maybe you see in `sys.dm_os_schedulers` that you only have 20 schedulers listed as `VISIBLE ONLINE`, and you wonder where the other 28 are.

What happened is that the SQL Server licensing model changed for 2012, and if you're not careful, you'll have a bunch of hardware that you can't utilize properly without spending a lot more money on licensing. Our good friend and fellow-MVP Aaron Bertrand wrote a comprehensive blog post about this here.

Another problem we see is that people don't really understand how to scope out a new hardware purchase, so often end up with a system that is under-powered, or vastly over-powered, for the workload and its growth over the next few years. And why should they? Why should DBAs and developers have to understand how to put together a properly-sized server system? That's another area of knowledge and complexity that most people don't have and don't have the time to acquire.

And don't get me started about consolidation of multiple SQL Servers into VMs on a single beefy server. Over and over we see problems where application VMs with small numbers of virtual-CPUs (vCPUs) are mixed with SQL Server VMs with a large number of vCPUs – all in the name of saving money on servers. The problem there is that the VMs with a large number of vCPUs can be starved of processor resources because of the way the hypervisor does scheduling.

Operating systems generally assume that all of the processors available run at the same clock rate, which may not be the case in a virtualized implementation, so the hypervisor has to co-schedule the vCPUs periodically, by preempting the same number of physical processors (pCPUs), to remove the inter-CPU skew that accumulates from the vCPUs being scheduled independently. When small VMs mix with larger VMs, the result can be that the larger VMs wait for the correct number of pCPUs to be preempted for co-scheduling, while smaller VMs continue to be scheduled and execute. This can lead to starvation for the large VMs.

Although new releases of the various hypervisors do improve overall performance, we still see mis-configurations over and over due to over-provisioned, over-committed, and over-subscribed virtual hosts. Sometimes it can be better to have some SQL Servers running on smaller, cheaper, dedicated servers rather than virtualizing everything all together.

Call to action: The next time your company is looking at getting new hardware, virtualizing, or upgrading in-place on older hardware, get some advice from someone who's really hardware-savvy. Your company might have a centralized IT server team that could offer you some advice,

you might have someone on your team who's really into hardware (and has read Glenn's book on SQL Server Hardware), or you might need to call in someone like us. But whatever you do, don't fall into the trap of buying the biggest server you can afford, or trying to re-use older hardware – you'll likely end up wasting money on hardware or licensing (or both), or suffering performance problems down the road. With the money you can save from scoping out hardware properly, you might just end up getting it essentially for free – if you make the effort!

I'm curious to hear your thoughts about provisioning new hardware, so please feel free to drop me a line, treated confidentially of course.

Video Demo

For this week's insider video, Joe shows you how the Query Optimizer's assumption about column independence can result in cardinality-estimation issues. He walks through an example scenario and then demonstrates two methods you can use to resolve the cardinality-estimation issue. The video is around 5 minutes long.

I produced the video in WMV and MOV formats so everyone can watch. You can get the videos:

- For WMV: here
- For MOV: here

You can get the demo code here.

Enjoy!

SQLskills Offerings

All of our 2013 public classes are now open for registration! Based on requests from people, attendee ratings of the hotels we used this year, and the ease of using hotels we know, we're using the same locations again. This means we cover both sides of the US, central US, and Europe.

Please know that these classes are final as the hotel contracts are signed, and the classes will not be cancelled or moved for any reason, nor will the dates change.

- February 4-8, 2013: Internals and Performance (**IE1**) in Tampa, FL – USA
- February 11-15, 2013: Performance Tuning (**IE2**) in Tampa, FL – USA
- April 29-May 3, 2013: Internals and Performance (**IE1**) in Chicago, IL – USA
- April 29-May 3, 2013: Immersion Event for Business Intelligence (**IEBI**) in Chicago, IL – USA (co-located but in a different training room. Attendance is for one event or the other; these cannot be combined for one attendee where they move back/forth.)
- May 6-10, 2013: Performance Tuning (**IE2**) in Chicago, IL – USA
- May 13-17, 2013: High Availability & Disaster Recovery (**IE3**) in Chicago, IL – USA

- May 13-17, 2013: Immersion Event for Developers (**IEDev**) in Chicago, IL – USA (co-located but in a different training room. Attendance is for one event or the other; these cannot be combined for one attendee where they move back/forth.)
- May 20-24, 2013: Development Support (**IE4**) in Chicago, IL – USA
- June 3-7, 2013: Internals and Performance (**IE1**) in London – UK
- June 10-14, 2013: Performance Tuning (**IE2**) in London – UK
- June 17-21, 2013: High Availability & Disaster Recovery (**IE3**) in London – UK
- September 16-20, 2013: Internals and Performance (**IE1**) in Bellevue, WA – USA
- September 23-27, 2013: Performance Tuning (**IE2**) in Bellevue, WA – USA

One thing to note is that the course prices have increased slightly for 2013, reflecting increasing food, logistics, travel, and accommodation costs. We kept our prices the same for the last three years but now we have to raise them a little.

For US classes, the new early-bird price is US$3,295 and the full-price is US$3,795. However, for all registrations received before January 1, 2013, and for all past attendees in the 12 months prior to registration, we will only charge the 2012 early bird price of US$2,995 – super-early-bird! – **get your registrations in early!**

For UK classes, the new early-bird price is US$3,795 and the full-price is US$4,295. There is a similar super-early-bird and past-attendee price equal to the 2012 UK early bird price of US$3,495 – **again, get your registrations in early!**

See here for the main Immersion Event Calendar page that allows you to drill through to each class for more details and registration links.

So, that's it for now. We hope to see you soon!

Summary

We hope you've enjoyed this issue - we really enjoy putting these together.

If there is anything else you're interested in, we'd love to hear from you - drop us a line.

Thanks,
Paul and Kimberly

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