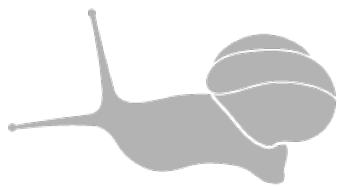# 6 TIPS TO ELIMINATE LATENCY

in your virtualized environment

solarwinds

Background

Latency is the principal enemy of an administrator. If your virtual infrastructure is running smoothly and latency is at an acceptable level then everything is fine. However, if latency at the storage side or on the network goes through the ceiling, then you're in trouble. You might also be running applications that are very sensitive to latency problems.
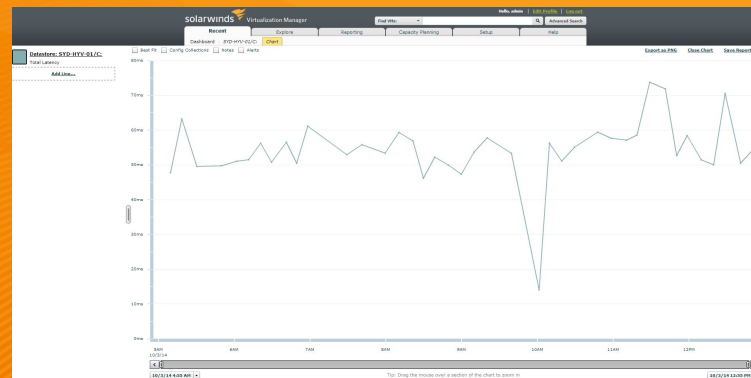
Storage latency graph

Can you fight it? Yes!

Concerning network latency, you can tweak a few things not only on the virtual infrastructure, but also on physical infrastructure.

When packets travel from one VM living on one ESXi™ host, to another VM living on another ESXi host, they cross a physical switch at one moment—and there are a few improvements that can be made.

So how do you "fight" latency and best fine tune the environment for latency sensitive VMs? Follow these tips to find out.

BIOS Settings

Servers with newer CPUs from Intel® or AMD® offer a power saving option. However, high power performance is the only way to go!

While C-State is helpful for power savings, it can increase latency across applications. That said, it's a good idea to disable C-State.
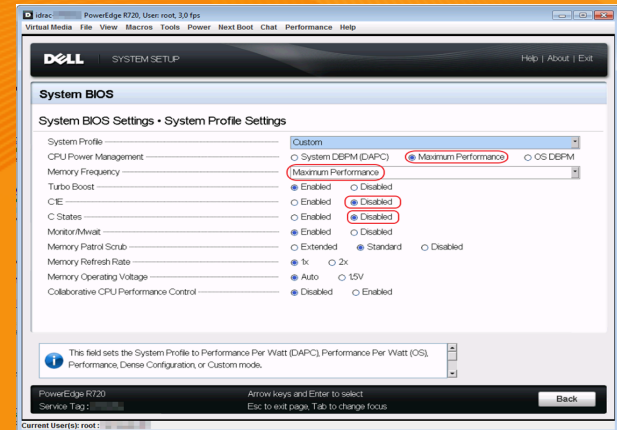
CPU PERFORMANCE	C-STATE	vSPHERE (ESXi)
MAXIMUM	**DISABLE**	**HIGH**

Finally, make sure vSphere® (ESXi) is set to high performance. Also, depending on your hardware manufacturer, you should check its documentation for the best possible performance settings.
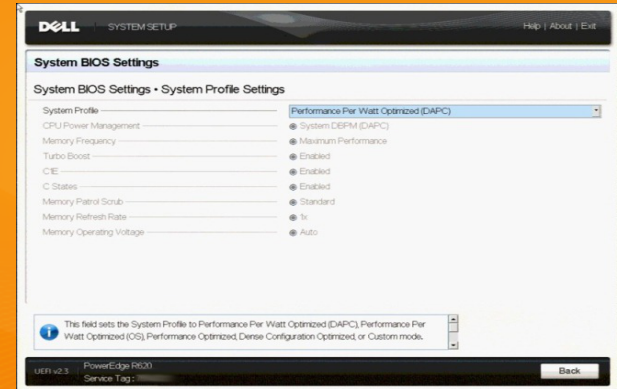
System BIOS Settings. System profile screen


System BIOS Settings once adjusted

NUMA

Processor affinity for vCPU should be scheduled on specific NUMA nodes and memory affinity for all VM memory should be allocated from those NUMA nodes.

Provided below is an example for vSphere (you can enable through):

Manage ▶ Settings ▶ Edit ▶ Advanced ▶ Edit configuration button

Here you'll need to Add new option "numa.nodeAffinity" and as a value you'll use a comma separated list for multiple nodes. If you use vSphere as your virtualization platform then it depends on your version. Check the documentation for "numa.nodeAffinity".
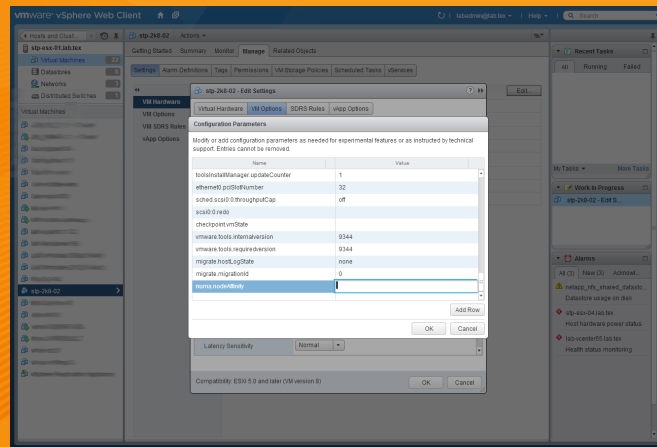

Note: This is an exception and should only be done if the application calls for it!

NIC Settings

It's possible to disable interrupt moderation on physical NICs, which is beneficial to achieve lower latency for very sensitive, low-latency applications. The feature is also called interrupt throttling. It's been instated however to keep the given host from being overwhelmed with CPU cycles which only treats interrupts. However, this can lead to CPU overhead on the host and can possibly affect other VMs running on the host from a performance perspective.

With virtual NICs tweaks, it's important to choose the right vNIC type, like VMXNET3, especially for applications and VMs that really need the best possible performance. It's also possible to disable virtual interrupt coalescing on the vNIC (by adding "ethernetX.coalescingScheme" with value "disabled"). You can also modify host based settings, however it will affect ALL virtual machines running on the particular host.
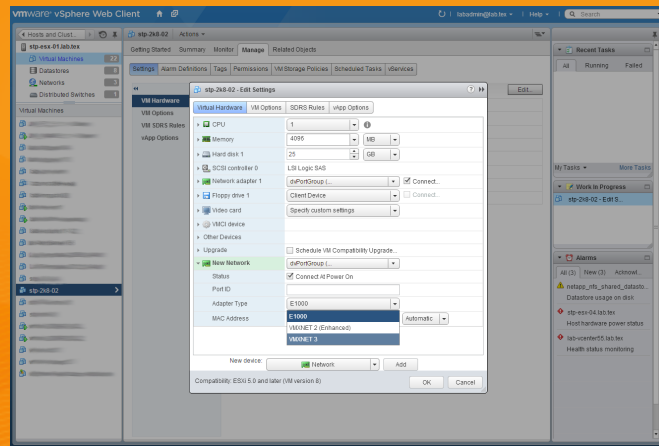
Note: Disabling interrupt moderation on physical NICs could negatively impact other VMs. Perform a baseline check prior to making these changes. Once changes have been made, use SolarWinds® Virtualization Manager to identify if a negative impact has been made as a result of these changes.

Virtual Disk SCSI Controller Choice

Depending on the OS you're using on particular VM(s), it can be useful to change the typical default setting (LSI Logic SAS) to VMware® Paravirtual, which leads to lower CPU utilization and higher throughput.

LOWER CPU UTILIZATION
7% TO 10%

To deliver the same number of IOPS, it uses less CPU cycles (10% lower CPU utilization). Additionally, it's the most effective and efficient driver. Note that only 4 PVSCSI controllers per VM are currently supported.
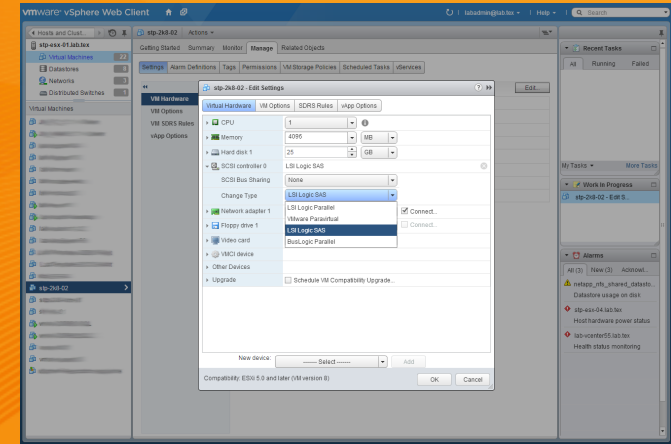
Note: Once the change is made you have to choose the right setting depending on OS/template in VMware.

Guest OS Optimizations

If you've already rightsized your VMs CPU & memory, you can look at other possible tweaks at the application & guest OS levels to improve performance.

APPLICATION LEVEL	&	GUEST OS LEVEL

Depending on the workloads you're running, you can find specific optimization guides for VDI deployments where you need to tweak the master image, deactivate some services, etc.

Instead of focusing on performance tweaks at the application and guest OS level, consider making adjustments at the virtual hardware layer. Here you can delete unnecessary floppy drives, COM ports, or USB ports.
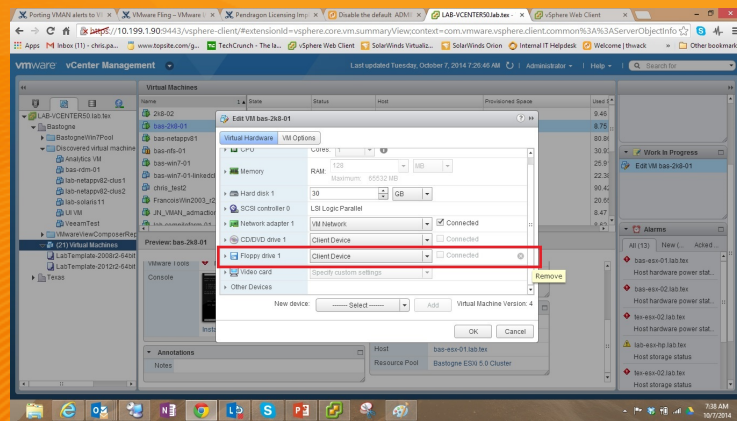
Floppy with the removal "x"

Addressing Storage Performance Issues

When it comes to storage management, there's a high probability of developing performance issues over time. There can be bottlenecks and hotspots in many places on your storage environment, including storage arrays, controllers, and disk drives. If the server environment is virtualized, it will lead to more storage performance challenges due to an over-commitment of resources, abstraction, and VM sprawl issues.

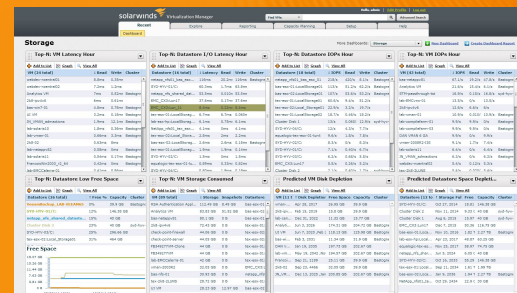Learn how storage bottlenecks impact performance in virtualized environments with these 5 simple tips

TIPS

1	Consider changing RAID type
2	Replace old disk with SSD
3	Reallocate disk I/O load
4	Upgrade to larger cache
5	Plan well & add more physical disk arrays

Storage latency dashboard

Congrats You're Done!

ADDITIONAL HELPFUL POSTS

Helping customers to solve their problems first

What-if scenarios—how cool is that?

When Performance Optimization Matters

Follow us @SWI_Systems or on LinkedIn for systems
management best practices.

THANKS!

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