QUALITY OF SERVICE IN VIRTUALIZED GRAPHICS **DEPLOYMENTS USING AMD MxGPU TECHNOLOGY**

AMD MxGPU graphics virtualization technology delivers leading Quality of Service (QoS) with performance that is up to nine times more consistent than the competion.[1]

Quality of Service?

Predictable, reliable infrastructure is paramount in an enterprise environment. Traditional workspaces ensure predictability using physically isolated personal computers on each user's desk. Modern virtualized deployments have more dependencies for predictability and reliability. For example, the activity of other users can directly impact your experience, or Quality of Service (QoS).

Graphics in the Cloud

Public and private cloud infrastructures are increasingly adopting dedicated graphics hardware by way of GPUs. More and more Independent software vendors (ISVs) are integrating support for GPU acceleration into their products. Users of applications such as Microsoft PowerPoint®, Autodesk Revit™, and YouTube can use GPUs to provide a rich experience. This trend is causing enterprises to start paying attention to graphics QoS.

Noisy Neighbors

Imagine an architect who needs to render a kitchen design using different cabinets. She starts the rendering, but notices unusually slow performance. Investigation reveals that a nearby coworker began a similar render at almost the same moment. Nobody could predict this timing, and neither user can afford degraded performance.

Untrusted Neighbors

Many enterprises have at least one user who responds to spam and clicks flashing ads despite warnings. These users can be more likely to infect enterprise infrastructure with malware that can degrade performance as it spreads from virtual machine to virtual machine.

An Elegant Solution: AMD MxGPU

IAMD Multi-User GPU (MxGPU) technology is designed to deliver predictable and consistent performance irrespective of noisy and untrusted neighbors. Hardware-enforced time- slicing and memory isolation divide and isolate resources to prevent mingling. AMD FirePro S7100 series graphics accelerators deliver world-class QoS.

How Well Does It Work?

AMD performed lab tests to compare the QoS delivered by the AMD FirePro S7150 x2 versus the NVIDIA Tesla M60. SPECapc® for Solidworks™—a real-world benchmark—was instantiated simultaneously across 16 virtual machines in a vSphere 6.5 environment on a Dell PowerEdge™ R730 server[2]. Figure 1 (next page) displays the resulting normalized graphics composite scores and demonstrates the consistency and predictability of AMD MxGPU technology.

To further quantify QoS, we used the reciprocal of the statistical standard deviation of the 16 virtual machine graphics scores to measure predictability. This approach reveals that the AMD S7150 x2 MxGPU delivers performance that is nine times more stable2 than the NVIDIA Tesla M60, as shown in Figure 2, below

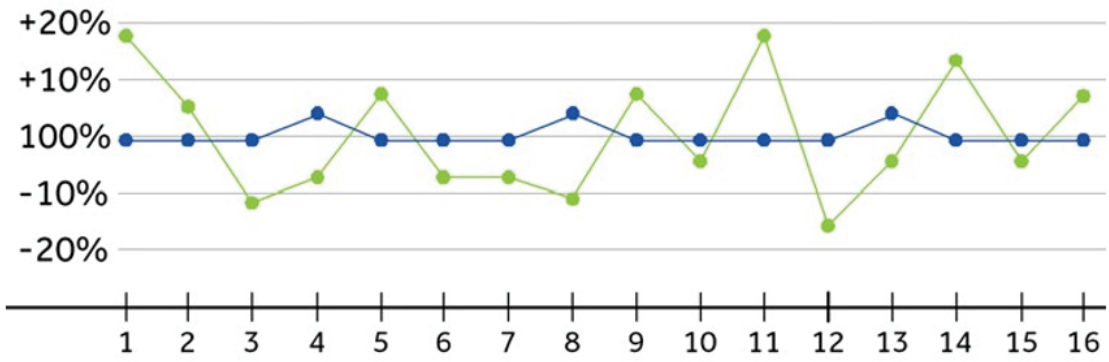
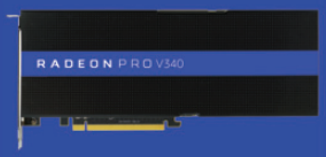


Figure 1. Performance stability across 16 virtual machines for AMD MxGPU (blue) and NVIDIA Tesla (green). Values are normalized to make the mean 100%. Flatter curve nearer to 100% is better.

The performance variability on the AMD FirePro S7150 x2 with 16 simultaneous workloads is in line with expected observations on 16 identical, isolated physical machines. AMD MxGPU technology replaces noisy and/or untrusted neighbors with good neighbors.

	S7100X	S7150X2	V340
			
Max. Virtual Machines	16	32	32
Max. Power	100W	265W	<300W
Form Factor	PCIe® 3 MXM 3.1	Full height & length PCIe® 3x16	Full height & length PCIe® 3x16
Cooling	Passive	Passive	Passive
Interface	256 bit	256 bit	256 bit
Memory	8GB GDDR5	16GB GDDR5	32GB HBM2
ECC Memory	supported	supported	supported
API Support	DirectX® 11.1, OpenGL® 4.4 and OpenCL™ 2.0		
OS Support	Microsoft® Windows 10, Windows® 7, Windows® Server 2016, Windows® Server 2008 R2 (64-bit only)		
Hypervisor Supt.	VMware® ESXi™ 6.5, 6.0, Citrix® XenServer® 7.4+		
Remote Vis. Supt.	VMware® Horizon® View 7.0+, Citrix® XenDesktop® 7.15+, Citrix® XenApp® 7.15+		

Peripheral Benefits For Your Business

The stable and predictable QoS delivered by AMD MxGPU technology offers the following compelling benefits to your business:

- Fewer IT Support Calls: Effective use of virtualized infrastructure should reduce IT support and not clog the lines with performance-related complaints—and especially not complaints about performance varying for no apparent reason.
- Better Business Planning: Your enterprise's Program Management Office likely isn't fond of committing to projects while there is a significant risk computational resources can fail to perform as expected at any given moment of any given day.

For more information, please visit http://www.amd.com/mxgpu

FOOTNOTES

1. Testing conducted by AMD Performance Labs as of August 1st under following host and virtual machine configuration: Host: VMware ESXi 6.5.0 with host driver Radeon Pro VMware vSphere Driver– Revision 1.02 / Nvidia VMware ESXi 6.5 Host Driver 367.106 Virtual Machines: Intel(R) Xeon(R) E5-2698 v4 @2.20 GHz, 4 Cores, 4 Logical Processors, 8GB Physical Memory, 120 GB Storage, Windows 7 Enterprise 64-bit SP1 Build 7601 with Radeon Pro Software 17.30 driver/Nvidia GRID 370.12 guest graphics driver Benchmark: SPECapc Solidworks simultaneously on 16 virtual machines Nvidia GRID vGPU configuration: Each VM has 1 vGPU assigned from Nvidia GRID M60-0Q profile (16 vGPU on a physical GPU). AMD MxGPU configuration: Each VM has 1 vGPU assigned from 16 VFs configuration (16 vGPU on a physical GPU). Raw, normalized, AMD scores across 16 VMs: 0.994174757 0.994174757 0.994174757 1.025242718 0.994174757 0.994174757 0.994174757 1.025242718 0.994174757 0.994174757 0.994174757 0.994174757 1.025242718 0.994174757 0.994174757 0.994174757 Raw, normalized, Nvidia scores across 16 VMs: 1.181981982 1.066666667 0.893693694 0.922522523 1.066666667 0.922522523 0.922522523 0.893693694 1.066666667 0.951351351 1.181981982 0.836036036 0.951351351 1.124324324 0.951351351 1.066666667 FirePro™ S7150x2 graphics standard deviation: 0.00390 Nvidia Tesla M60 graphics standard deviation: 0.03618 Performance Differential: 0.03618/0.00390 = ~9.27x higher standard deviation on Nvidia Tesla M60. FirePro™ S7150x2 graphics performance predictability (inverse of standard deviation): 1/0.00390 = 256.41 Nvidia Tesla M60 graphics performance predictability (inverse of standard deviation): 1/0.03618 = 27.64 PC and server manufacturers may vary configurations, yielding different results. Performance may vary based on use of latest drivers. RPW-177

2. Server configured as:
Host: VMware ESXi 6.5.0 with host driver Radeon Pro VMware vSphere Driver– Revision 1.02 / Nvidia VMware ESXi 6.5 Host Driver 367.106
Virtual Machines: Intel(R) Xeon(R) E5-2698 v4 @2.20 GHz, 4 Cores, 4 Logical Processors, 8GB Physical Memory, 120 GB Storage, Windows 7 Enterprise 64-bit SP1 Build 7601 with Radeon Pro Software 17.30 driver/Nvidia GRID 370.12 guest graphics driver

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ATTRIBUTION