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Virgl asynchronous command stream submission

Virgl testing of performance improvement

Automated Executive Summary

Async transfer query fixed too again had the most wins, coming in first place for 25% of the tests.

Test Systems:

Asynchronous command emission and early flush

Processor: 8 x QEMU Virtual 2.5+ (8 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (rel-1.14.0-0-g155821a1990b-prebuilt.qemu.org BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 32GB, Disk: 97GB, Graphics: virgl 12288GB, Audio: Intel 82801I, Monitor: QEMU Monitor, Network: Red Hat Virtio device

OS: Gentoo/Linux, Kernel: 5.15.11-gentoo-x86_64 (x86_64), Display Server: X Server 1.20.14, OpenGL: 4.3 Mesa 22.0.0-devel (git-55482b8164) (LLVM 13.0.0 D...), Compiler: GCC 11.2.0 + LLVM 13.0.0, File-System: ext4, Screen Resolution: 1440x900, System Layer: QEMU

Processor Notes: CPU Microcode: 0x1000065

Python Notes: Python 3.9.9

Security Notes: `itlb_multihit`: Not affected + `l1tf`: Not affected + `mds`: Not affected + `meltdown`: Not affected + `spec_store_bypass`: Not affected + `spectre_v1`: Mitigation of `usercopy/swapgs` barriers and `__user` pointer sanitization + `spectre_v2`: Mitigation of Full AMD retrpoline STIBP: disabled RSB filling + `srbds`: Not affected + `tsx_async_abort`: Not affected

Baseline

Processor: 8 x QEMU Virtual 2.5+ (8 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (rel-1.14.0-0-g155821a1990b-prebuilt.qemu.org BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 32GB, Disk: 97GB, Graphics: virgl 12288GB, Audio: Intel 82801I, Monitor: QEMU Monitor, Network: Red Hat Virtio device

OS: Gentoo/Linux, Kernel: 5.15.11-gentoo-x86_64 (x86_64), Display Server: X Server 1.20.14, OpenGL: 4.3 Mesa 22.0.0-devel (git-a167e8ecc8) (LLVM 13.0.0 D...), Compiler: GCC 11.2.0 + LLVM 13.0.0, File-System: ext4, Screen Resolution: 1440x900, System Layer: QEMU

Processor Notes: CPU Microcode: 0x1000065

Python Notes: Python 3.9.9

Security Notes: `itlb_multihit`: Not affected + `l1tf`: Not affected + `mds`: Not affected + `meltdown`: Not affected + `spec_store_bypass`: Not affected + `spectre_v1`: Mitigation of `usercopy/swapgs` barriers and `__user` pointer sanitization + `spectre_v2`: Mitigation of Full AMD retrpoline STIBP: disabled RSB filling + `srbds`: Not affected + `tsx_async_abort`: Not affected

Async transfer fixed

Processor: 8 x QEMU Virtual 2.5+ (8 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (rel-1.14.0-0-g155821a1990b-prebuilt.qemu.org BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 32GB, Disk: 97GB, Graphics: virgl 12288GB, Audio: Intel 82801I, Monitor: QEMU Monitor, Network: Red Hat Virtio device

OS: Gentoo/Linux, Kernel: 5.15.11-gentoo-x86_64 (x86_64), Display Server: X Server 1.20.14, OpenGL: 4.3 Mesa 22.0.0-devel (git-47fee50e3e) (LLVM 13.0.0 D...), Compiler: GCC 11.2.0 + LLVM 13.0.0, File-System: ext4, Screen Resolution: 1024x768, System Layer: QEMU

Processor Notes: CPU Microcode: 0x1000065

Python Notes: Python 3.9.9

Security Notes: `itlb_multihit`: Not affected + `l1tf`: Not affected + `mds`: Not affected + `meltdown`: Not affected + `spec_store_bypass`: Not affected + `spectre_v1`: Mitigation of `usercopy/swapgs` barriers and `__user` pointer sanitization + `spectre_v2`: Mitigation of Full AMD retrpoline STIBP: disabled RSB filling + `srbds`: Not affected + `tsx_async_abort`: Not affected

Async transfer query fixed too

Async transfer query fixed too again

Processor: 8 x QEMU Virtual 2.5+ (8 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (rel-1.14.0-0-g155821a1990b-prebuilt.qemu.org BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 32GB, Disk: 97GB, Graphics: virgl 12288GB, Audio: Intel 82801I, Monitor: QEMU Monitor, Network: Red Hat Virtio device

OS: Gentoo/Linux, Kernel: 5.15.11-gentoo-x86_64 (x86_64), Display Server: X Server 1.20.14, OpenGL: 4.3 Mesa 22.0.0-devel (git-692c5348f2) (LLVM 13.0.0 D...), Compiler: GCC 11.2.0 + LLVM 13.0.0, File-System: ext4, Screen Resolution: 1024x768, System Layer: QEMU

Processor Notes: CPU Microcode: 0x1000065

Python Notes: Python 3.9.9

Security Notes: `itlb_multihit`: Not affected + `l1tf`: Not affected + `mds`: Not affected + `meltdown`: Not affected + `spec_store_bypass`: Not affected + `spectre_v1`: Mitigation of `usercopy/swapgs` barriers and `__user` pointer sanitization + `spectre_v2`: Mitigation of Full AMD retrpoline STIBP: disabled RSB filling + `srbds`: Not affected + `tsx_async_abort`: Not affected

Async transfer fixed staging too

Async transfer fixed staging too disable dpms

Async transfer fixed staging too -dpms

Processor: 8 x QEMU Virtual 2.5+ (8 Cores), Motherboard: QEMU Standard PC (Q35 + ICH9 2009) (rel-1.14.0-0-g155821a1990b-prebuilt.qemu.org BIOS), Chipset: Intel 82G33/G31/P35/P31 + ICH9, Memory: 32GB, Disk: 97GB, Graphics: virgl 12288GB, Audio: Intel 82801I, Monitor: QEMU Monitor, Network: Red Hat Virtio device

OS: Gentoo/Linux, Kernel: 5.15.11-gentoo-x86_64 (x86_64), Display Server: X Server 1.20.14, OpenGL: 4.3 Mesa 22.0.0-devel (git-b8ec3a5274) (LLVM 13.0.0 D...), Compiler: GCC 11.2.0 + LLVM 13.0.0, File-System: ext4, Screen Resolution: 1024x768, System Layer: QEMU

Processor Notes: CPU Microcode: 0x1000065

Python Notes: Python 3.9.9

Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Not affected + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline STIBP: disabled RSB filling + srbs: Not affected + tsx_async_abort: Not affected

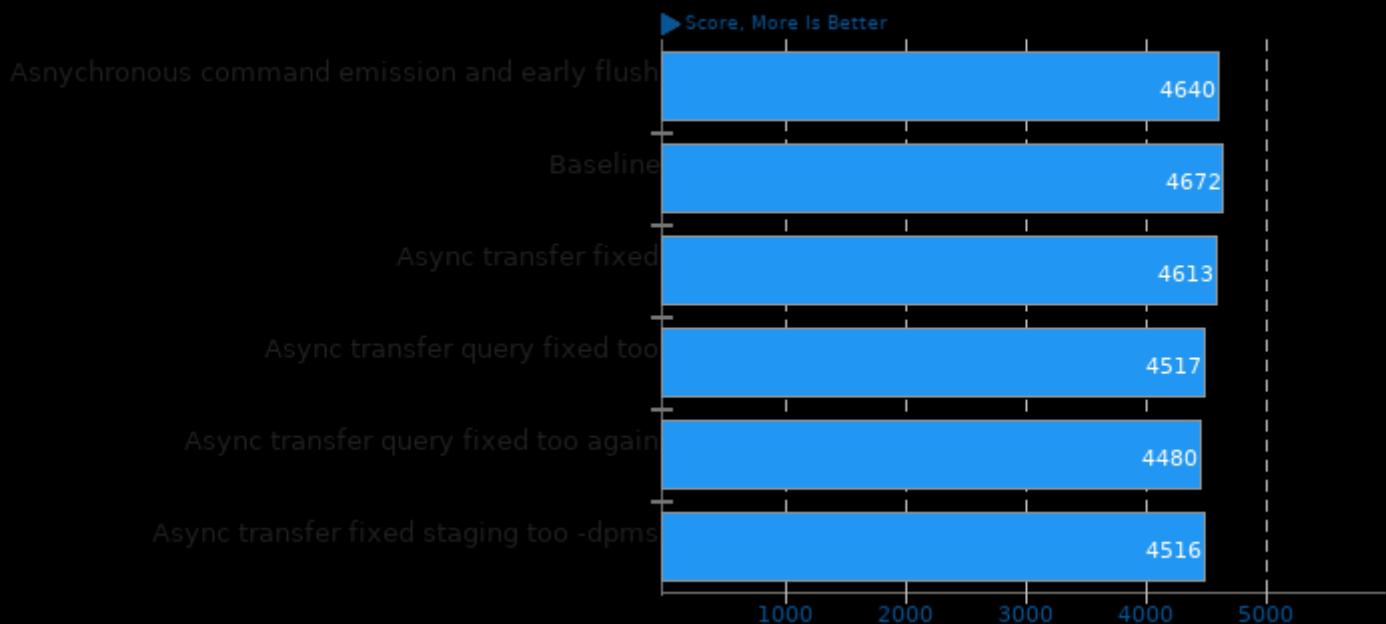
		Asynchronous command emission and early flush	Baseline	Async transfer fixed	Async transfer query fixed	Async transfer too again	Async transfer fixed staging	Async transfer fixed staging	Async transfer too disable dpms
GLmark2 - 1024 x 768	4640	4672	4613	4517	4480				4516
	(Score)								
Normalized	99.32%	100%	98.74%	96.68%	95.89%				96.66%
GpuTest - 1600 x 900	14741	13369	14618	14859	14741				14816
	(Points)								
Normalized	99.21%	89.97%	98.38%	100%	99.21%				99.71%
Standard Deviation	0.6%	1.4%	0.9%	0.1%	0.5%				0.4%
OpenArena - 1600 x 900	412.6	301.1	365.5	392.5	399.9	358.0			374.1
	(FPS)								
Normalized	100%	72.98%	88.58%	95.13%	96.92%	86.77%			90.67%
Standard Deviation	1.4%	0.6%	0.4%	2.2%	1.3%	2.5%			0.6%
Unigine Heaven - 1600 x 900 - Fullscreen - OpenGL (FPS)	163.886	162.689	165.368	163.478	164.351	157.481			164.467
Normalized	99.1%	98.38%	100%	98.86%	99.39%	95.23%			99.46%
Standard Deviation	0.2%	0.6%	0.2%	0.3%	0.1%	3.1%			0.3%
Unigine Sanctuary - 1600 x 900 - Fullscreen	357.740	213.194	397.093	408.487	510.694				347.941
Normalized	70.05%	41.75%	77.76%	79.99%	100%				68.13%
Standard Deviation	22.2%	30.7%	28.9%	26.5%	0.7%				29.1%
Unigine Tropics - 1600 x 900 - Fullscreen (FPS)	232.878	168.360	235.961	233.080	254.427				243.035
Normalized	91.53%	66.17%	92.74%	91.61%	100%				95.52%
Standard Deviation	10.3%	9.8%	7.5%	7.9%	2.3%				7.3%

Unigine Valley - 1600 x 900 - Fullscreen - OpenGL (FPS)	159.183	160.499	161.147	159.120	159.482	163.096
Normalized	97.6%	98.41%	98.8%	97.56%	97.78%	100%
Standard Deviation	1.6%	0.4%	0.5%	0.8%	0.6%	0.6%
Xonotic - 1024 x 768 - Ultimate (FPS)	268.313281	250.478789	271.126355	270.167761	271.274113	272.269910
Normalized	98.55%	92%	99.58%	99.23%	99.63%	100%
Standard Deviation	0.3%	0.4%	0.2%	0.7%	1%	1.1%

Virgl asynchronous command stream submission

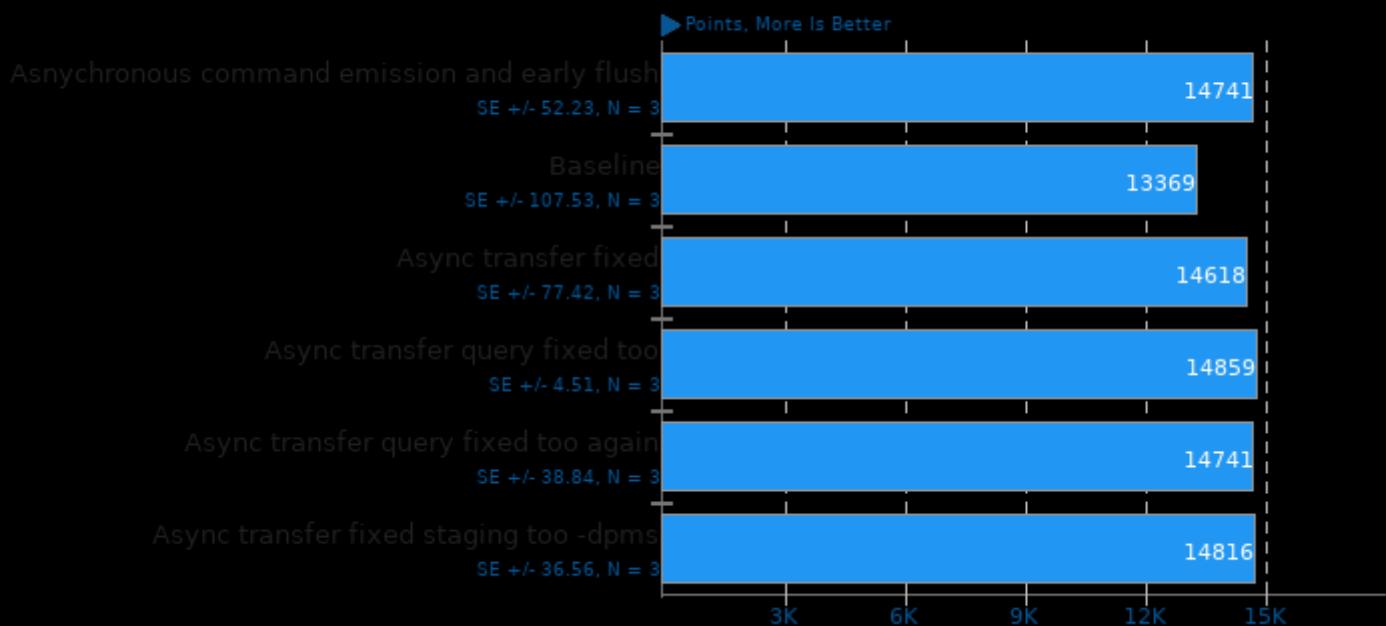
GLmark2 2021.08.30

Resolution: 1024 x 768



GpuTest 0.7.0

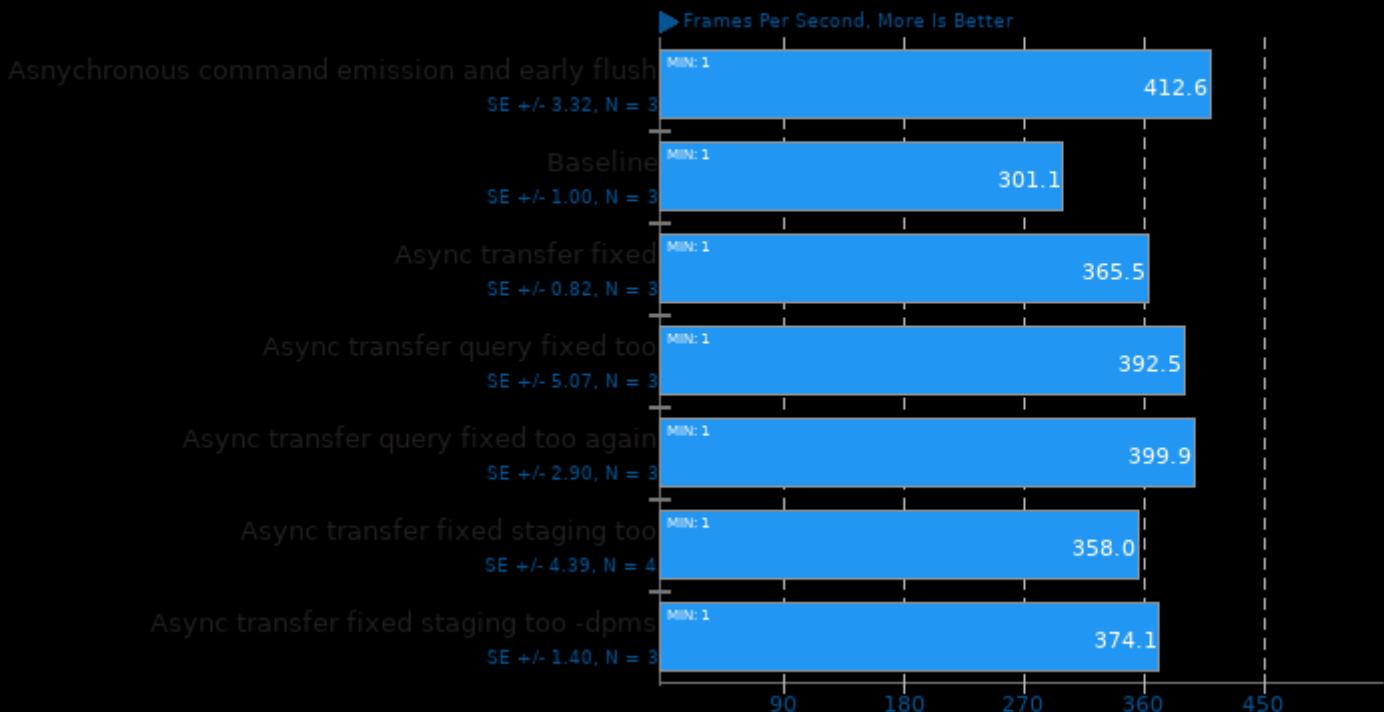
Resolution: 1600 x 900



Virgl asynchronous command stream submission

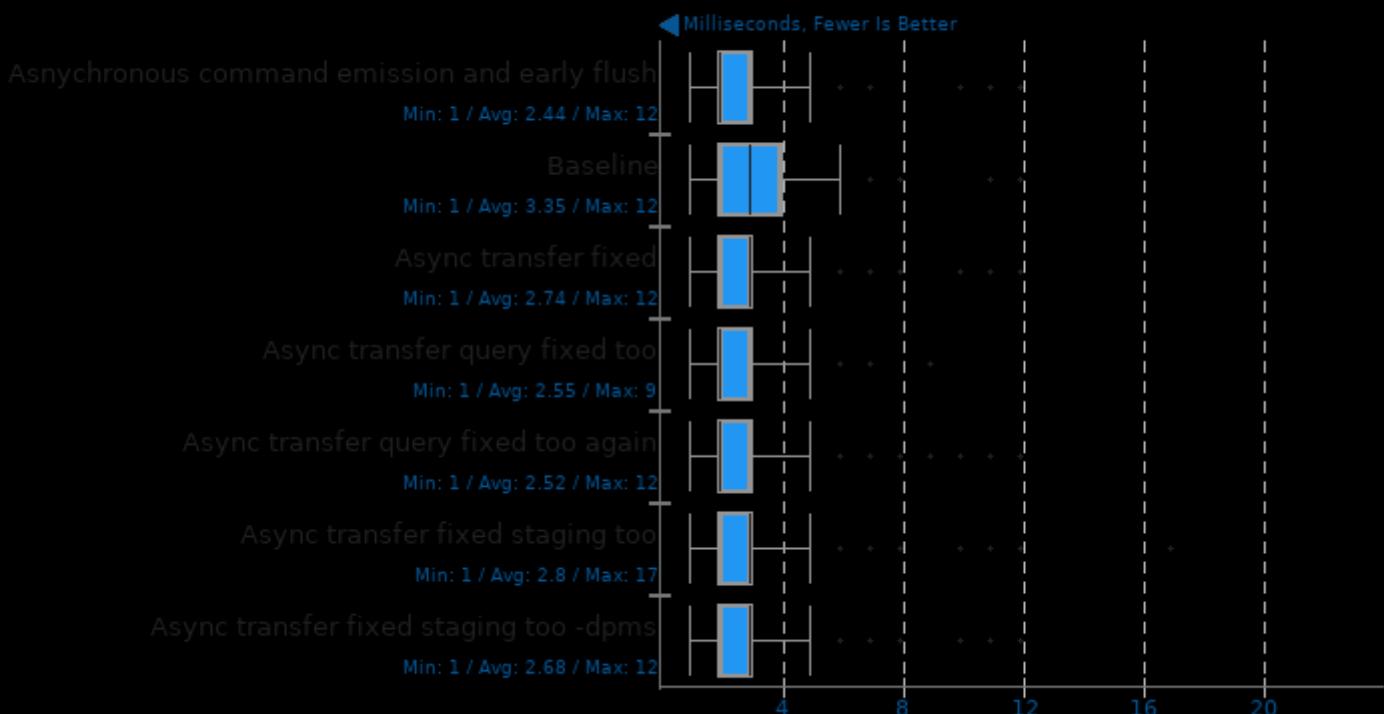
OpenArena 0.8.8

Resolution: 1600 x 900



OpenArena 0.8.8

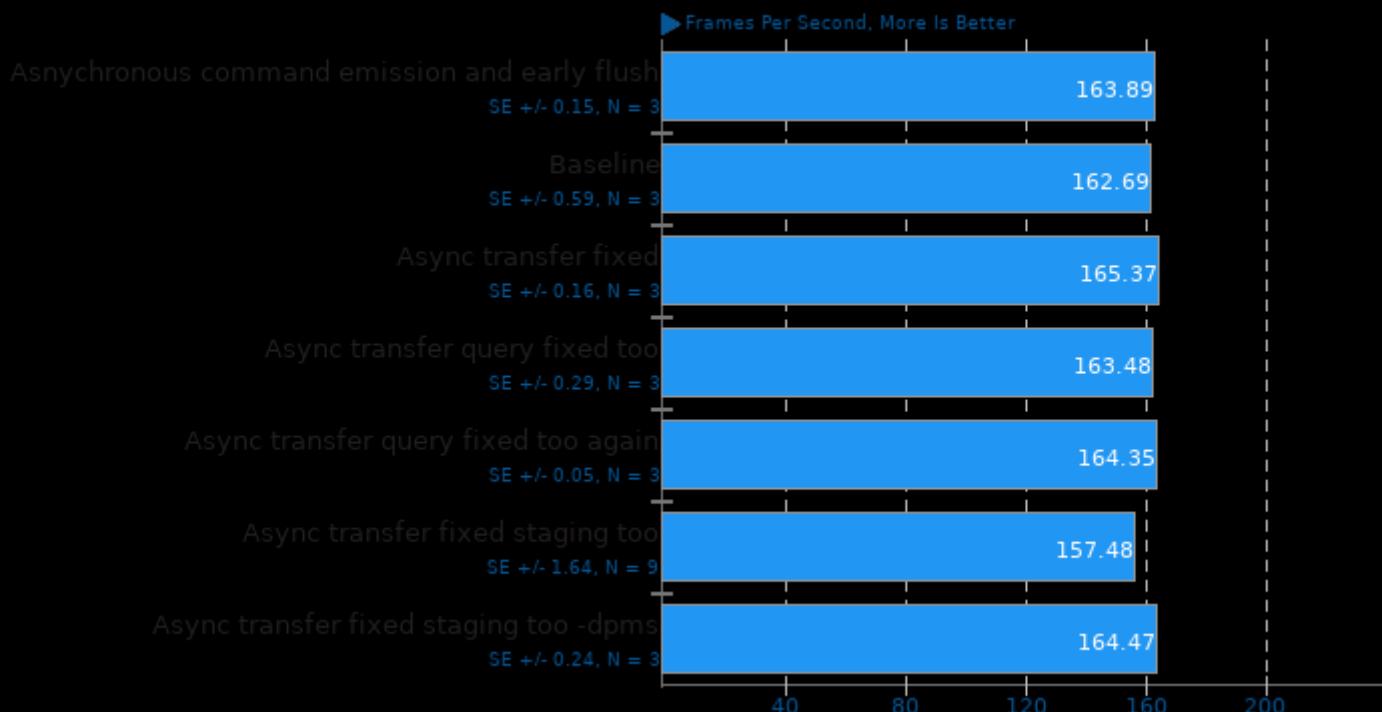
Resolution: 1600 x 900 - Total Frame Time



Virgl asynchronous command stream submission

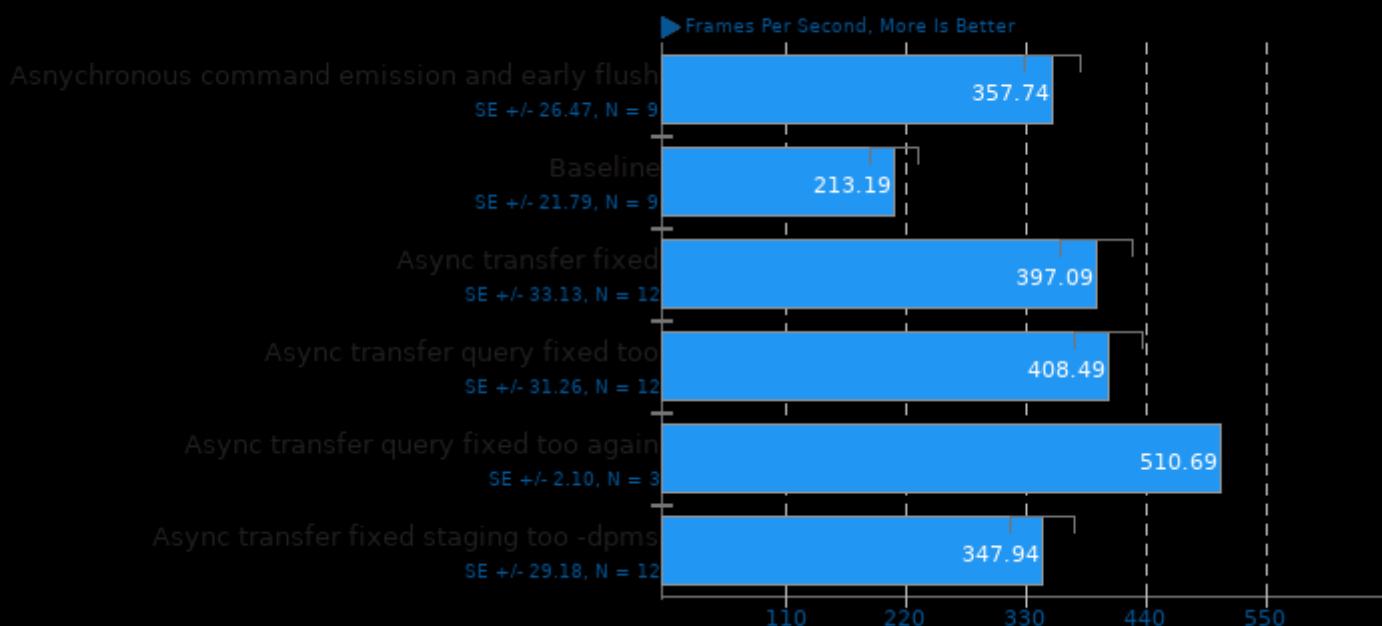
Unigine Heaven 4.0

Resolution: 1600 x 900 - Mode: Fullscreen - Renderer: OpenGL



Unigine Sanctuary 2.3

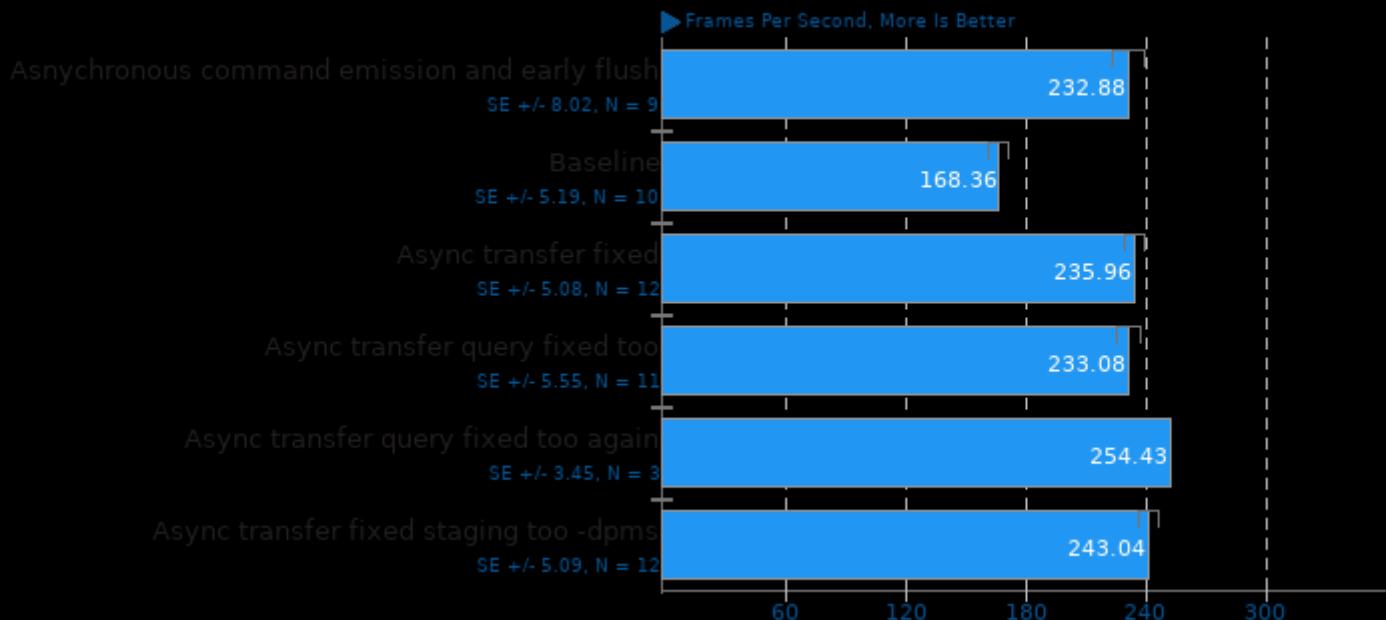
Resolution: 1600 x 900 - Mode: Fullscreen



Virgl asynchronous command stream submission

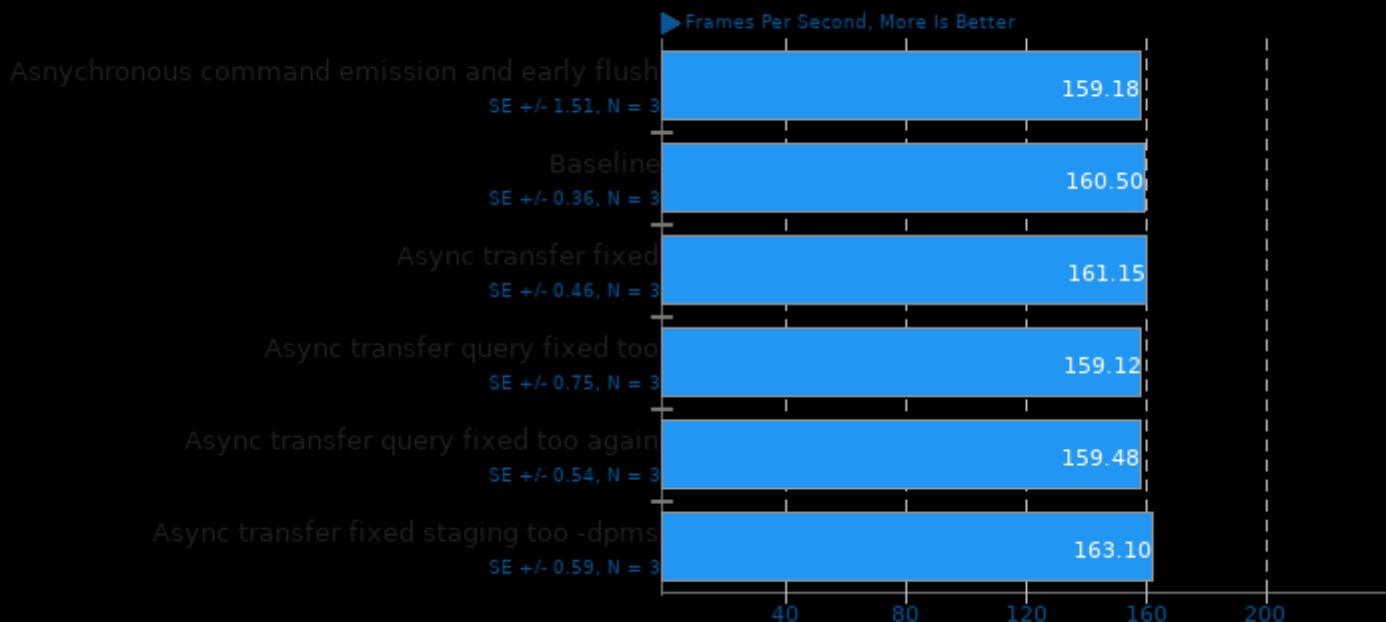
Unigine Tropics 1.3

Resolution: 1600 x 900 - Mode: Fullscreen



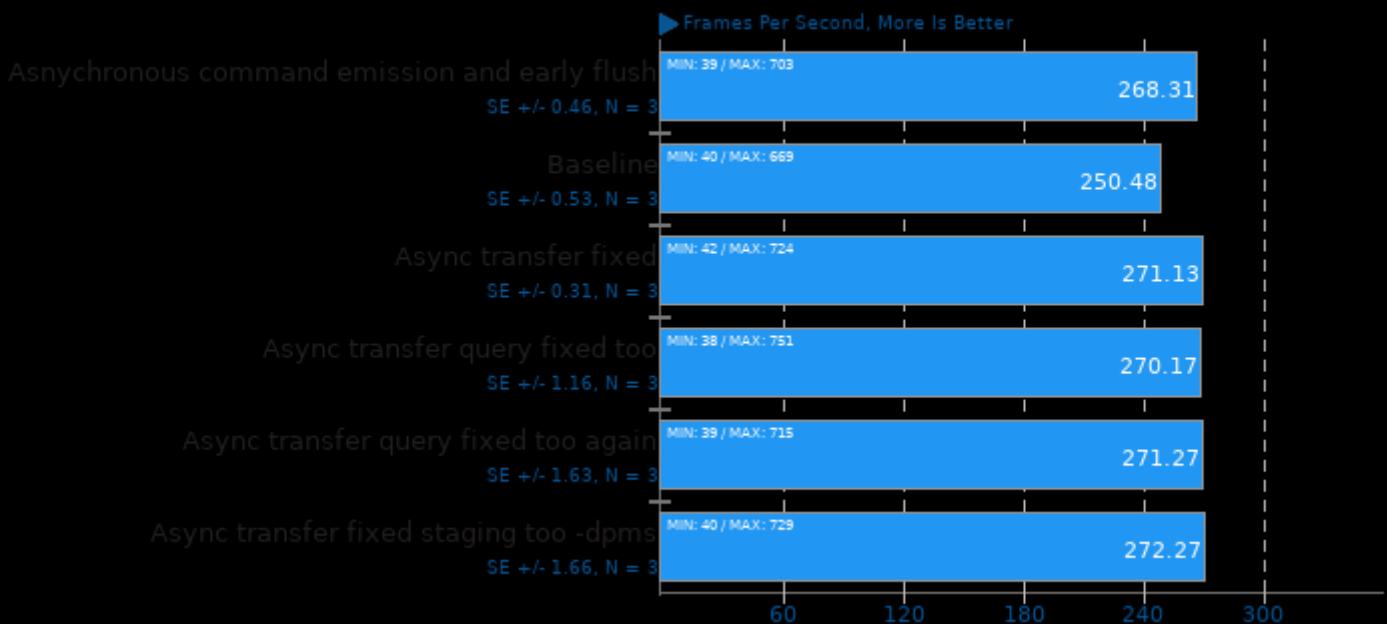
Unigine Valley 1.0

Resolution: 1600 x 900 - Mode: Fullscreen - Renderer: OpenGL



Xonotic 0.8.2

Resolution: 1024 x 768 - Effects Quality: Ultimate



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