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AMD Ryzen 9 5900X 12-Core testing with a ASUS ROG CROSSHAIR VIII HERO (3801 BIOS) and NVIDIA GeForce RTX 3090 24GB on Ubuntu 20.04 via the Phoronix Test Suite.

Automated Executive Summary

RTX 3090 had the most wins, coming in first place for 63% of the tests.

Based on the geometric mean of all complete results, the fastest (NVIDIA 3090) was 1.003x the speed of the slowest (NVIDIA RTX 3090). RTX 3090 was 0.999x the speed of NVIDIA 3090 and NVIDIA RTX 3090 was 0.998x the speed of RTX 3090.

The results with the greatest spread from best to worst included:

NCNN (Target: Vulkan GPU - Model: googlenet) at 1.138x
Rodinia (Test: OpenCL Particle Filter) at 1.066x
VkFFT at 1.054x
clpeak (OpenCL Test: Integer Compute INT) at 1.042x
NAMD CUDA (ATPase Simulation - 327,506 Atoms) at 1.041x
NCNN (Target: Vulkan GPU - Model: squeezenet_ssd) at 1.038x
LuxCoreRender (Scene: Danish Mood - Acceleration: GPU) at 1.027x
NCNN (Target: Vulkan GPU - Model: efficientnet-b0) at 1.026x

vkpeak (fp32-scalar) at 1.019x
Blender (Blend File: BMW27 - Compute: NVIDIA OptiX) at 1.017x.

Test Systems:

RTX 3090

NVIDIA RTX 3090

NVIDIA 3090

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3801 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Western Digital WDS100T1X0E-00AFY0 + 2000GB, Graphics: NVIDIA GeForce RTX 3090 24GB, Audio: NVIDIA Device 1aef, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.11.0-37-generic (x86_64), Desktop: GNOME Shell 3.36.9, Display Server: X Server 1.20.11, Display Driver: NVIDIA 470.74, OpenGL: 4.6.0, OpenCL: OpenCL 3.0 CUDA 11.4.136, Vulkan: 1.2.175, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq ondemand (Boost: Enabled) - CPU Microcode: 0xa201016
Graphics Notes: BAR1 / Visible vRAM Size: 32768 MiB
OpenCL Notes: GPU Compute Cores: 10496
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

	RTX 3090	NVIDIA RTX 3090	NVIDIA 3090
NCNN - Vulkan GPU - googlenet (ms)	4.08	**4.28**	**3.76**
Normalized	92.16%	87.85%	100%
Rodinia - O.P.F (sec)	**3.899**	**3.657**	3.675
Normalized	93.79%	100%	99.51%
VkFFT (Benchmark Score)	45026	**45219**	**42914**
Normalized	99.57%	100%	94.9%
clpeak - I.C.I (GIOPS)	**17725**	17769	**18469**
Normalized	95.97%	96.21%	100%
NAMD CUDA - ATPase Simulation - 327,506 Atoms (days/ns)	**0.12509**	0.12079	**0.12013**
Normalized	96.03%	99.45%	100%
NCNN - Vulkan GPU - squeezenet_ssd (ms)	4.07	**4.13**	**3.98**

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Normalized	97.79%	96.37%	100%
LuxCoreRender - Danish Mood - GPU (M samples/sec)	8.87	8.64	8.86
Normalized	100%	97.41%	99.89%
NCNN - Vulkan GPU - efficientnet-b0 (ms)	3.16	3.08	3.11
Normalized	97.47%	100%	99.04%
vkpeak - fp32-scalar (GFLOPS)	21270	20967	20877
Normalized	100%	98.57%	98.15%
Blender - BMW27 - NVIDIA OptiX (sec)	9.43	9.52	9.59
Normalized	100%	99.05%	98.33%
NCNN - Vulkan GPU-v2-v2 - mobilenet-v2	1.84	1.82	1.81
Normalized	98.37%	99.45%	100%
vkpeak - fp32-vec4 (GFLOPS)	27834	27594	27386
Normalized	100%	99.14%	98.39%
LeelaChessZero - OpenCL (Nodes/s)	38187	38411	38778
Normalized	98.48%	99.05%	100%
vkpeak - int32-scalar (GIOPS)	20922	20611	20685
Normalized	100%	98.52%	98.87%
vkpeak - int32-vec4 (GIOPS)	20824	20515	20597
Normalized	100%	98.52%	98.91%
Chaos Group V-RAY - NVIDIA RTX GPU (vrays)	2954	2915	2934
Normalized	100%	98.68%	99.32%
NCNN - Vulkan GPU - resnet18 (ms)	1.51	1.51	1.53
Normalized	100%	100%	98.69%
NCNN - Vulkan GPU - vgg16 (ms)	4.02	4.07	4.02
Normalized	100%	98.77%	100%
NCNN - Vulkan GPU - alexnet (ms)	1.74	1.75	1.76
Normalized	100%	99.43%	98.86%
NCNN - Vulkan GPU - blazeface (ms)	0.88	0.88	0.87
Normalized	98.86%	98.86%	100%
Blender - Barbershop - NVIDIA OptiX (sec)	319.32	316.96	315.92
Normalized	98.94%	99.67%	100%
NCNN - Vulkan GPU-v3-v3 - mobilenet-v3	2.06	2.07	2.08
Normalized	100%	99.52%	99.04%
Blender - Classroom - NVIDIA OptiX (sec)	28.37	28.52	28.29
Normalized	99.72%	99.19%	100%
vkpeak - fp16-scalar (GFLOPS)	20837	20671	20713
Normalized	100%	99.2%	99.4%
RealSR-NCNN - 4x - No (sec)	5.568	5.61	5.596
Normalized	100%	99.25%	99.5%
vkpeak - fp64-scalar (GFLOPS)	653.35	648.46	648.73
Normalized	100%	99.25%	99.29%
vkpeak - int16-scalar (GIOPS)	13704	13602	13655
Normalized	100%	99.26%	99.65%
vkpeak - fp64-vec4 (GFLOPS)	653.36	648.56	651.04
Normalized	100%	99.27%	99.64%
Hashcat - T.R.X (H/s)	833000	827900	827000
Normalized	100%	99.39%	99.28%
clpeak - D.P.D (GFLOPS)	658.34	656.64	653.66
Normalized	100%	99.74%	99.29%
vkpeak - fp16-vec4 (GFLOPS)	40532	40245	40254
Normalized	100%	99.29%	99.32%

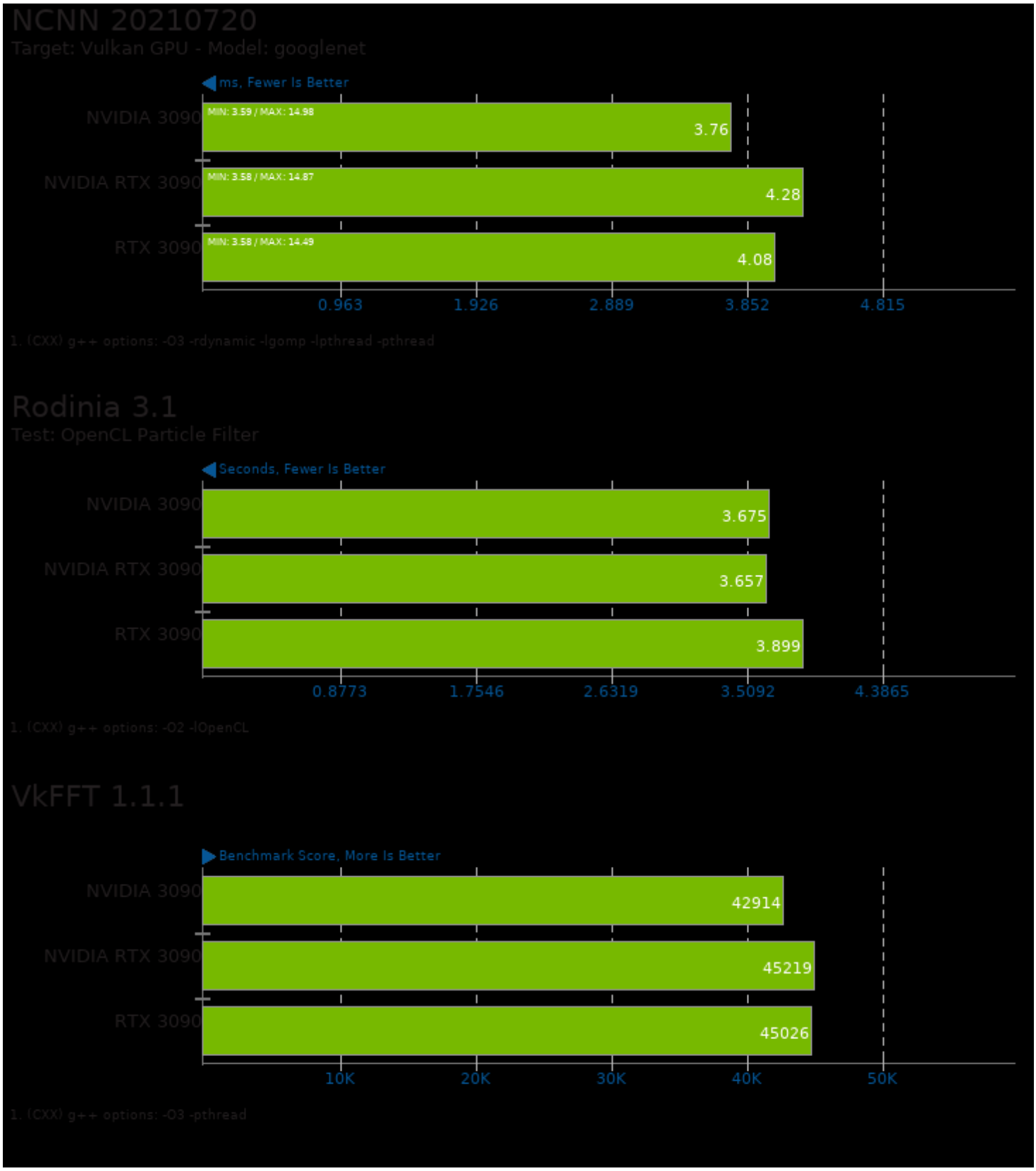
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Waifu2x-NCNN Vulkan - 2x - 3 - Yes (sec)	**3.292**	3.294	**3.313**
Normalized	100%	99.94%	99.37%
NCNN - Vulkan GPU - resnet50 (ms)	**3.4**	**3.42**	3.41
Normalized	100%	99.42%	99.71%
VkResample - 2x - Double (ms)	**118.839**	119.394	**119.469**
Normalized	100%	99.54%	99.47%
LuxCoreRender - Orange Juice - GPU (M samples/sec)	10.43	**10.44**	**10.39**
Normalized	99.9%	100%	99.52%
RealSR-NCNN - 4x - Yes (sec)	28.633	**28.57**	**28.702**
Normalized	99.78%	100%	99.54%
IndigoBench - OpenCL GPU - Bedroom (M samples/s)	**20.945**	**20.856**	20.861
Normalized	100%	99.58%	99.6%
NCNN - Vulkan GPU - regnety_400m (ms)	**2.36**	**2.37**	**2.37**
Normalized	100%	99.58%	99.58%
Hashcat - 7-Zip (H/s)	**1117600**	1113400	**1113000**
Normalized	100%	99.62%	99.59%
NCNN - Vulkan GPU - yolov4-tiny (ms)	5.82	**5.81**	**5.83**
Normalized	99.83%	100%	99.66%
Hashcat - MD5 (H/s)	**71408500000**	71197600000	**71175800000**
Normalized	100%	99.7%	99.67%
Blender - Fishy Cat - NVIDIA OptiX (sec)	**18.96**	18.98	**19.02**
Normalized	100%	99.89%	99.68%
LuxCoreRender - LuxCore Benchmark - GPU (M samples/sec)		**10.88**	**10.91**
Normalized		99.73%	100%
Blender - BMW27 - CUDA (sec)	**18.27**	**18.32**	18.31
Normalized	100%	99.73%	99.78%
NCNN - Vulkan GPU - mobilenet (ms)	**3.99**	**4**	**3.99**
Normalized	100%	99.75%	100%
Hashcat - SHA-512 (H/s)	**2892600000**	2885600000	**2885400000**
Normalized	100%	99.76%	99.75%
Hashcat - SHA1 (H/s)	**22759500000**	**22707600000**	22752700000
Normalized	100%	99.77%	99.97%
Blender - Barbershop - CUDA (sec)	**373.21**	**373.98**	373.64
Normalized	100%	99.79%	99.88%
LuxCoreRender - R.C.a.P - GPU (M samples/sec)	32.12	**32.14**	**32.08**
Normalized	99.94%	100%	99.81%
LuxCoreRender - DLSC - GPU (M		**11.51**	**11.49**
Normalized		100%	99.83%
Blender - Pabellon Barcelona - NVIDIA OptiX (sec)	**43.46**	43.49	**43.52**
Normalized	100%	99.93%	99.86%
VkResample - 2x - Single (ms)	**9.27**	**9.27**	**9.282**
Normalized	100%	100%	99.87%
Blender - Pabellon Barcelona - CUDA (sec)	**120.17**	120.11	**120.04**
Normalized	99.89%	99.94%	100%
clpeak - S.P.F (GFLOPS)	**35194**	**35225**	**35225**
Normalized	99.91%	100%	100%
Blender - Fishy Cat - CUDA (sec)	**34.5**	34.48	**34.47**
Normalized	99.91%	99.97%	100%

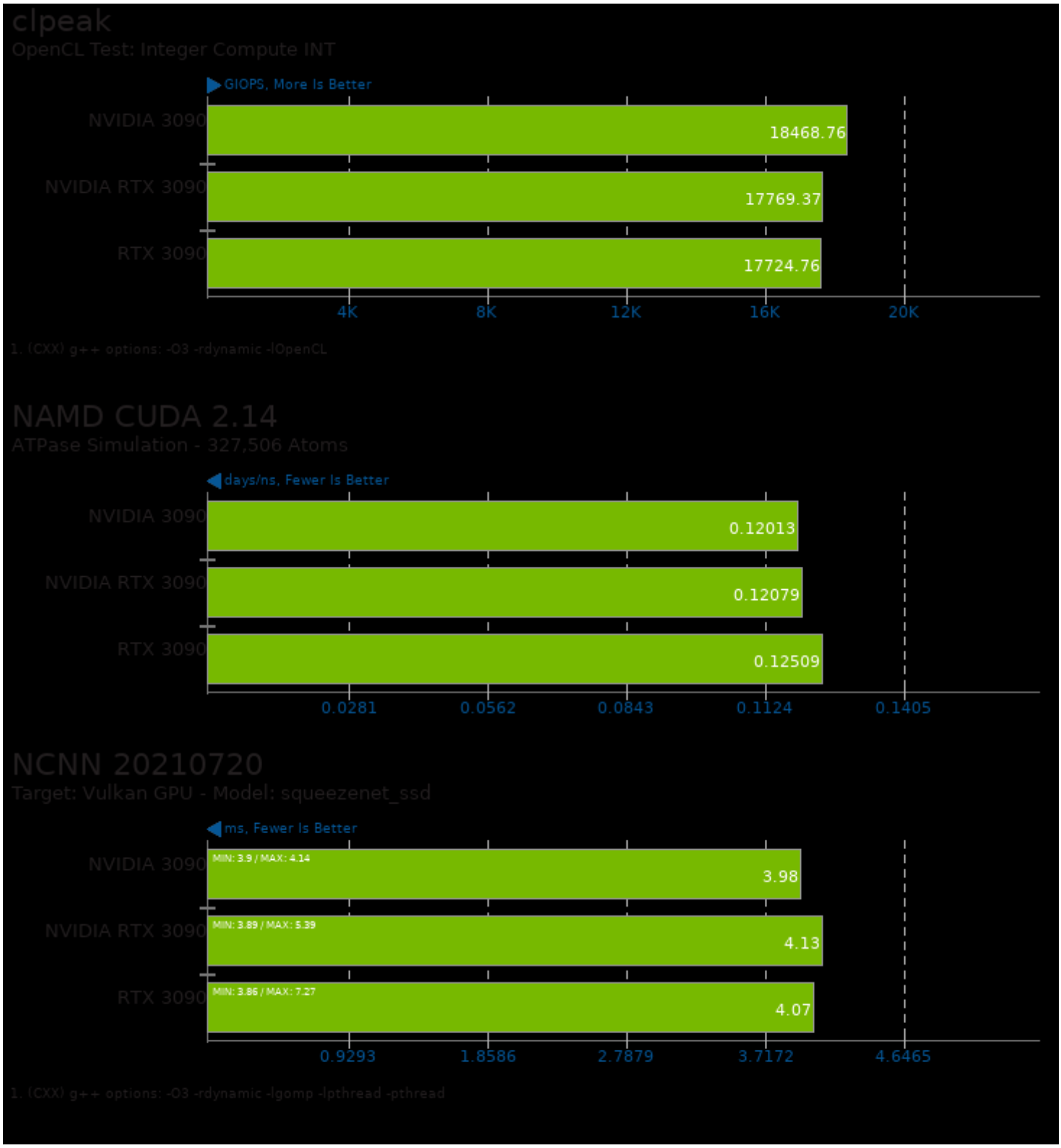
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IndigoBench - OpenCL GPU - Supercar (M samples/s)	**53.421**	53.399	**53.38**
Normalized	100%	99.96%	99.92%
Blender - Classroom - CUDA (sec)	**51.19**	**51.19**	**51.22**
Normalized	100%	100%	99.94%
OctaneBench - Total Score (Score)	**681.351647**	**681.698681**	681.48524
Normalized	99.95%	100%	99.97%
Chaos Group V-RAY - NVIDIA CUDA GPU (vpaths)	**2112**	**2113**	
Normalized	99.95%	100%	
clpeak - G.M.B (GBPS)	**813.44**	**813.29**	**813.44**
Normalized	100%	99.98%	100%
vkpeak - int16-vec4 (GIOPS)	**16880**	16879	**16878**
Normalized	100%	99.99%	99.99%
NCNN - Vulkan GPU - mnasnet (ms)	1.92	1.92	1.92
NCNN - Vulkan GPU - shufflenet-v2 (ms)	1.65	1.65	1.65

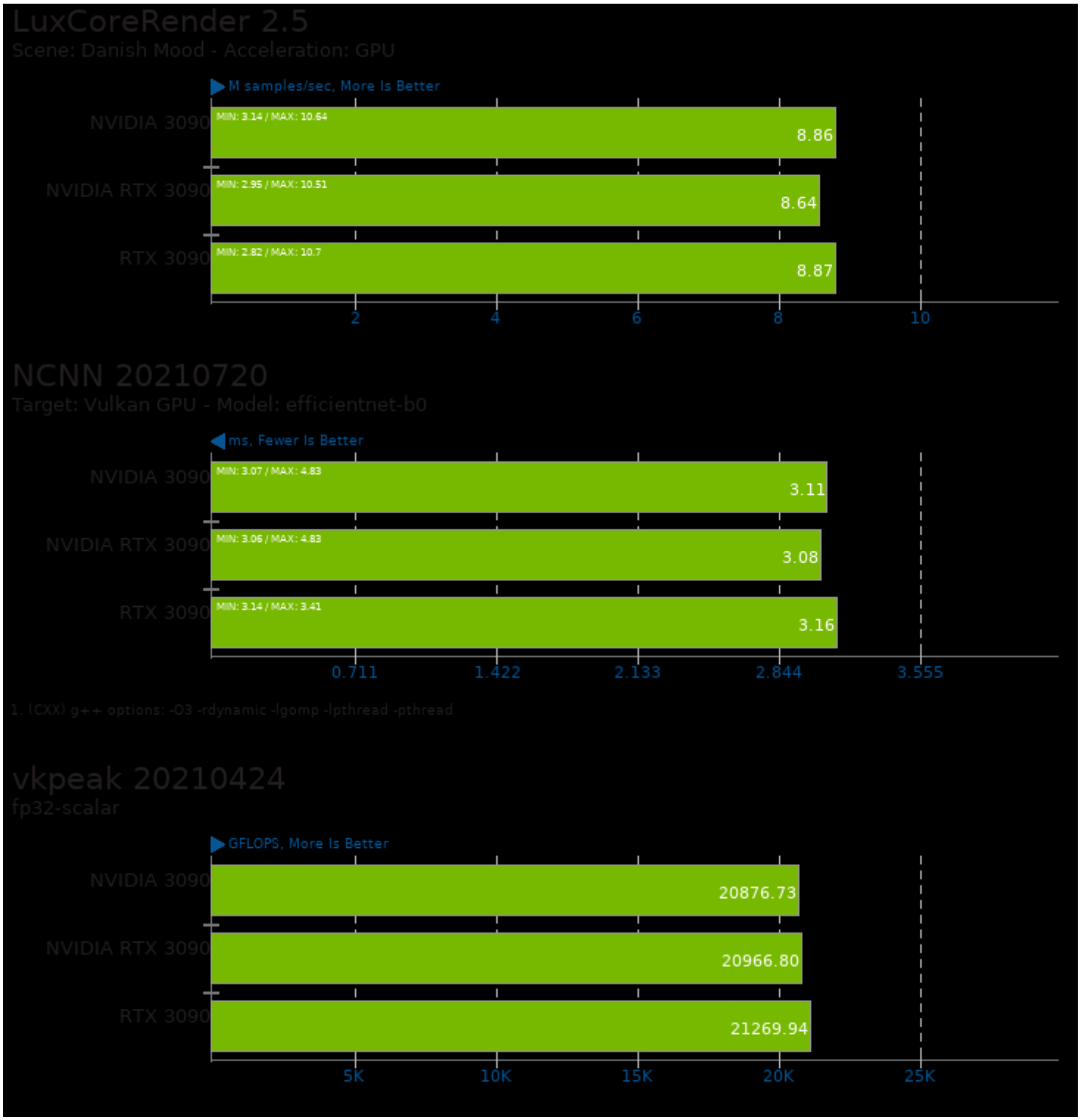
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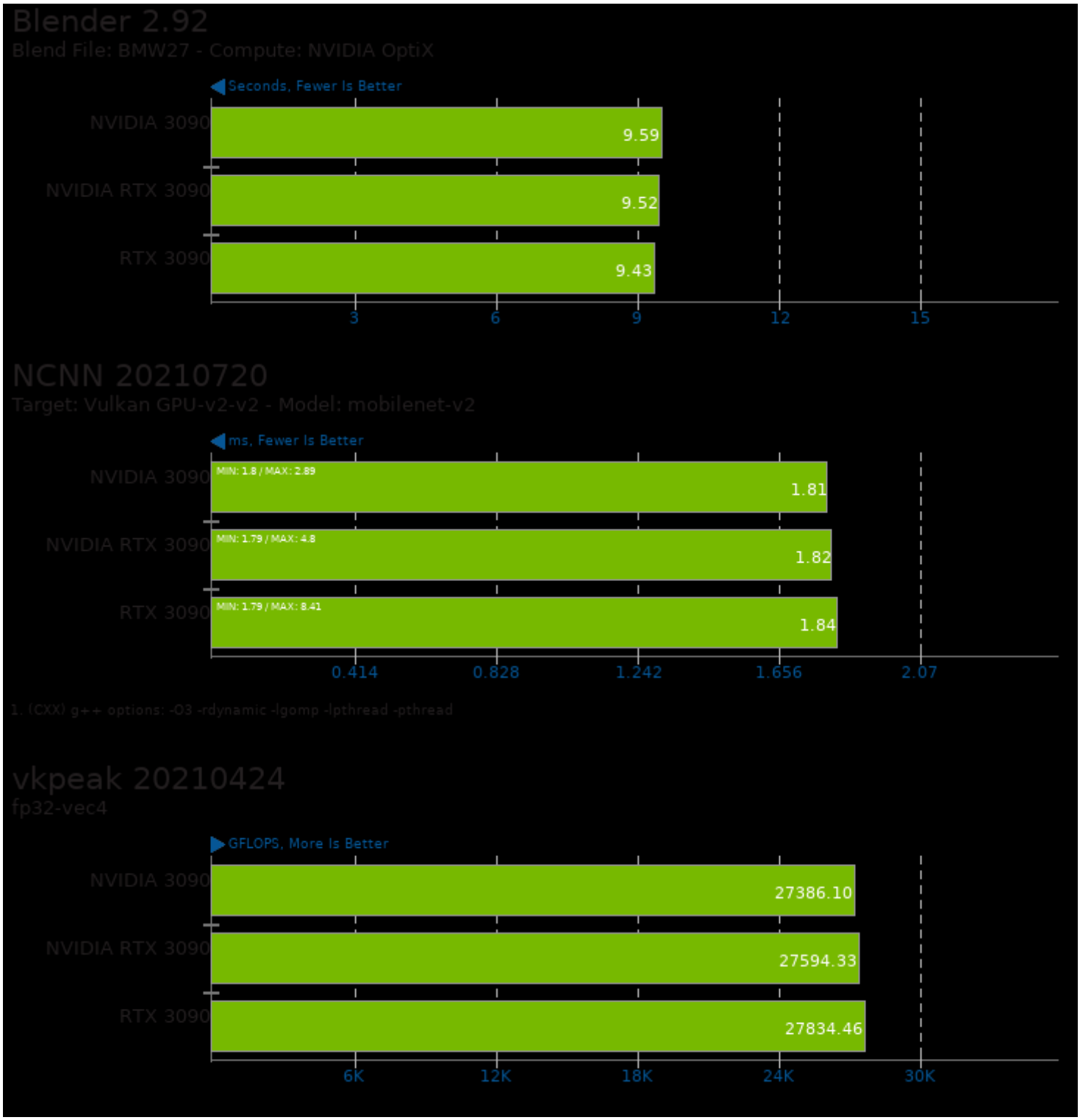
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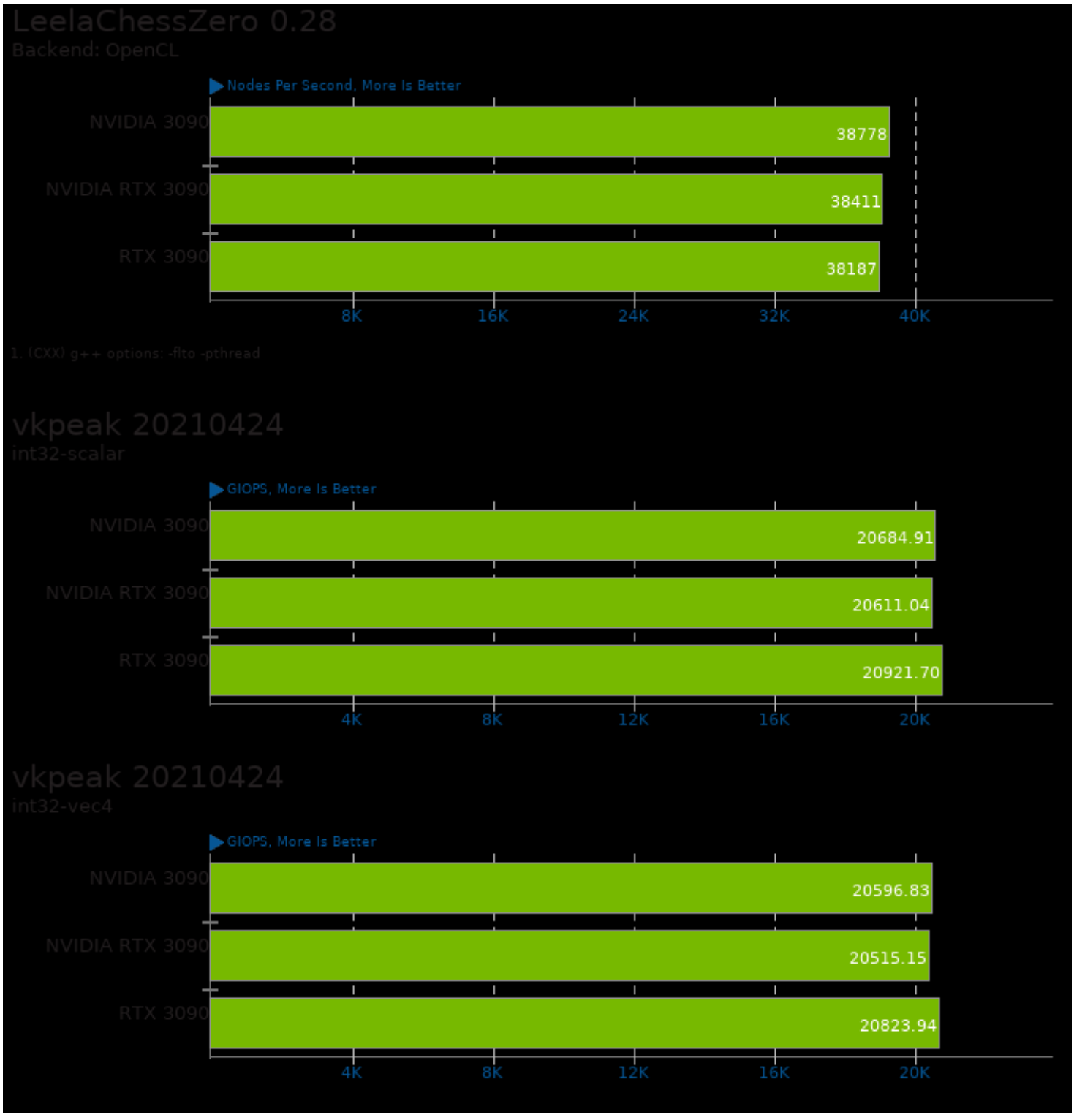
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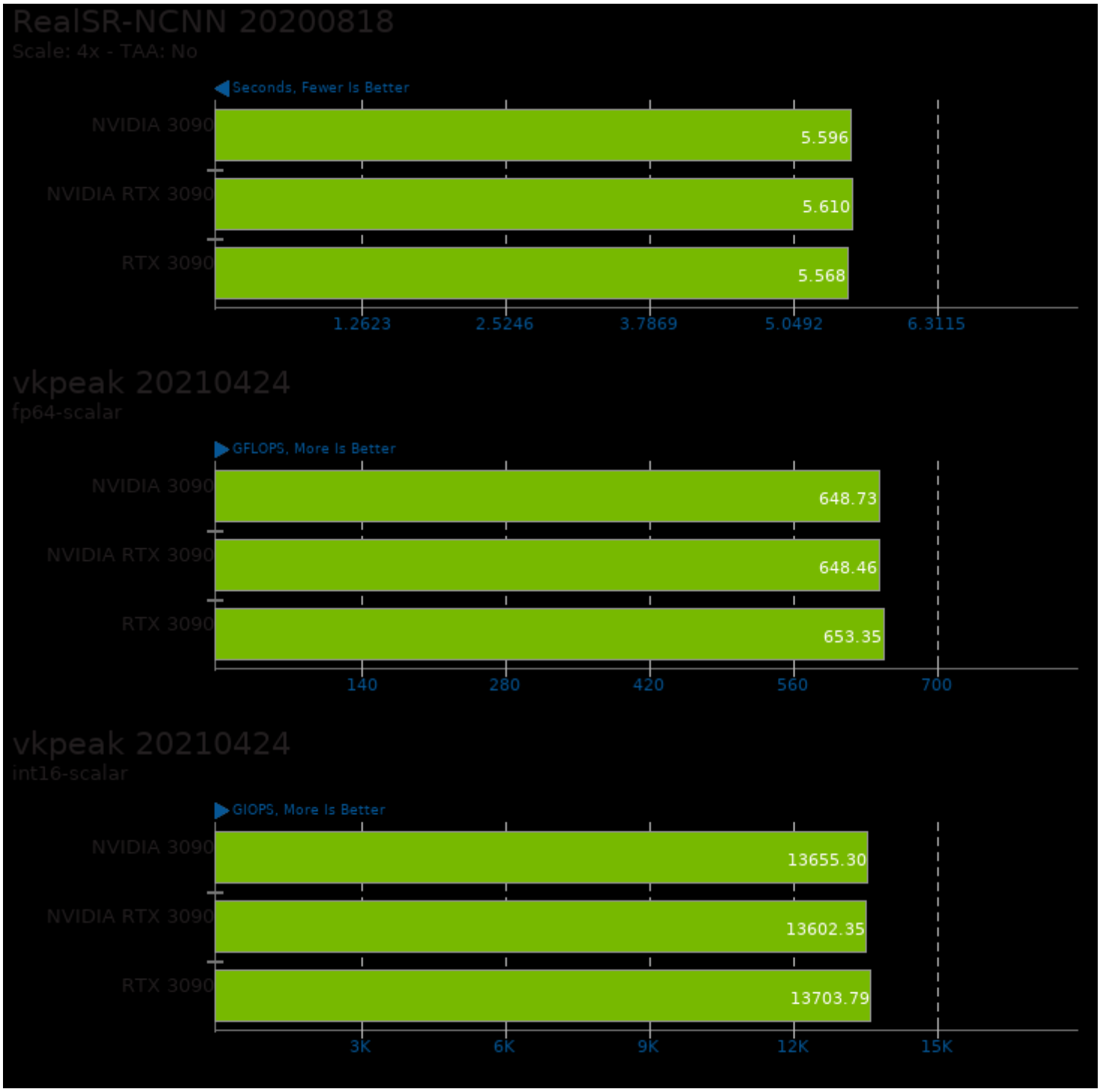
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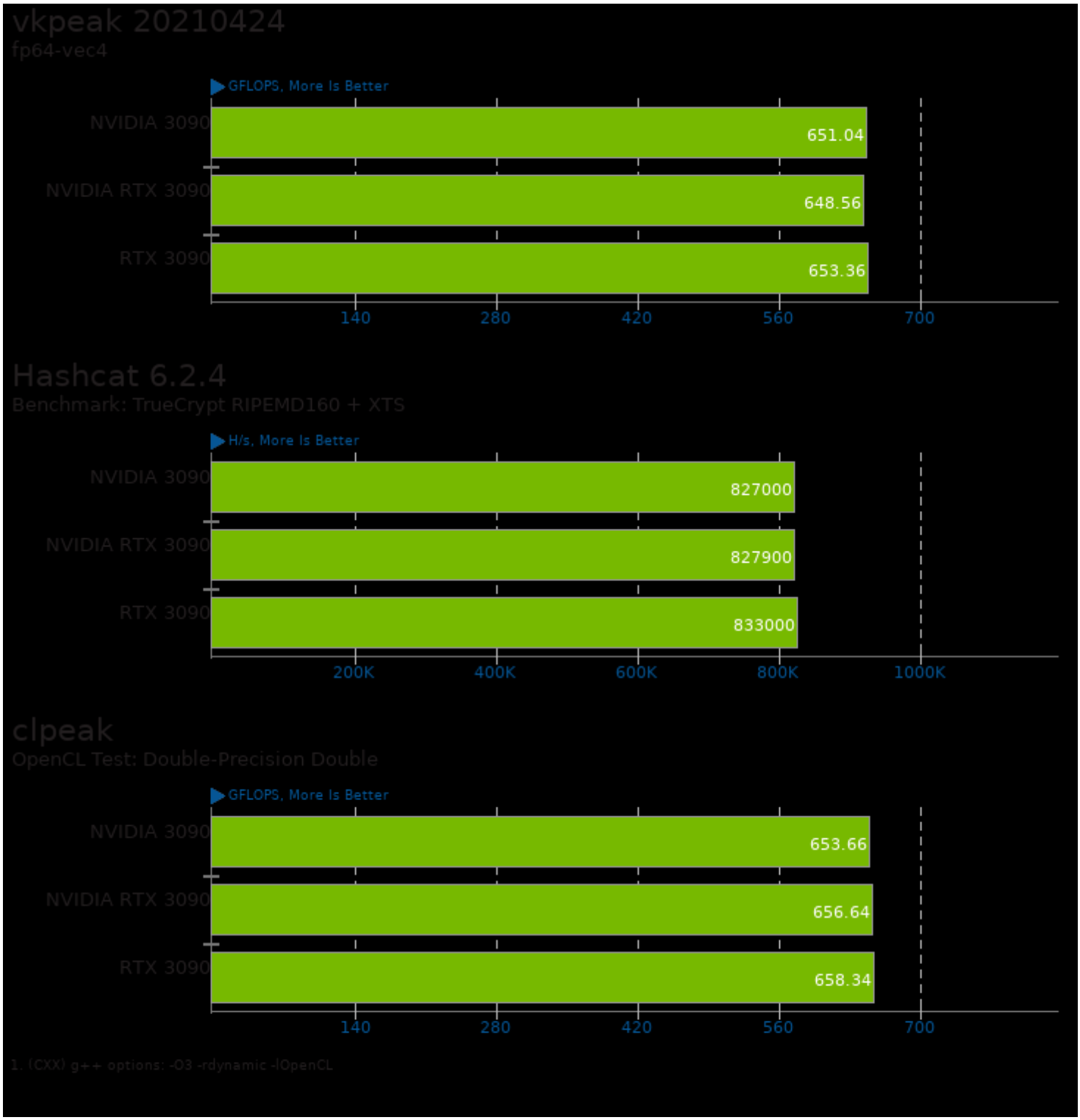
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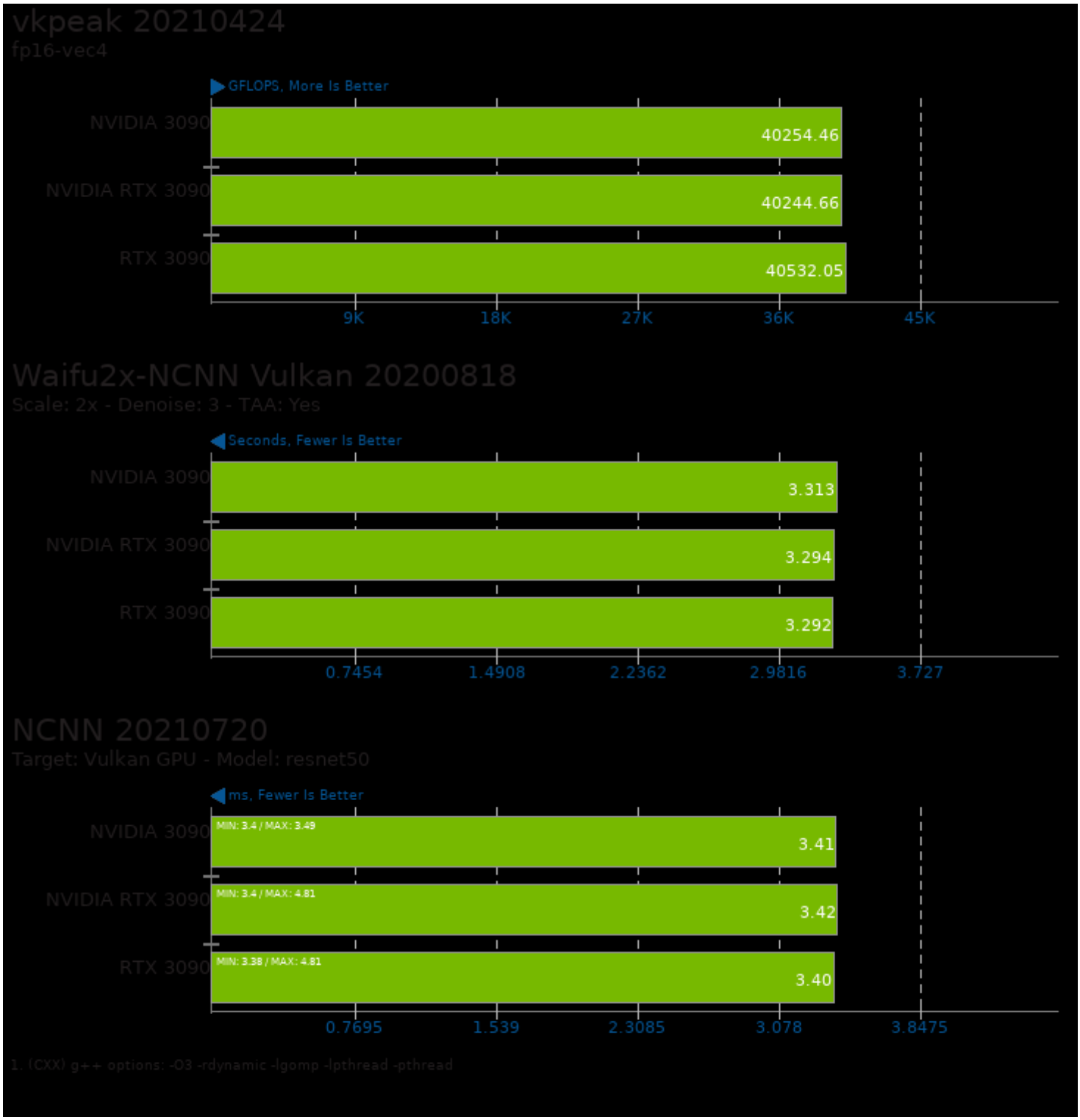
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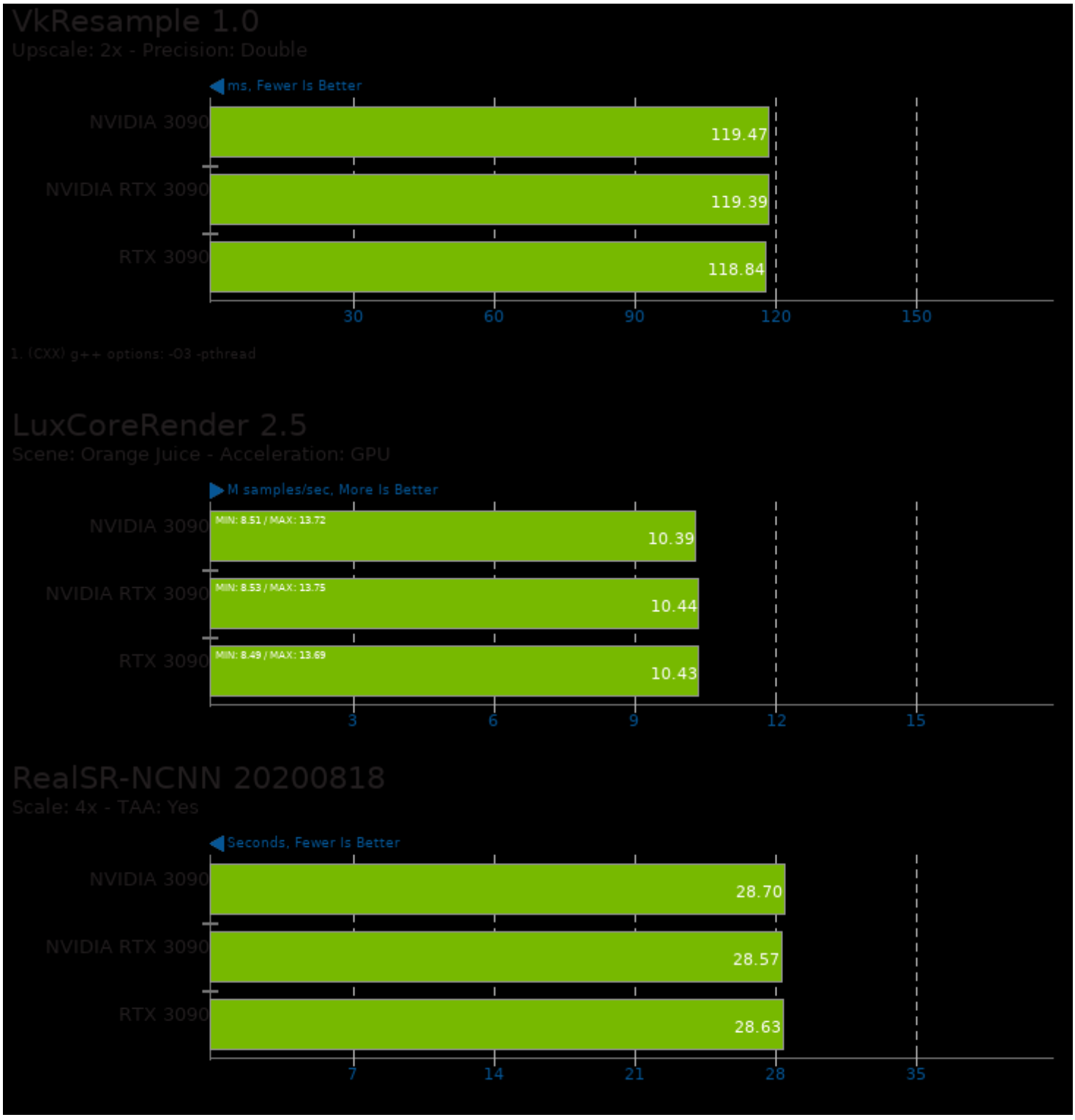
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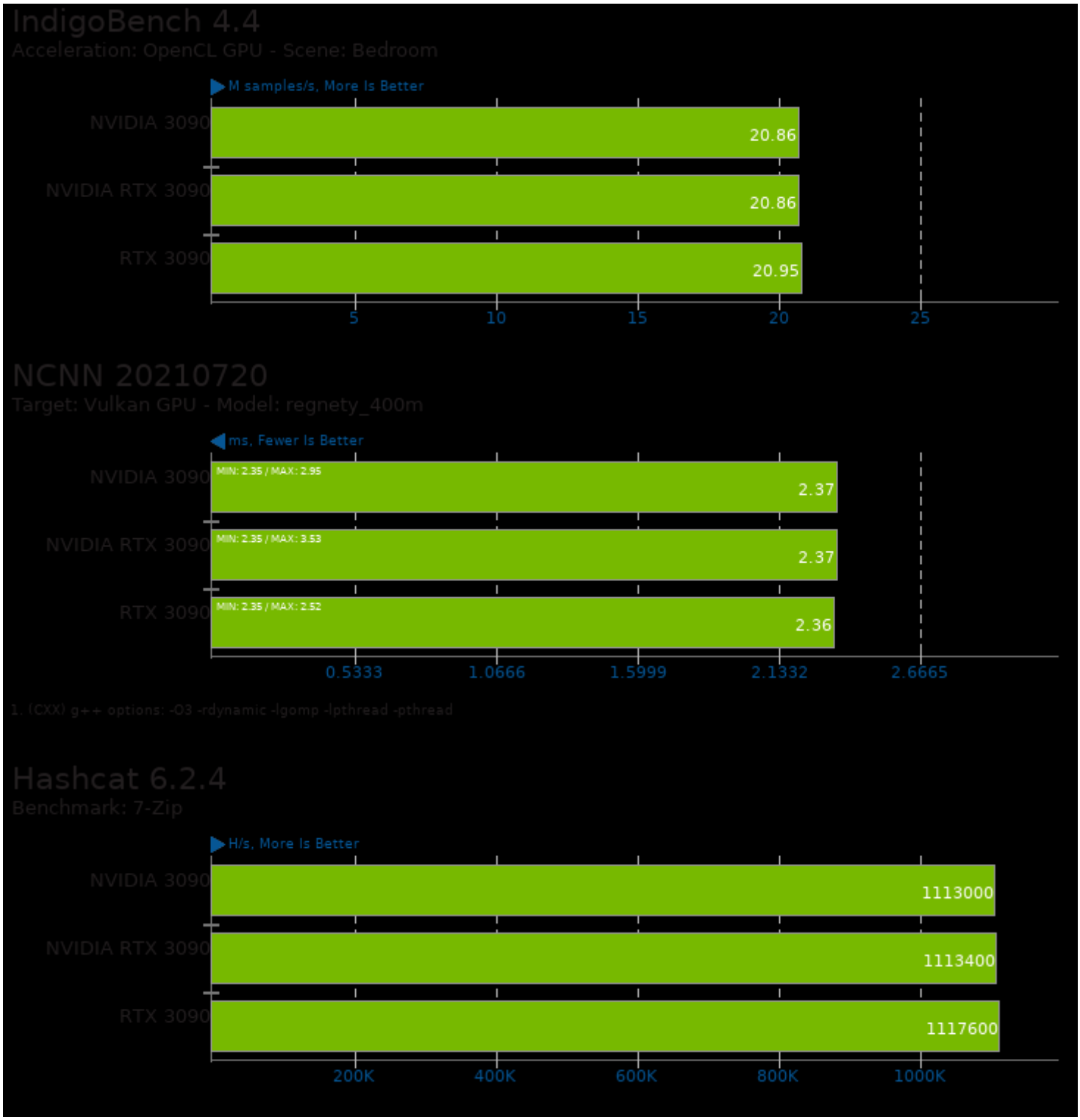
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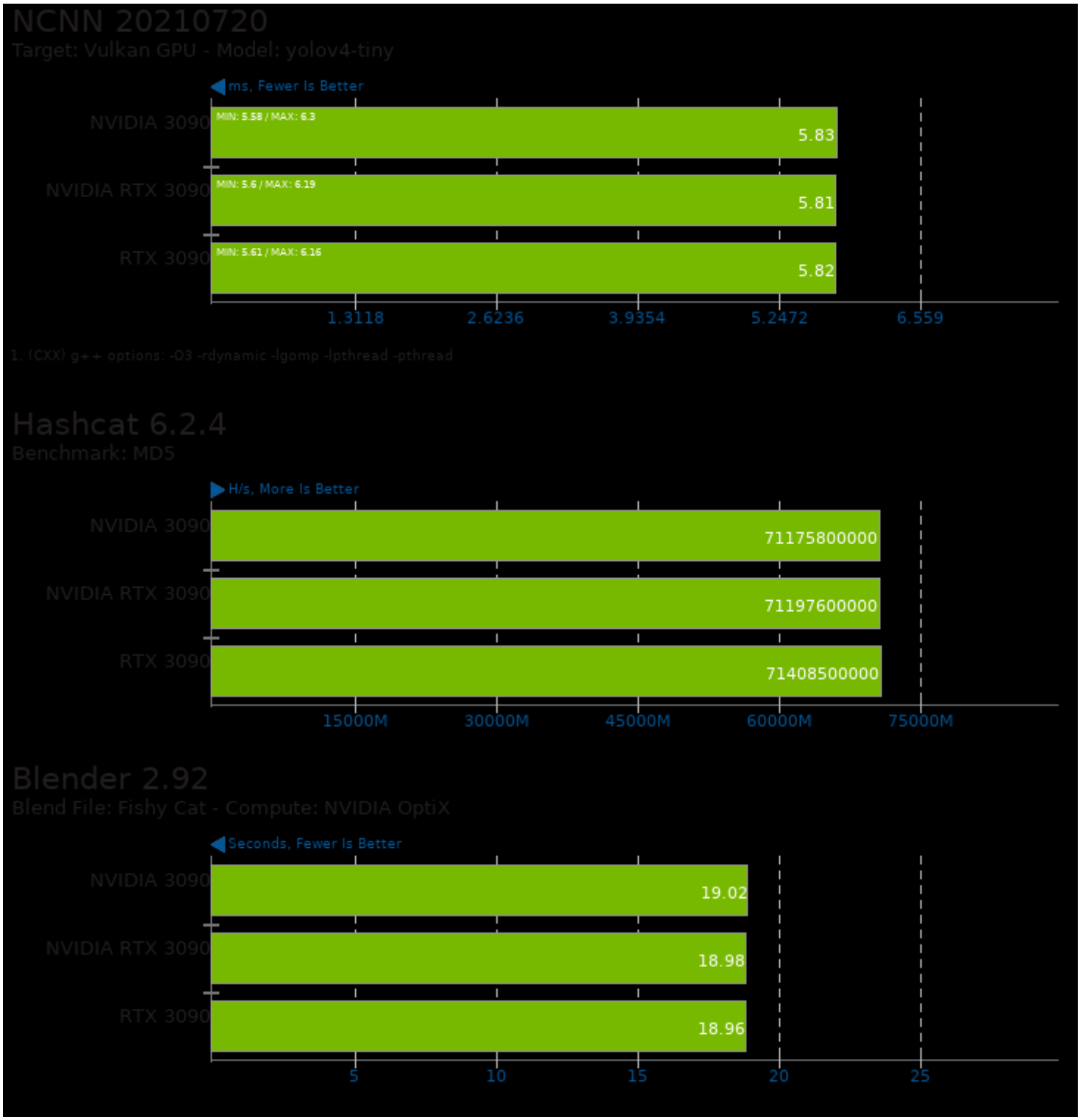
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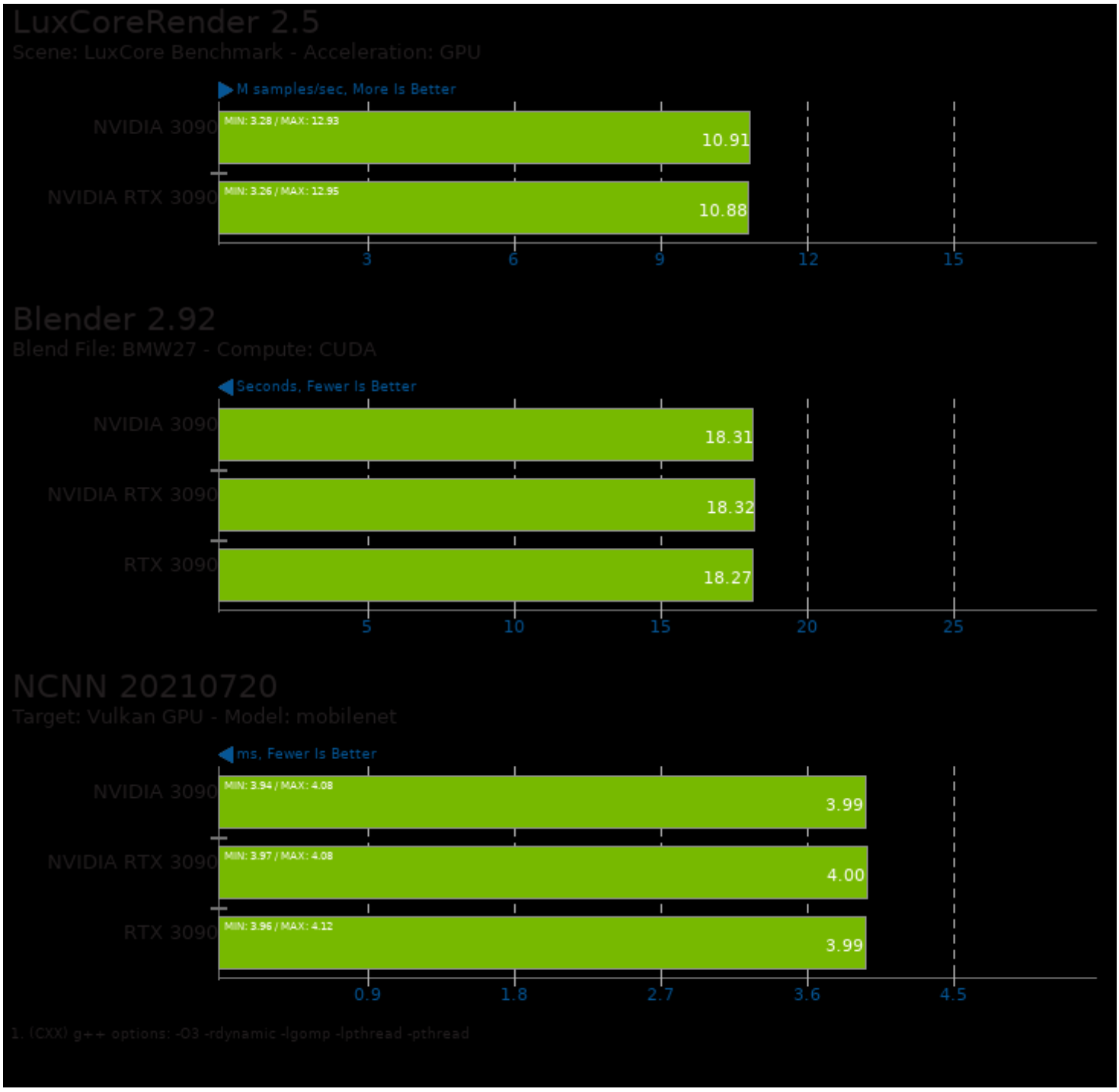
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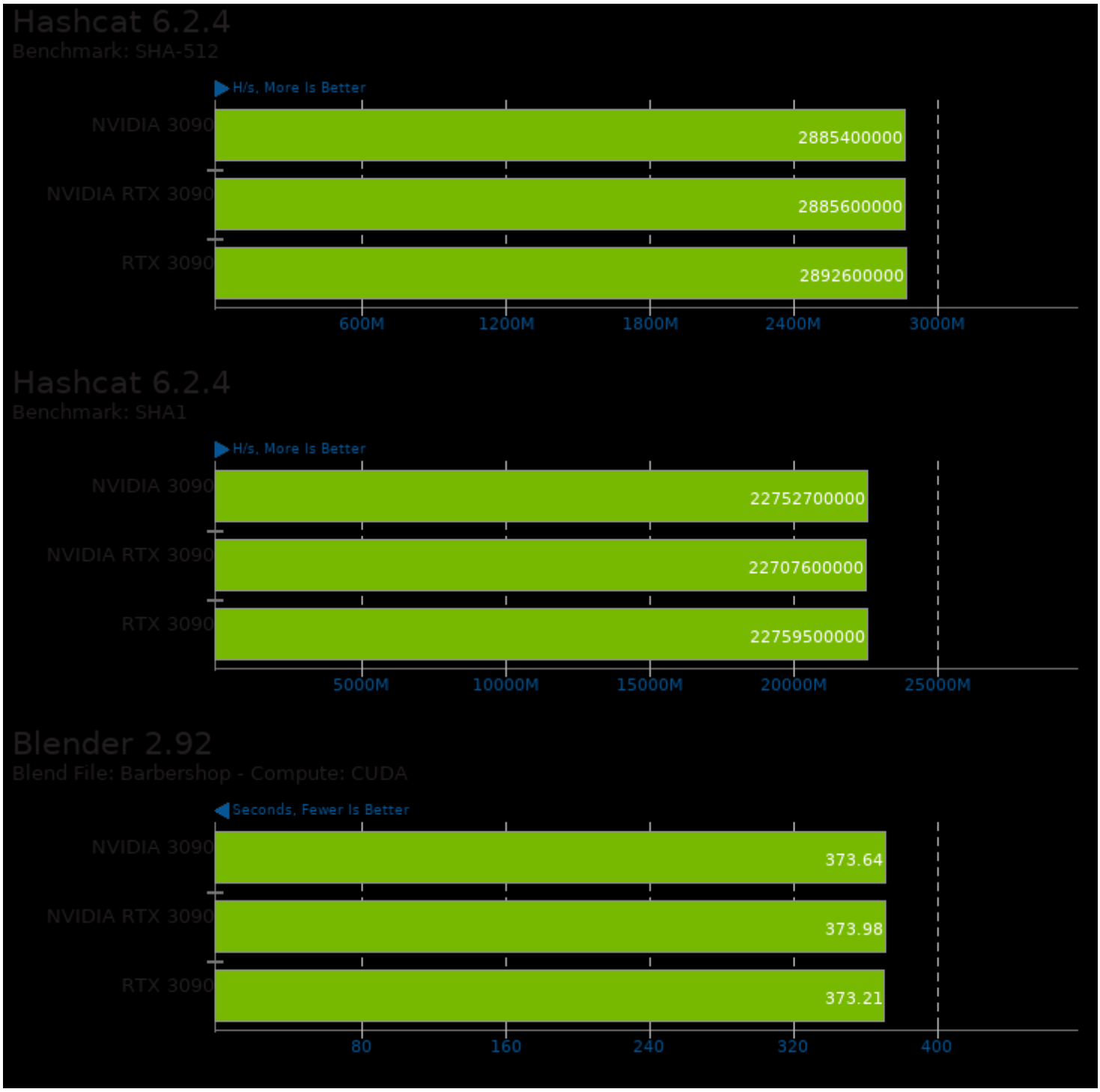
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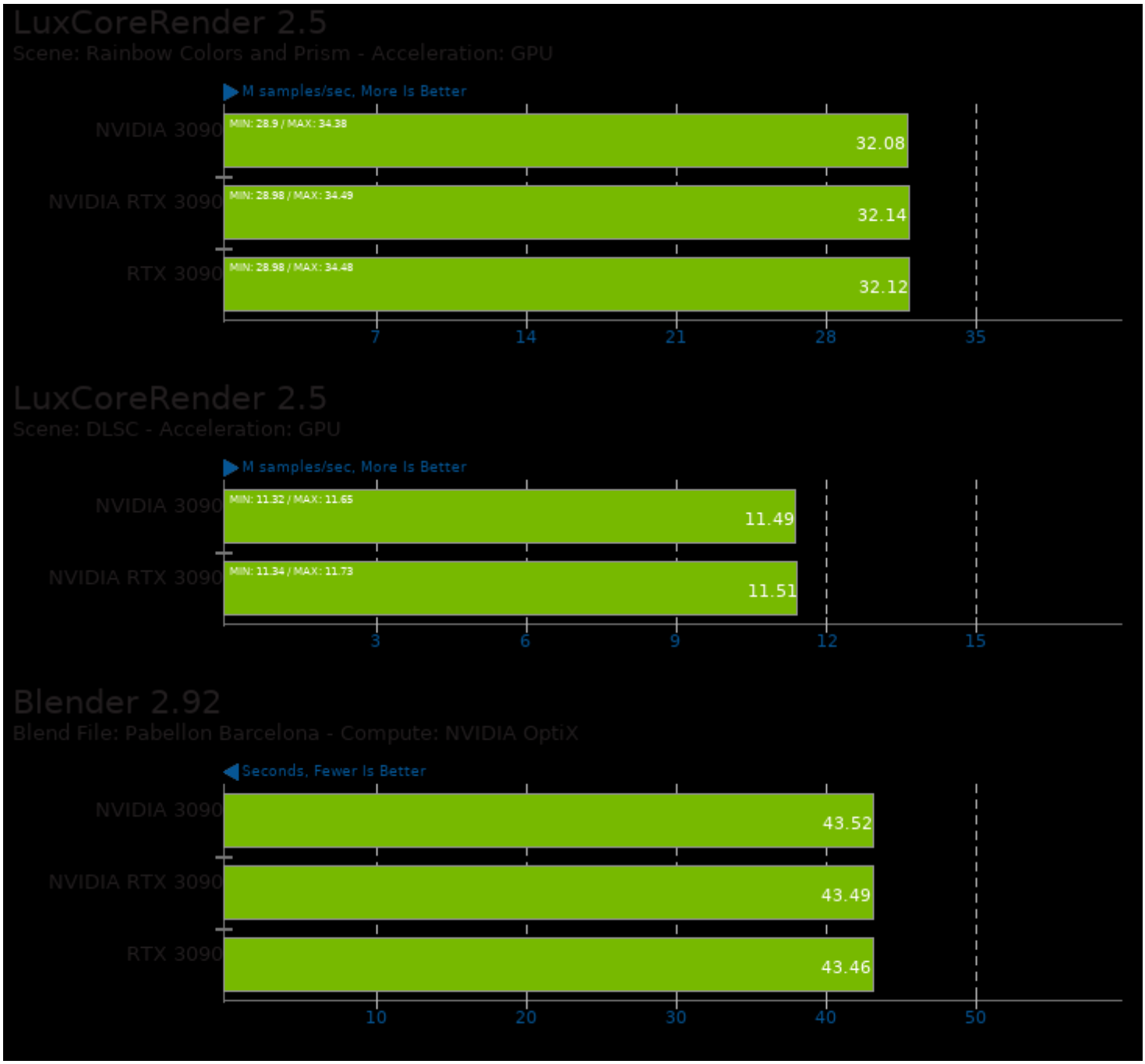
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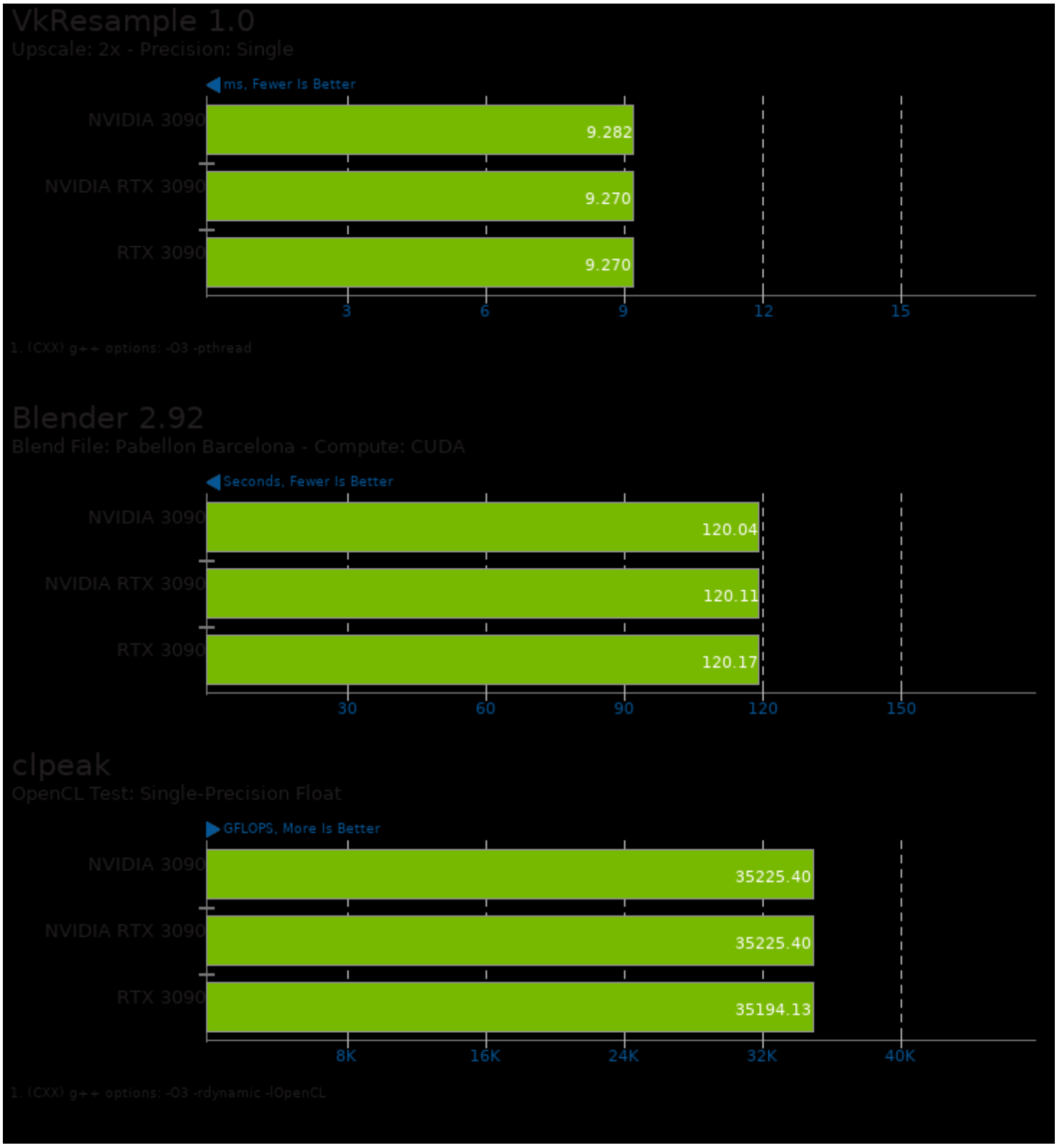
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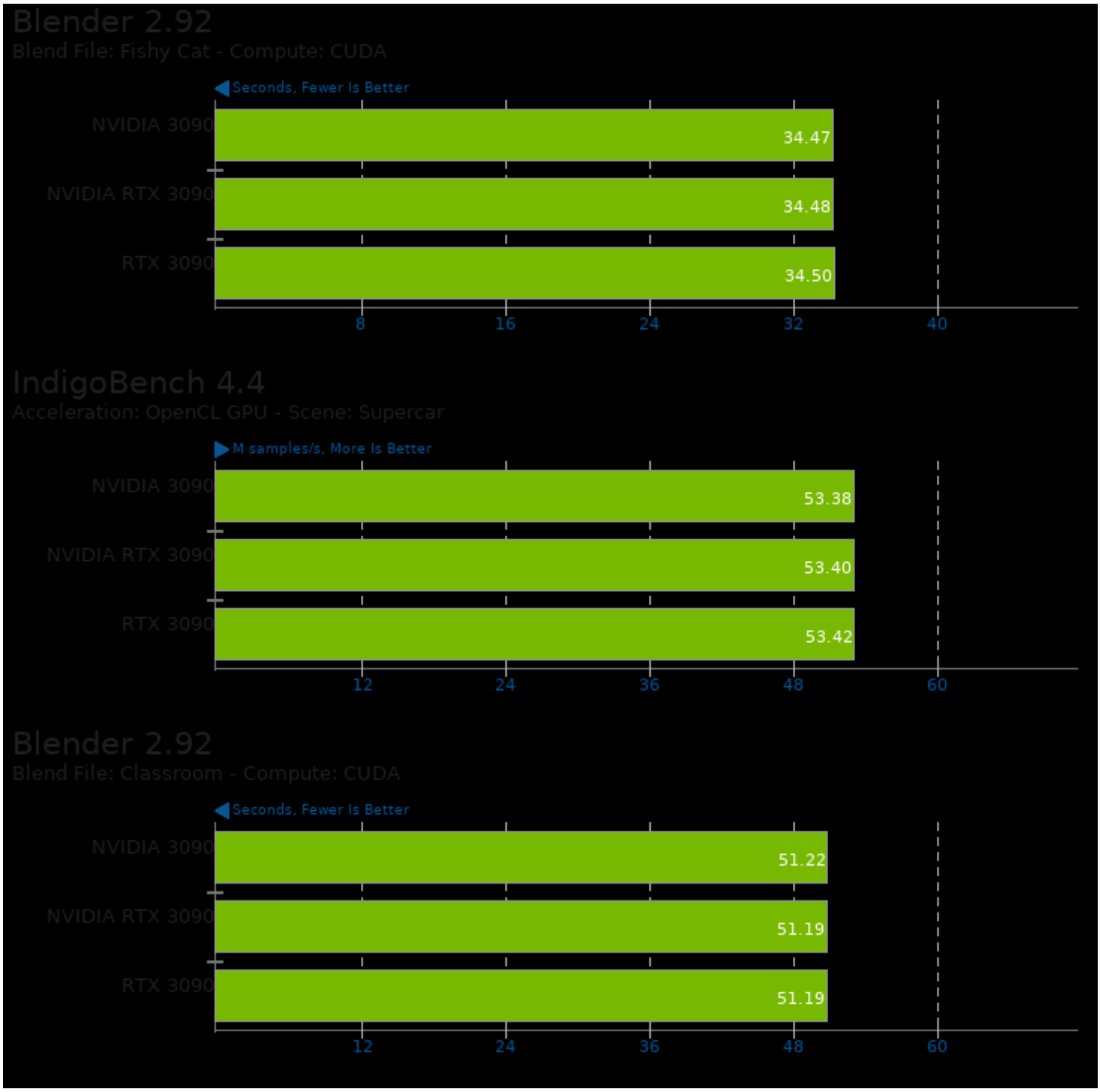
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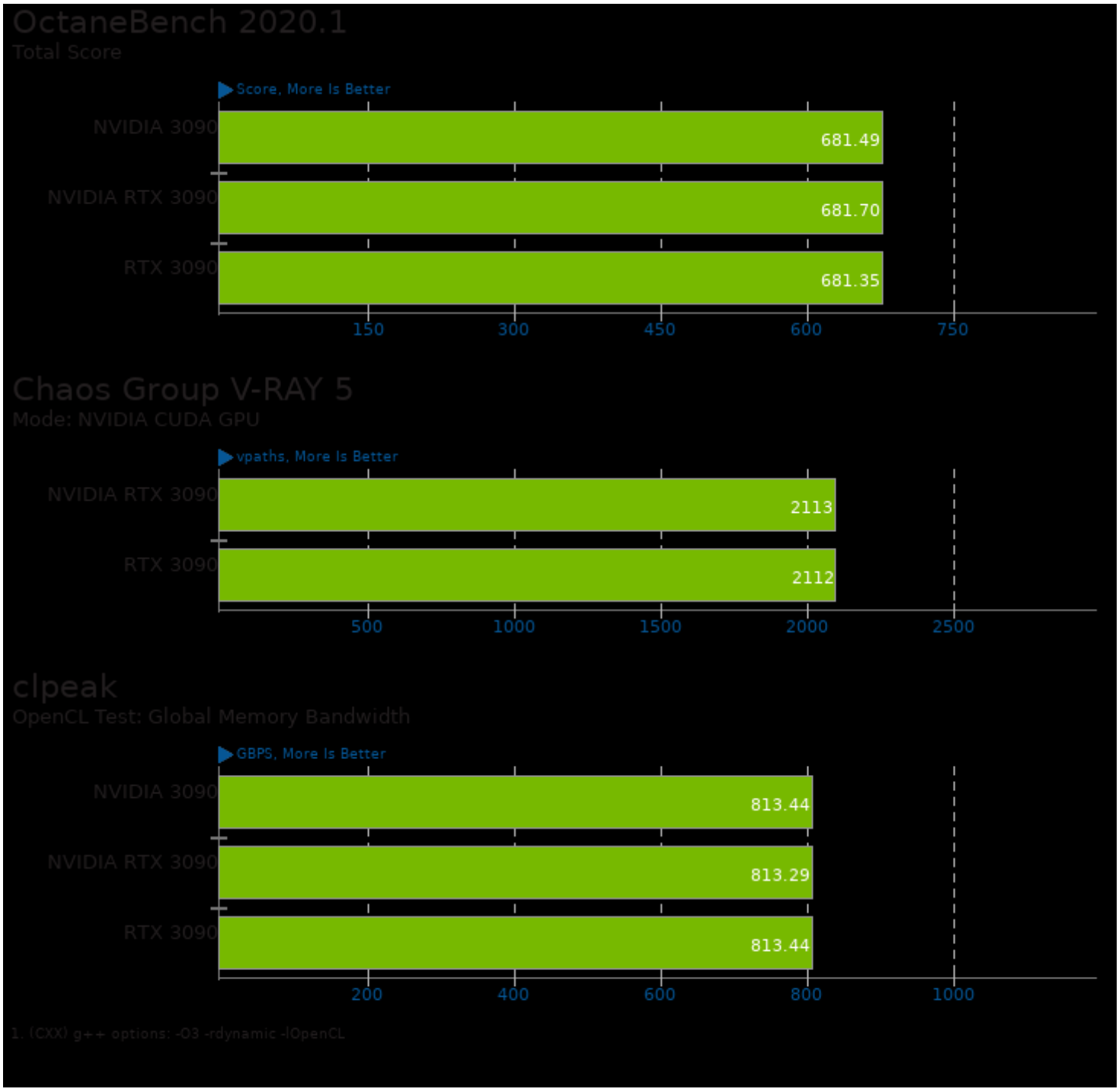
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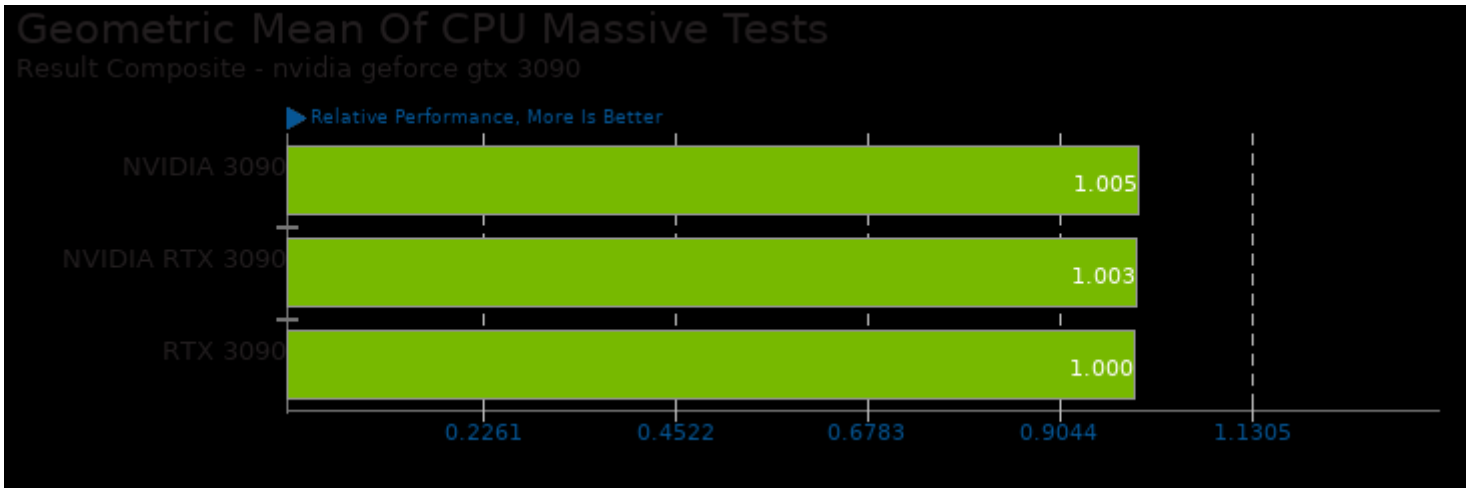


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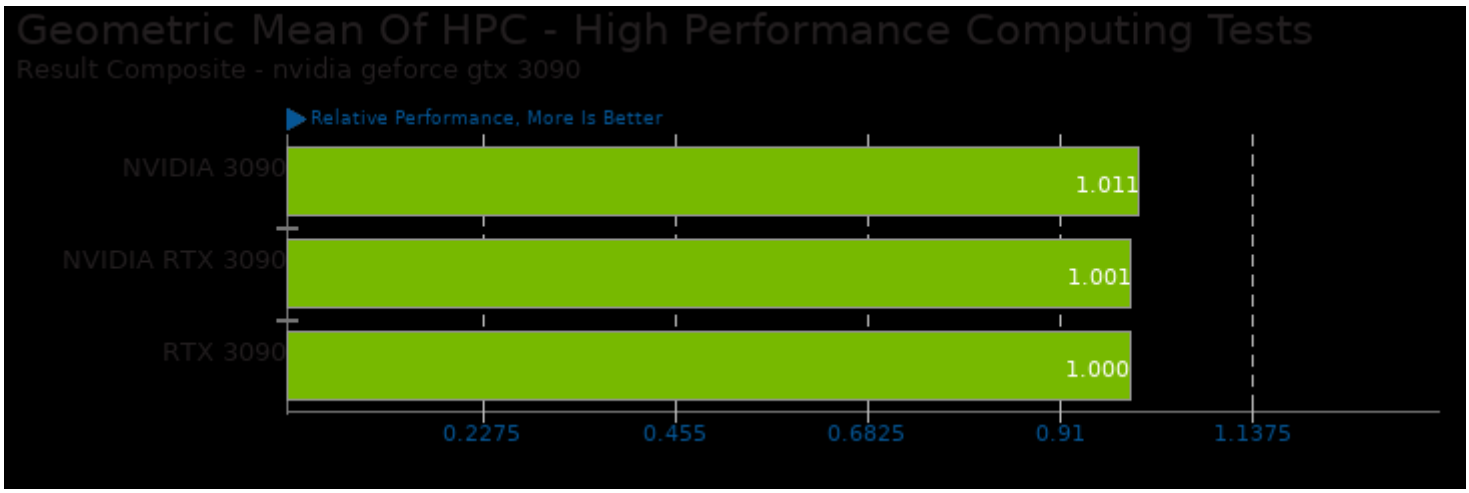
These geometric means are based upon test groupings / test suites for this result file.



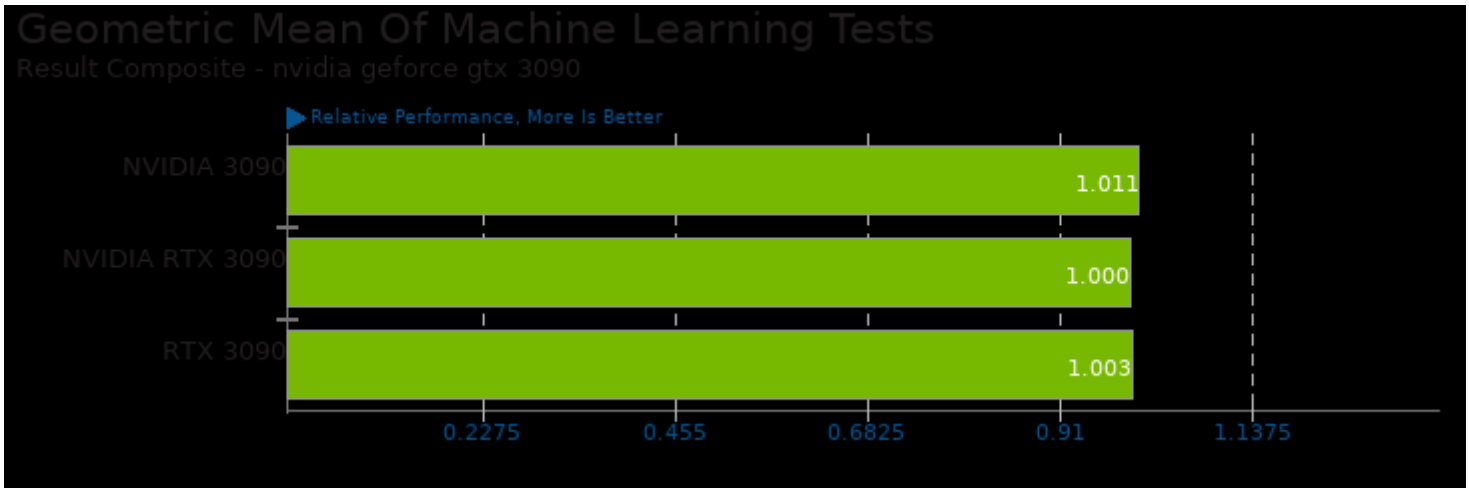
Geometric mean based upon tests: pts/lczero, pts/rodinia, pts/v-ray and pts/blender



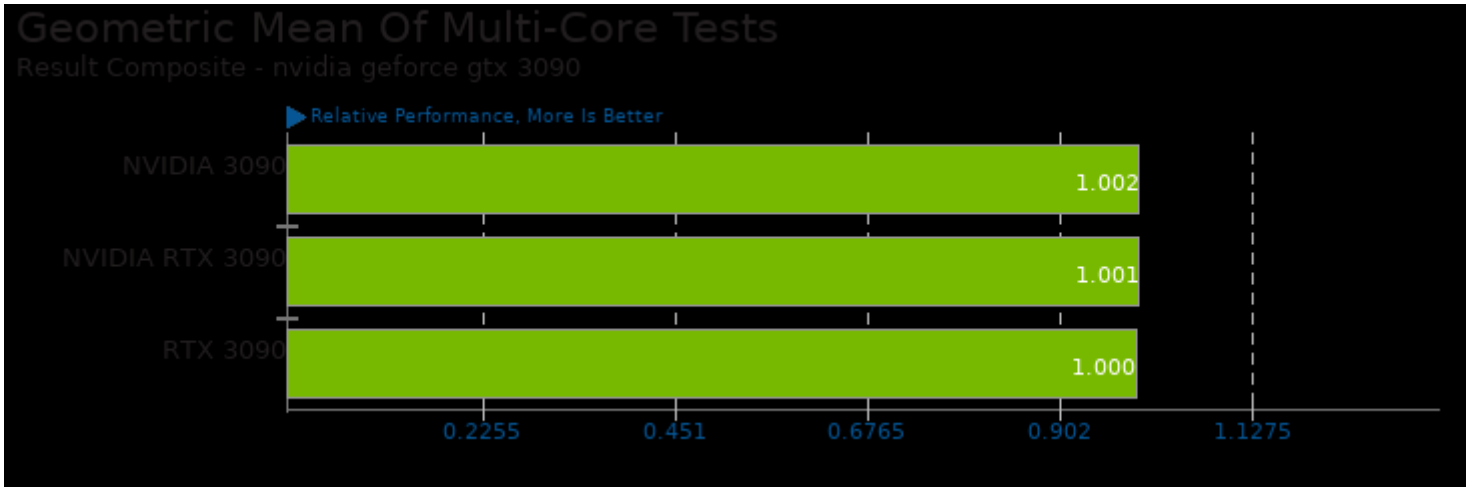
Geometric mean based upon tests: pts/blender, pts/luxcorerender, pts/v-ray, pts/indigobench and pts/neatbench



Geometric mean based upon tests: pts/rodinia, pts/gromacs, pts/ncnn and pts/lczero



Geometric mean based upon tests: pts/ncnn and pts/lczero



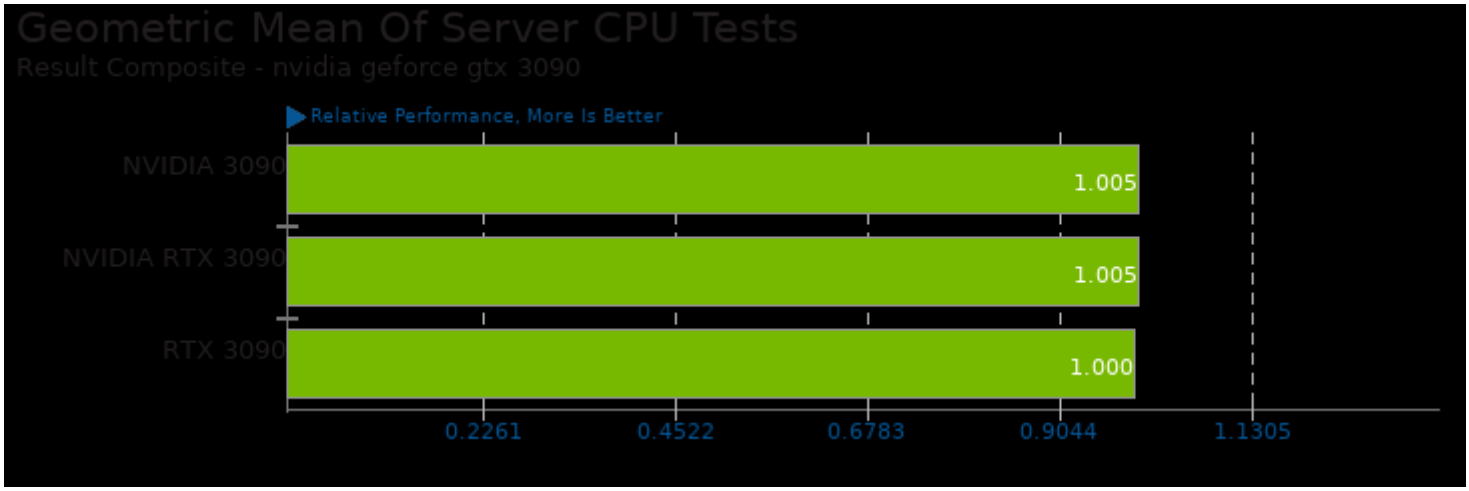
Geometric mean based upon tests: pts/blender, pts/rodinia, pts/gromacs, pts/luxcorerender, pts/v-ray, pts/indigobench and pts/neatbench



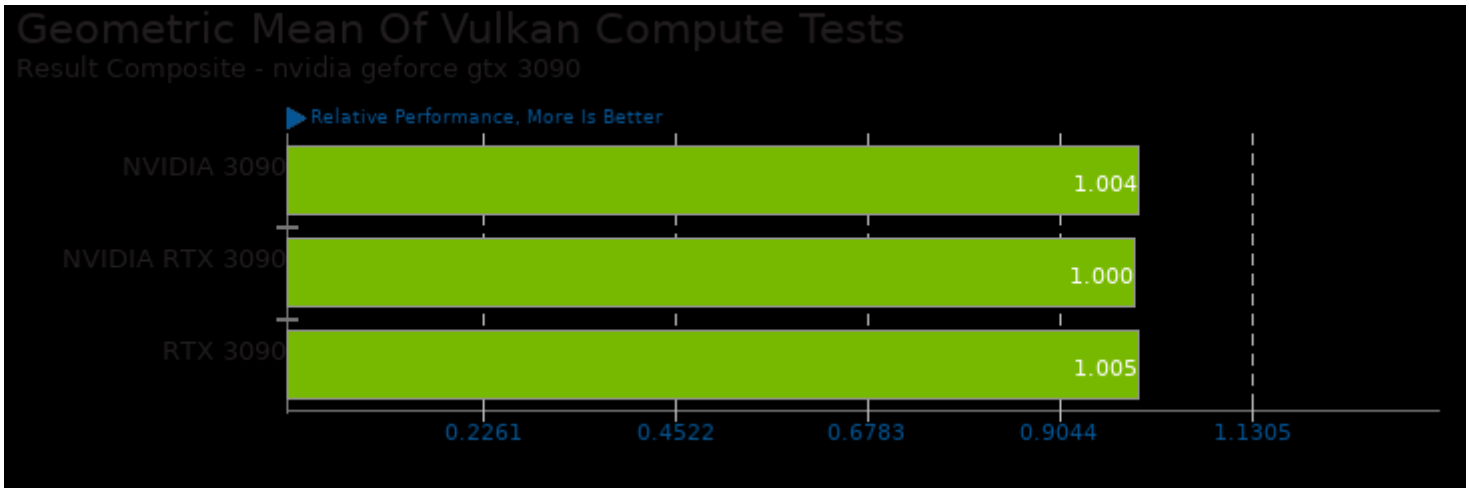
Geometric mean based upon tests: pts/clpeak and pts/rodinia



Geometric mean based upon tests: pts/blender, pts/luxcorerender, pts/v-ray and pts/indigobench



Geometric mean based upon tests: pts/rodinia and pts/blender



Geometric mean based upon tests: pts/vkfft, pts/vkresample, pts/vkpeak, pts/ncnn, pts/realsr-ncnn and pts/waifu2x-ncnn

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Geometric mean based upon tests: pts/blender and pts/rodinia

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