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AMD Ryzen 7 4700U testing with a LENOVO LNVNB161216 (DTCN18WWV1.04 BIOS) and AMD Renoir 512MB on Ubuntu 21.04 via the Phoronix Test Suite.

Automated Executive Summary

1 had the most wins, coming in first place for 50% of the tests.

Based on the geometric mean of all complete results, the fastest (1) was 1.041x the speed of the slowest (3). AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO was 0.985x the speed of 1 and 3 was 0.975x the speed of AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO.

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

NCNN (Target: CPU - Model: vgg16) at 1.259x
NCNN (Target: CPU-v3-v3 - Model: mobilenet-v3) at 1.149x
NCNN (Target: CPU - Model: mnasnet) at 1.145x
NCNN (Target: CPU - Model: blazeface) at 1.135x
NCNN (Target: CPU - Model: resnet18) at 1.133x
NCNN (Target: Vulkan GPU - Model: mobilenet) at 1.127x
NCNN (Target: CPU - Model: efficientnet-b0) at 1.127x
NCNN (Target: CPU-v2-v2 - Model: mobilenet-v2) at 1.126x

NCNN (Target: CPU - Model: regnety_400m) at 1.118x
NCNN (Target: CPU - Model: googlenet) at 1.114x.

Test Systems:

1

AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO

3

Processor: AMD Ryzen 7 4700U @ 2.00GHz (8 Cores), Motherboard: LENOVO LNVNB161216 (DTCN18WWV1.04 BIOS), Chipset: AMD Renoir Root Complex, Memory: 16GB, Disk: 512GB SAMSUNG MZALQ512HALU-000L2, Graphics: AMD Renoir 512MB (1600/400MHz), Audio: AMD Renoir Radeon HD Audio, Network: Intel Wi-Fi 6 AX200

OS: Ubuntu 21.04, Kernel: 5.13.0-051300-generic (x86_64), Desktop: GNOME Shell 3.38.4, Display Server: X Server + Wayland, OpenGL: 4.6 Mesa 21.3.0-devel (git-7de5293 2021-07-18 hirsute-oibaf-ppa) (LLVM 12.0.1), Vulkan: 1.2.182, Compiler: GCC 10.3.0, File-System: ext4, Screen Resolution: 1920x1080

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --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++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-gDeRY6/gcc-10-10.3.0/debian/tmp-gcn/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-build-config=bootstrap-lto-lean --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 schedutil (Boost: Enabled) - CPU Microcode: 0x8600102 - ACPI Profile: balanced
Java Notes: OpenJDK Runtime Environment (build 11.0.11+9-Ubuntu-0ubuntu2)
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: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

	1	AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO	3
NCNN - CPU - mobilenet (ms)	27.65	**26.96**	**28.1**
Normalized	97.5%	100%	95.94%
NCNN - CPU-v2-v2 - mobilenet-v2 (ms)	**6.93**	7.53	**7.8**
Normalized	100%	92.03%	88.85%
NCNN - CPU-v3-v3 - mobilenet-v3 (ms)	**5.89**	6.4	**6.77**
Normalized	100%	92.03%	87%
NCNN - CPU - shufflenet-v2 (ms)	**4.37**	**4.81**	4.78
Normalized	100%	90.85%	91.42%
NCNN - CPU - mnasnet (ms)	**5.24**	5.73	**6**
Normalized	100%	91.45%	87.33%

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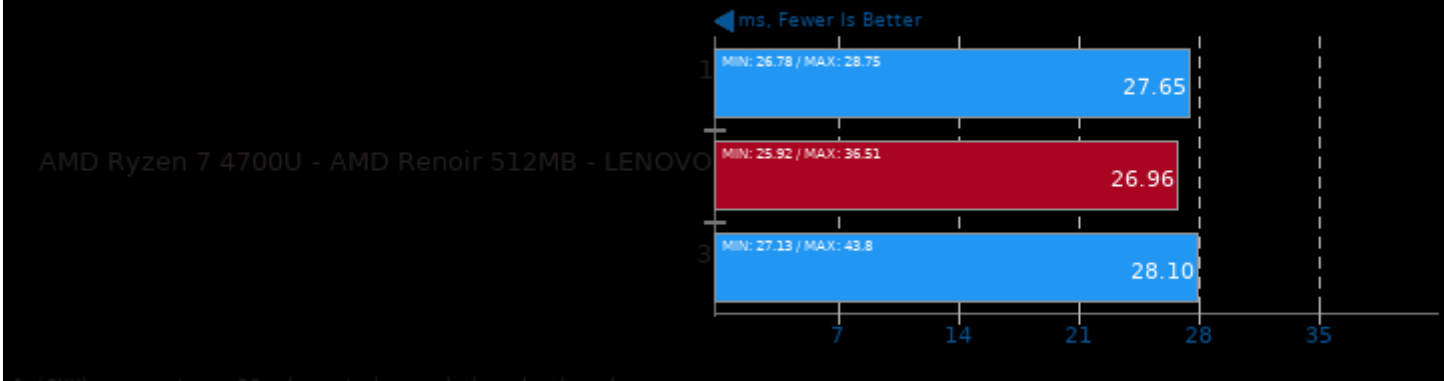
NCNN - CPU - efficientnet-b0 (ms)	**9.14**	10	**10.3**
Normalized	100%	91.4%	88.74%
NCNN - CPU - blazeface (ms)	**1.48**	**1.68**	1.59
Normalized	100%	88.1%	93.08%
NCNN - CPU - googlenet (ms)	**20.16**	21.89	**22.46**
Normalized	100%	92.1%	89.76%
NCNN - CPU - vgg16 (ms)	**135.2**	**107.41**	108.18
Normalized	79.45%	100%	99.29%
NCNN - CPU - resnet18 (ms)	**19.63**	21.5	**22.25**
Normalized	100%	91.3%	88.22%
NCNN - CPU - alexnet (ms)	**16.77**	17.82	**18.49**
Normalized	100%	94.11%	90.7%
NCNN - CPU - resnet50 (ms)	42.5	**39.72**	**42.72**
Normalized	93.46%	100%	92.98%
NCNN - CPU - yolov4-tiny (ms)	**40.7**	40.77	**41.58**
Normalized	100%	99.83%	97.88%
NCNN - CPU - squeezenet_ssd (ms)	**33.84**	33.69	**33.5**
Normalized	99%	99.44%	100%
NCNN - CPU - regnety_400m (ms)	**9.6**	10.6	**10.73**
Normalized	100%	90.57%	89.47%
NCNN - Vulkan GPU - mobilenet (ms)	15.57	**14.91**	**16.81**
Normalized	95.76%	100%	88.7%
NCNN - Vulkan GPU-v2-v2 - mobilenet-v2	5.28	**5.25**	**5.35**
Normalized	99.43%	100%	98.13%
NCNN - Vulkan GPU-v3-v3 - mobilenet-v3	**6.32**	**6.17**	6.24
Normalized	97.63%	100%	98.88%
NCNN - Vulkan GPU - shufflenet-v2 (ms)	**3.95**	3.97	**4.03**
Normalized	100%	99.5%	98.01%
NCNN - Vulkan GPU - mnasnet (ms)	5.25	**5.24**	**5.37**
Normalized	99.81%	100%	97.58%
NCNN - Vulkan GPU - efficientnet-b0 (ms)	**12.92**	**12.81**	12.88
Normalized	99.15%	100%	99.46%
NCNN - Vulkan GPU - blazeface (ms)	1.85	**1.81**	**1.86**
Normalized	97.84%	100%	97.31%
NCNN - Vulkan GPU - googlenet (ms)	**11.29**	11.32	**11.56**
Normalized	100%	99.73%	97.66%
NCNN - Vulkan GPU - vgg16 (ms)	**62.16**	63.08	**63.18**
Normalized	100%	98.54%	98.39%
NCNN - Vulkan GPU - resnet18 (ms)	8.35	**8.34**	**8.39**
Normalized	99.88%	100%	99.4%
NCNN - Vulkan GPU - alexnet (ms)	13.57	**13.55**	**13.76**
Normalized	99.85%	100%	98.47%
NCNN - Vulkan GPU - resnet50 (ms)	17.85	**17.78**	**17.87**
Normalized	99.61%	100%	99.5%
NCNN - Vulkan GPU - yolov4-tiny (ms)	26	**24.92**	**27.2**
Normalized	95.85%	100%	91.62%
NCNN - Vulkan GPU - squeezenet_ssd (ms)	19.37	**19.02**	**20.04**
Normalized	98.19%	100%	94.91%
NCNN - Vulkan GPU - regnety_400m (ms)	**6.92**	**6.92**	**6.97**
Normalized	100%	100%	99.28%
Apache Cassandra - Reads (Op/s)	45042	**45472**	**41296**
Normalized	99.05%	100%	90.82%
Apache Cassandra - Writes (Op/s)	**52685**	50822	**50793**

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Normalized	100%	96.46%	96.41%
Apache Cassandra - Mixed 1:1 (Op/s)	35597	**35240**	**35979**
Normalized	98.94%	97.95%	100%
Apache Cassandra - Mixed 1:3 (Op/s)	**37727**	36255	**35368**
Normalized	100%	96.1%	93.75%

NCNN 20210720

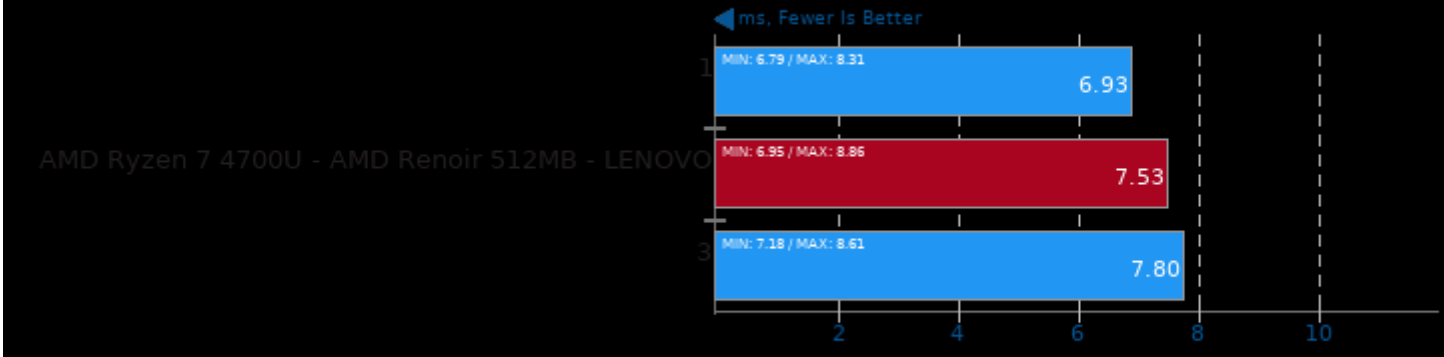
Target: CPU - Model: mobilenet



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

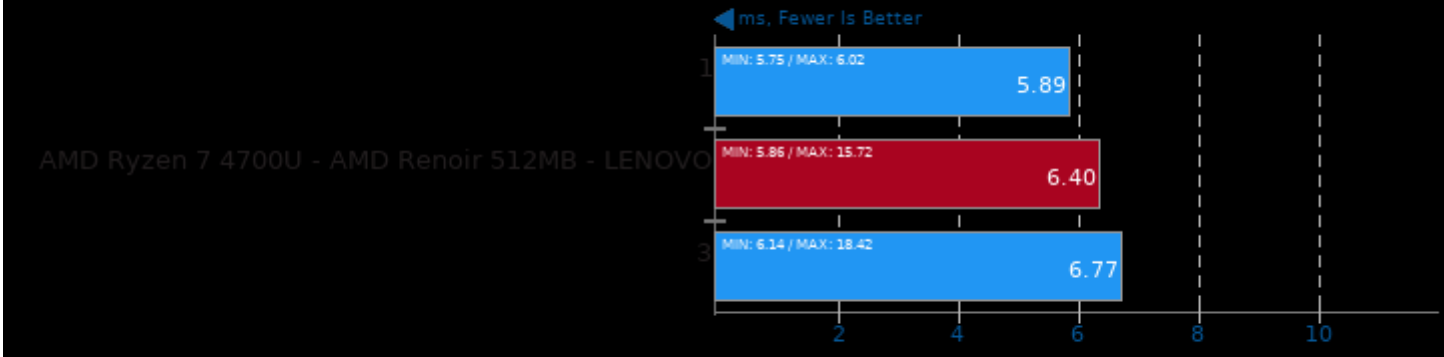
Target: CPU-v2-v2 - Model: mobilenet-v2



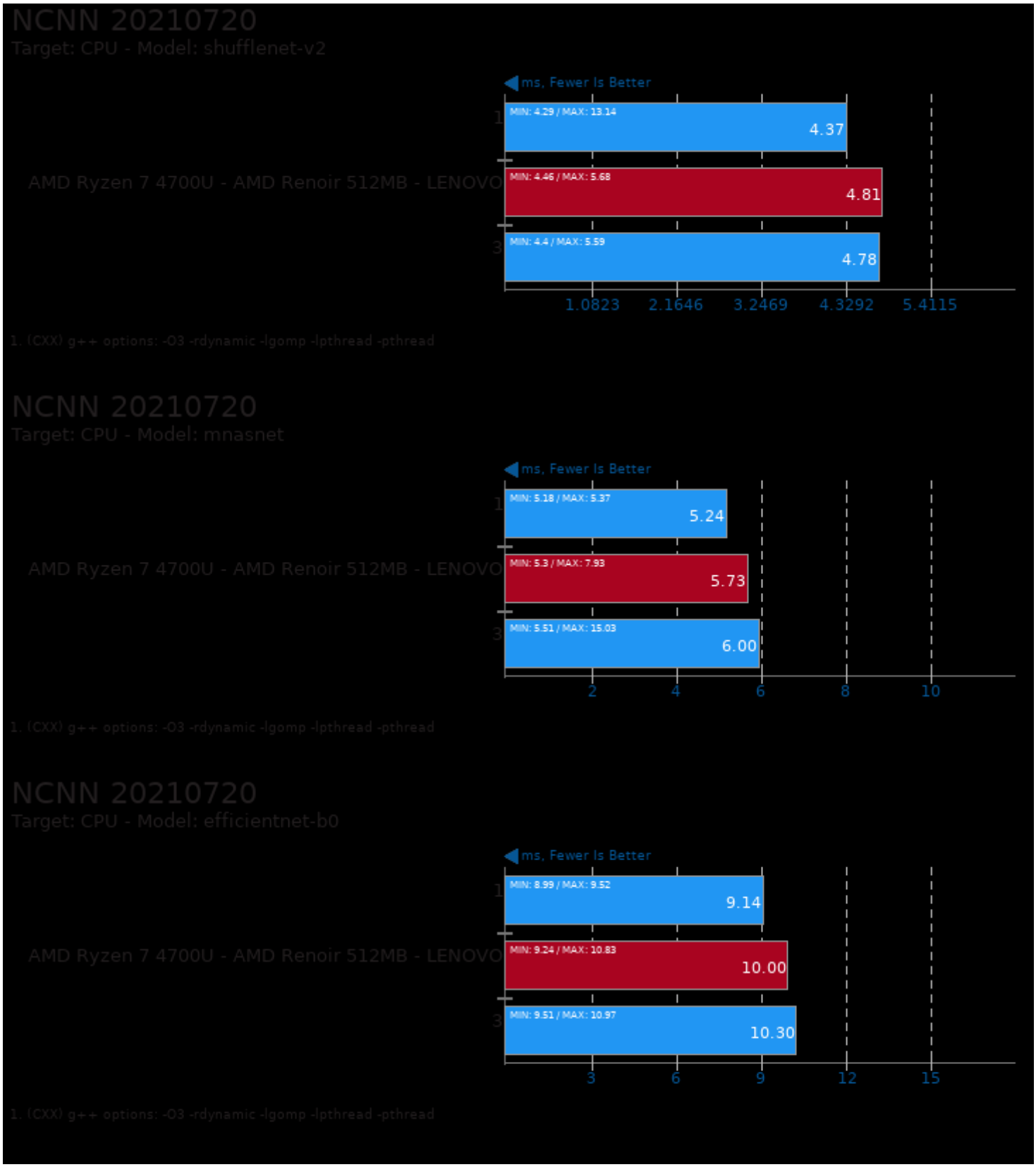
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

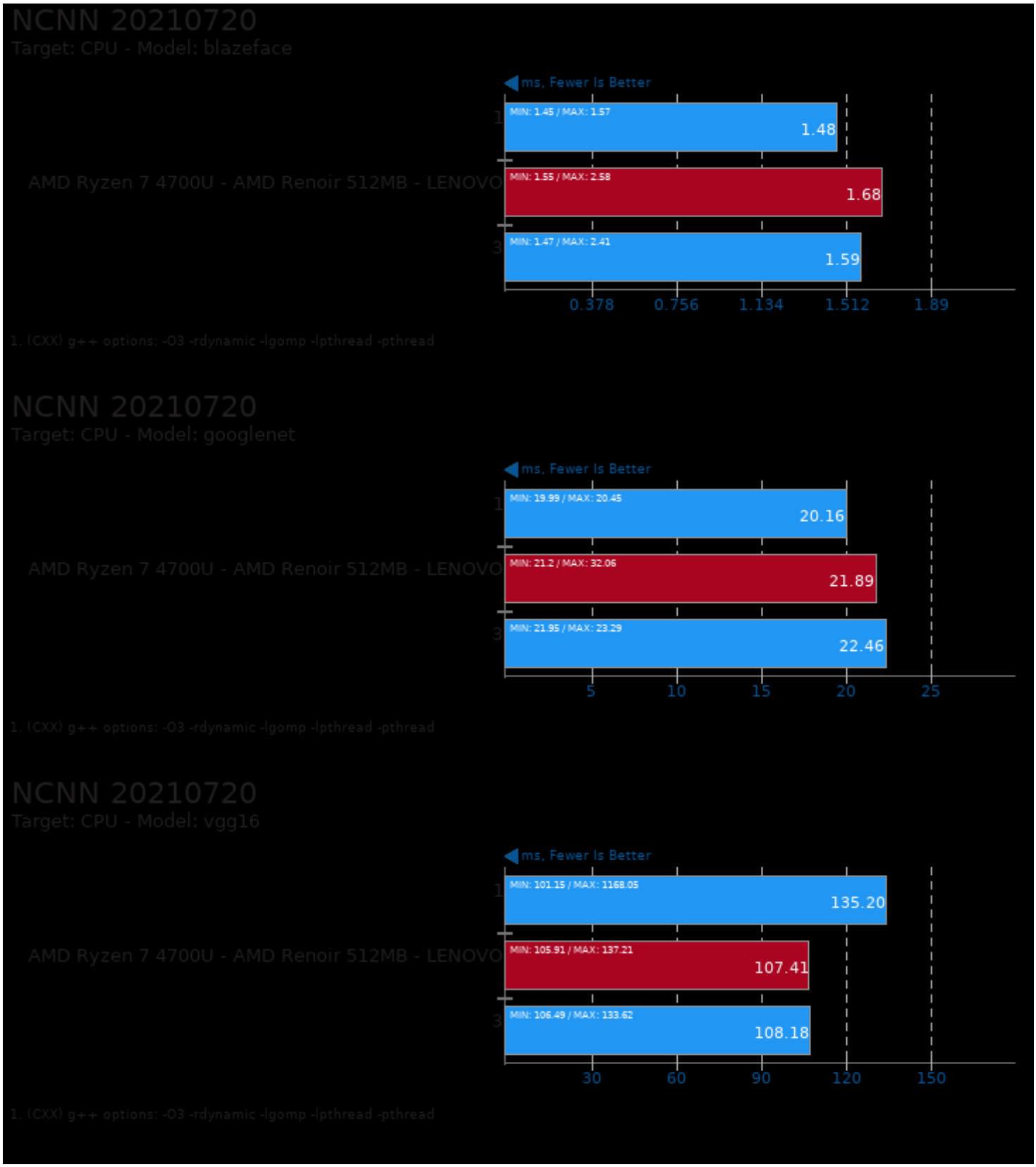
NCNN 20210720

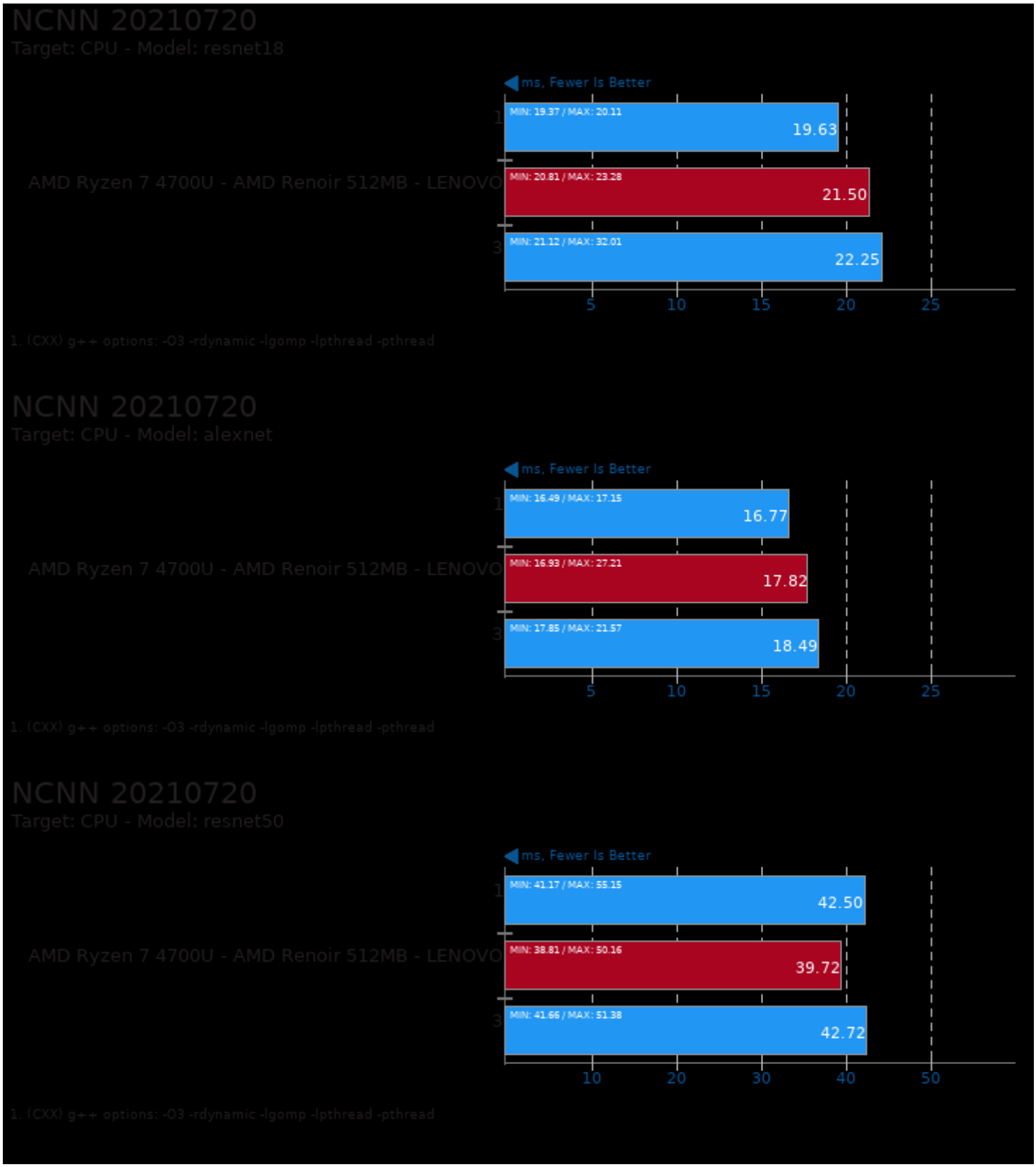
Target: CPU-v3-v3 - Model: mobilenet-v3

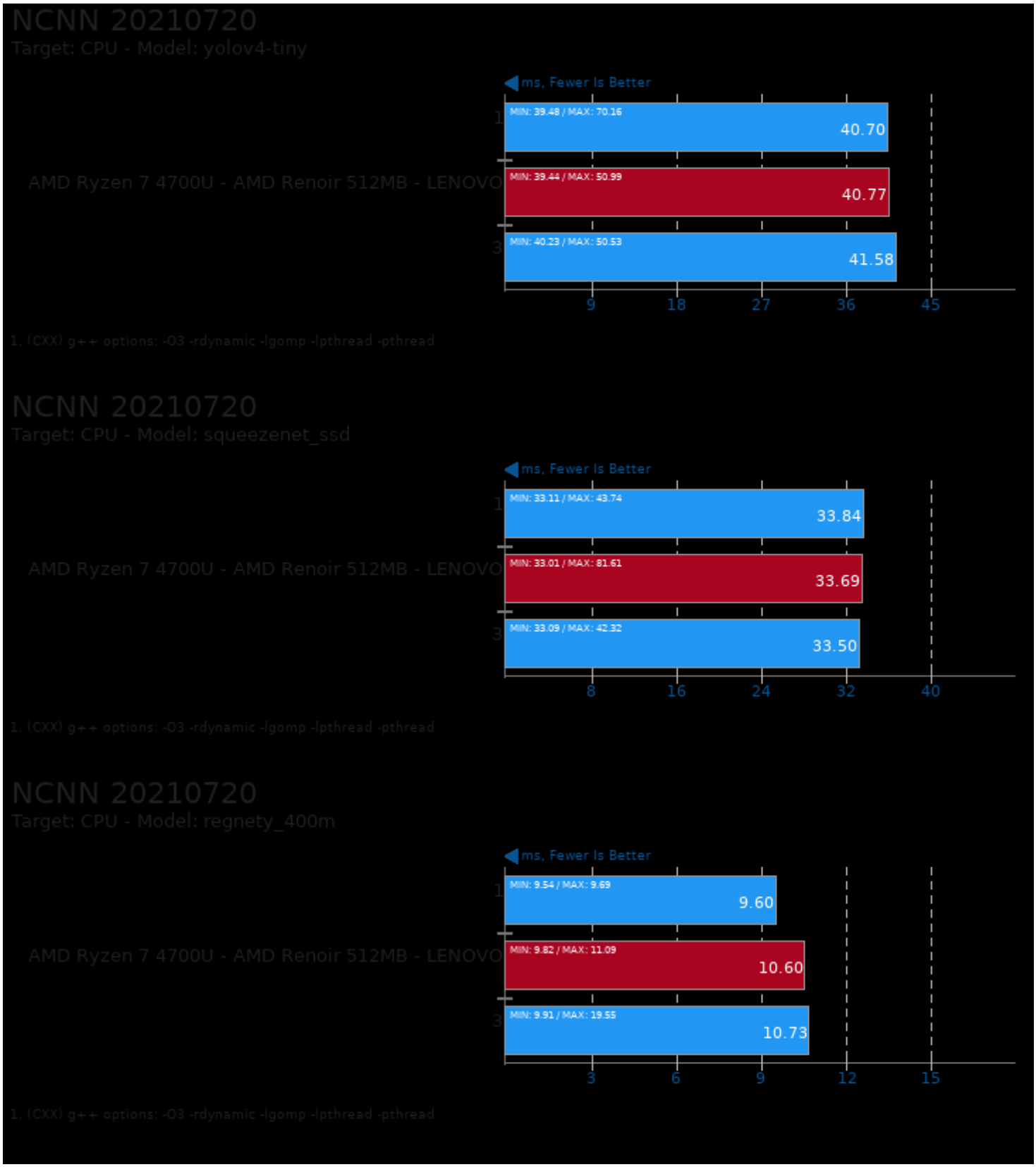


1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread


NCNN 20210720
Target: CPU - Model: shufflenet-v2
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 4.29 / MAX: 13.14
4.37
MIN: 4.46 / MAX: 5.68
4.81
3
MIN: 4.4 / MAX: 5.59
4.78
1.0823
2.1646
3.2469
4.3292
5.4115
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: mnasnet
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 5.18 / MAX: 5.37
5.24
MIN: 5.3 / MAX: 7.93
5.73
3
MIN: 5.51 / MAX: 15.03
6.00
2
4
6
8
10
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: efficientnet-b0
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 8.99 / MAX: 9.52
9.14
MIN: 9.24 / MAX: 10.83
10.00
3
MIN: 9.51 / MAX: 10.97
10.30
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

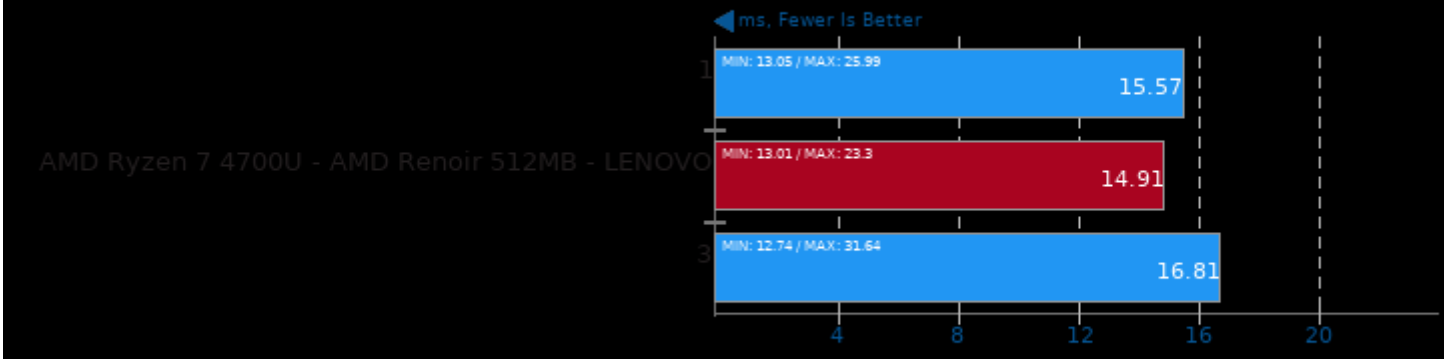

NCNN 20210720
Target: CPU - Model: blazeface
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 1.45 / MAX: 1.57
1.48
MIN: 1.55 / MAX: 2.58
1.68
3
MIN: 1.47 / MAX: 2.41
1.59
0.378
0.756
1.134
1.512
1.89
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: googlenet
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 19.99 / MAX: 20.45
20.16
MIN: 21.2 / MAX: 32.06
21.89
3
MIN: 21.95 / MAX: 23.29
22.46
5
10
15
20
25
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: vgg16
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 101.15 / MAX: 1168.05
135.20
MIN: 105.91 / MAX: 137.21
107.41
3
MIN: 106.49 / MAX: 133.62
108.18
30
60
90
120
150
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread


NCNN 20210720
Target: CPU - Model: resnet18
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 19.37 / MAX: 20.11
19.63
MIN: 20.81 / MAX: 23.28
21.50
3
MIN: 21.12 / MAX: 32.01
22.25
5
10
15
20
25
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: alexnet
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 16.49 / MAX: 17.15
16.77
MIN: 16.93 / MAX: 27.21
17.82
3
MIN: 17.85 / MAX: 21.57
18.49
5
10
15
20
25
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: resnet50
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 41.17 / MAX: 55.15
42.50
MIN: 38.81 / MAX: 50.16
39.72
3
MIN: 41.66 / MAX: 51.38
42.72
10
20
30
40
50
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread


NCNN 20210720
Target: CPU - Model: yolov4-tiny
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 39.48 / MAX: 70.16
40.70
MIN: 39.44 / MAX: 50.99
40.77
3
MIN: 40.23 / MAX: 50.53
41.58
9
18
27
36
45
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: squeezenet_ssd
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 33.11 / MAX: 43.74
33.84
MIN: 33.01 / MAX: 81.61
33.69
3
MIN: 33.09 / MAX: 42.32
33.50
8
16
24
32
40
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread
NCNN 20210720
Target: CPU - Model: regnety_400m
ms, Fewer Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
MIN: 9.54 / MAX: 9.69
9.60
MIN: 9.82 / MAX: 11.09
10.60
3
MIN: 9.91 / MAX: 19.55
10.73
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

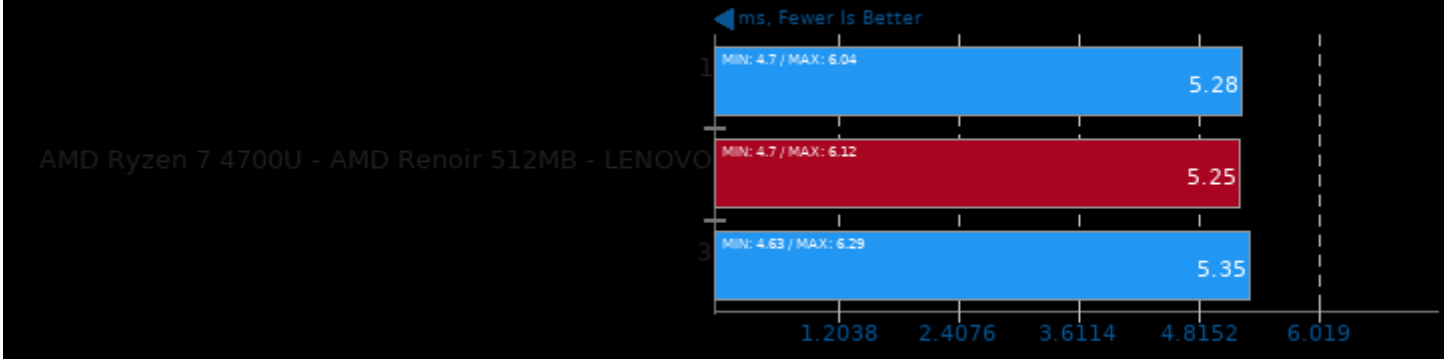
Target: Vulkan GPU - Model: mobilenet



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

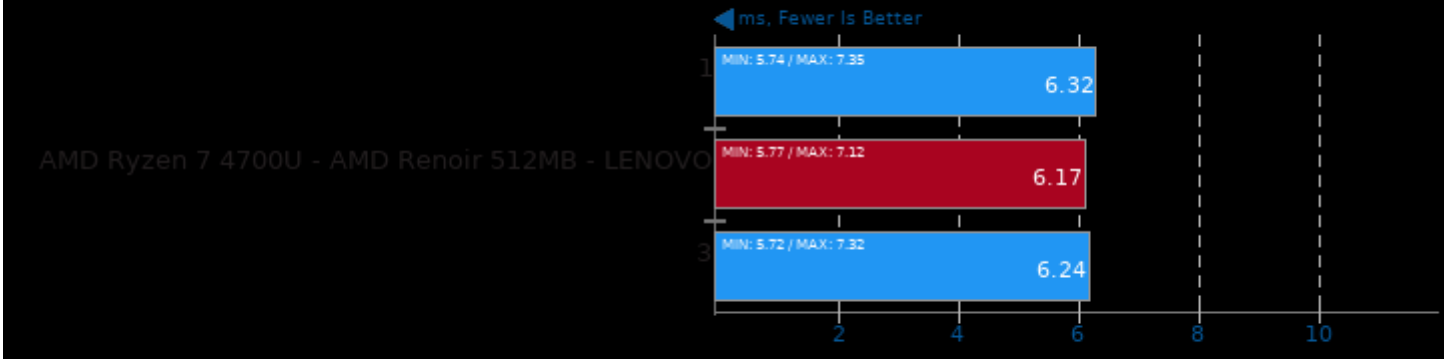
Target: Vulkan GPU-v2-v2 - Model: mobilenet-v2



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

Target: Vulkan GPU-v3-v3 - Model: mobilenet-v3



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

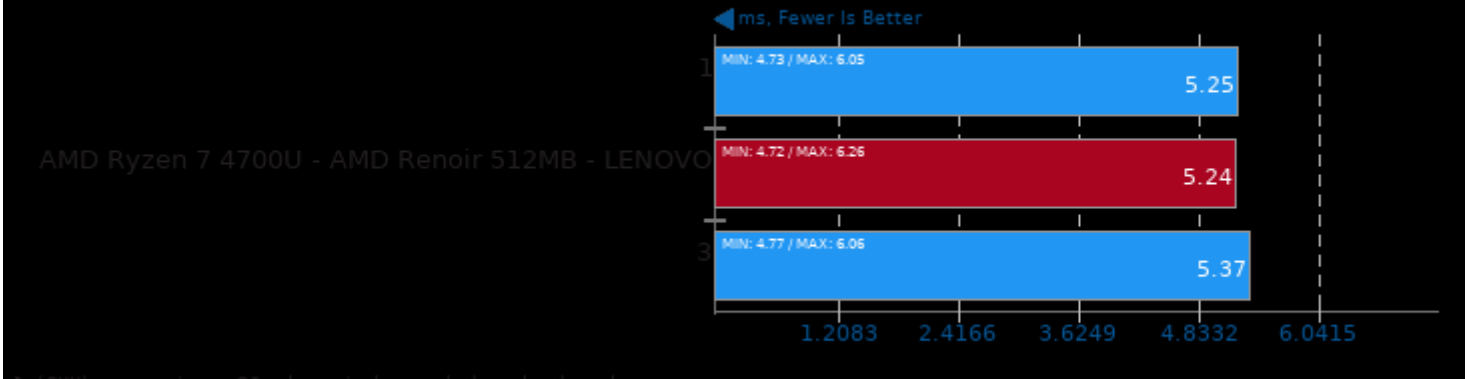
Target: Vulkan GPU - Model: shufflenet-v2



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

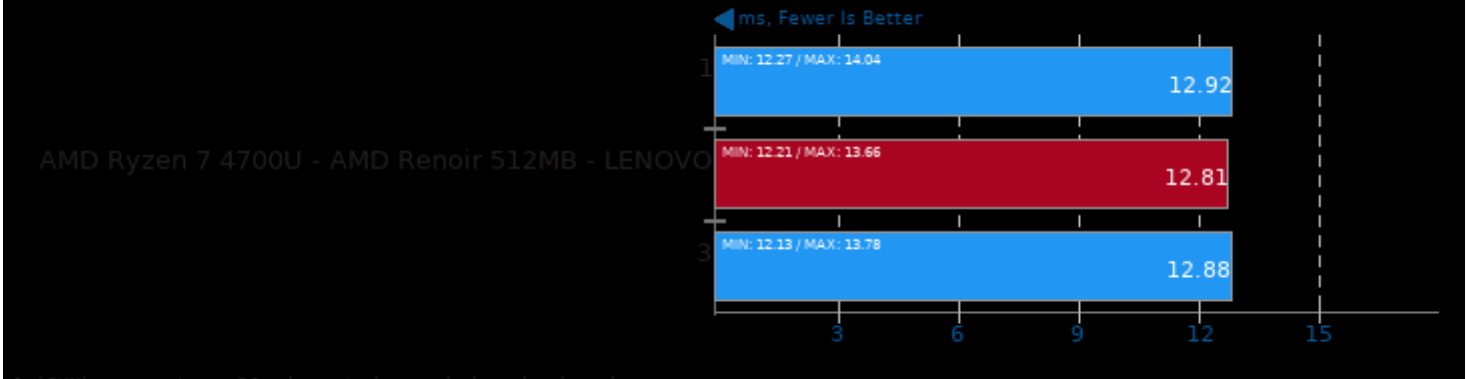
Target: Vulkan GPU - Model: mnasnet



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

Target: Vulkan GPU - Model: efficientnet-b0



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

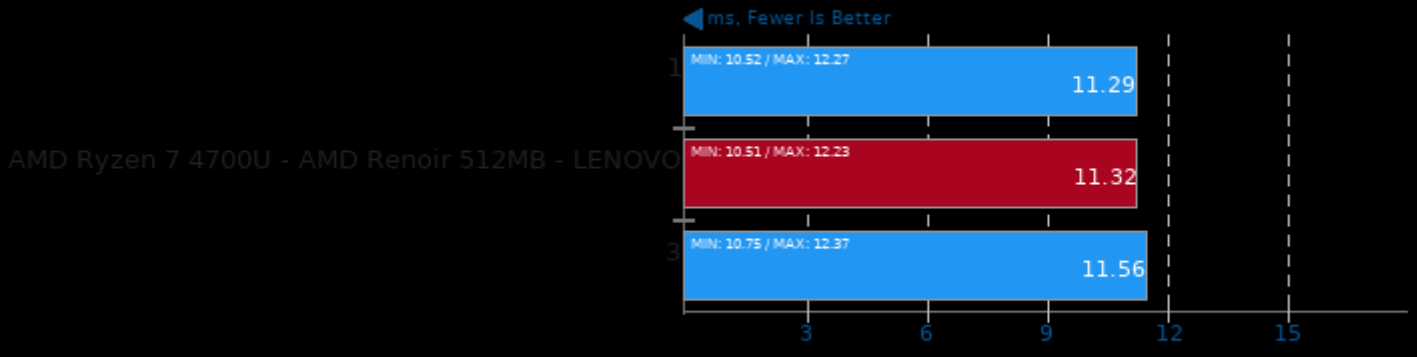
Target: Vulkan GPU - Model: blazeface



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

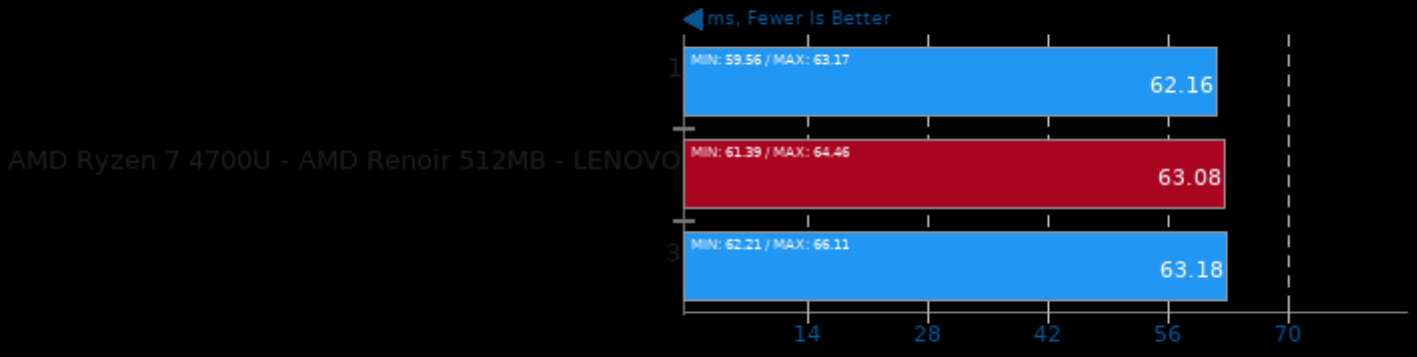
Target: Vulkan GPU - Model: googlenet



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

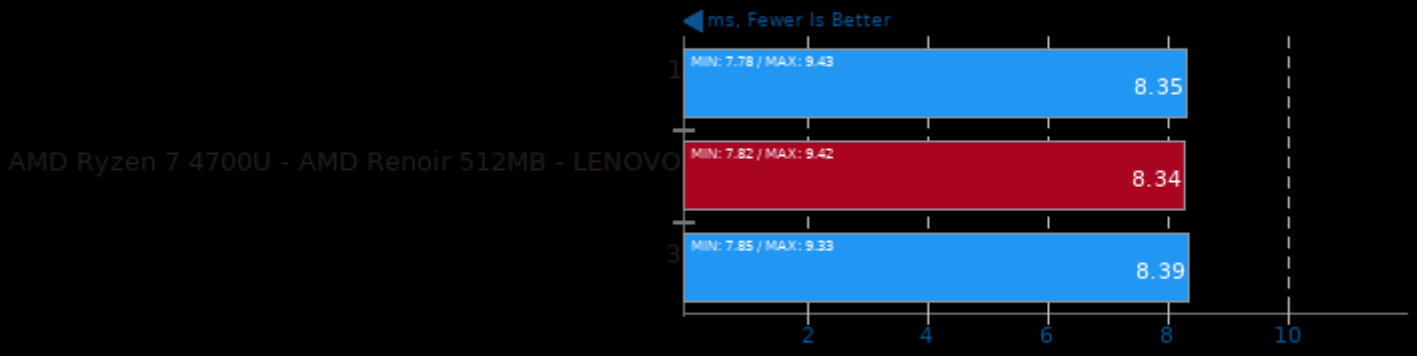
Target: Vulkan GPU - Model: vgg16



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

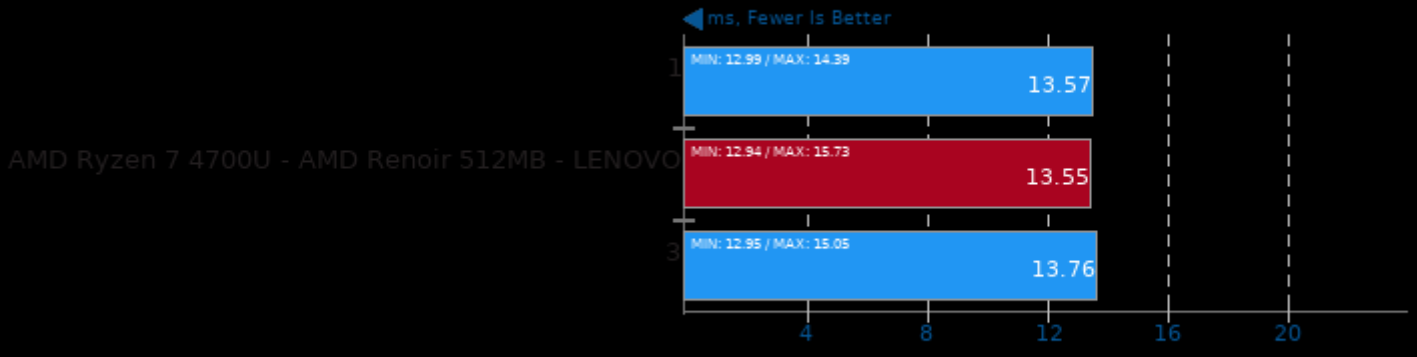
Target: Vulkan GPU - Model: resnet18



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

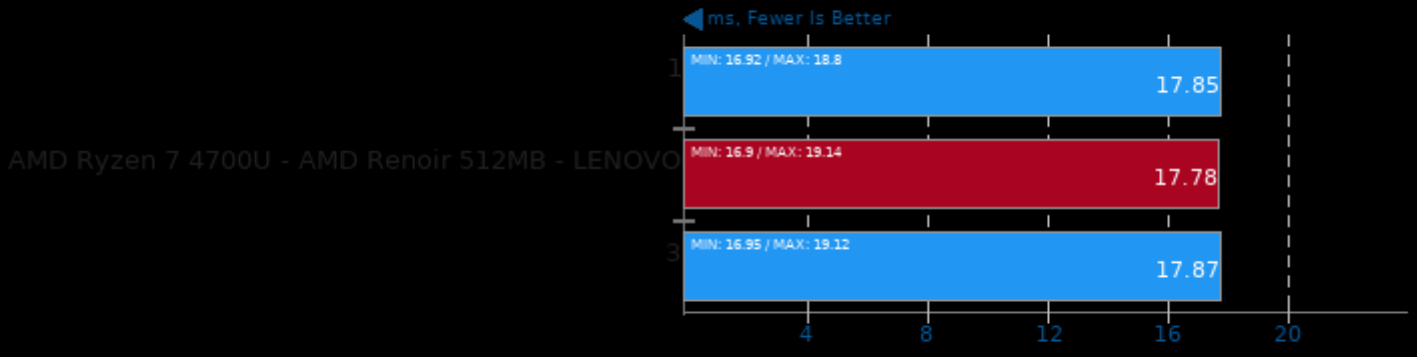
Target: Vulkan GPU - Model: alexnet



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

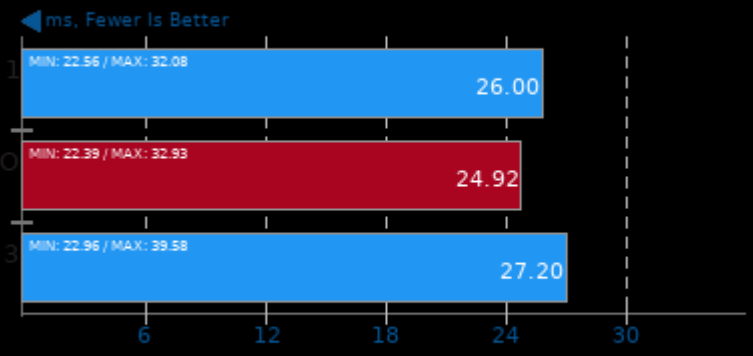
Target: Vulkan GPU - Model: resnet50



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

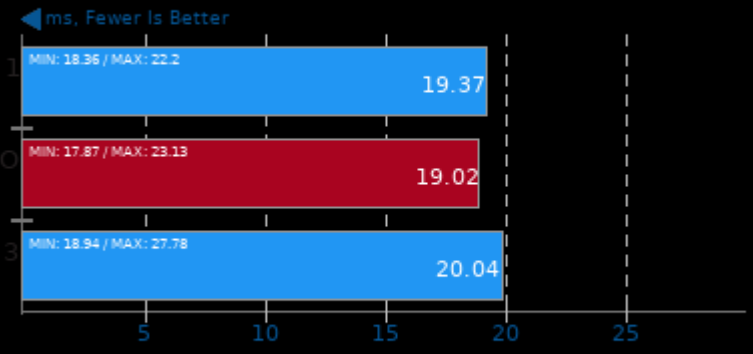
Target: Vulkan GPU - Model: yolov4-tiny



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

NCNN 20210720

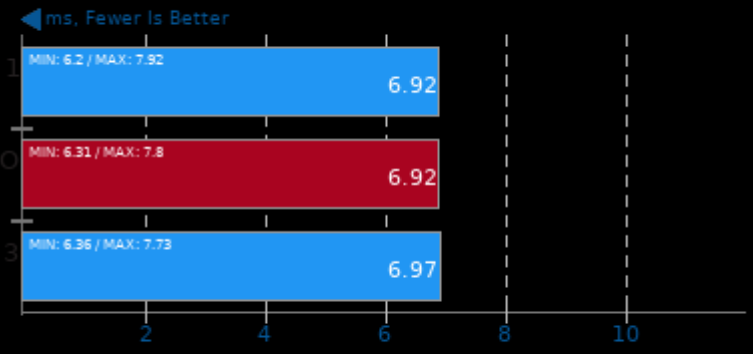
Target: Vulkan GPU - Model: squeezenet_ssd



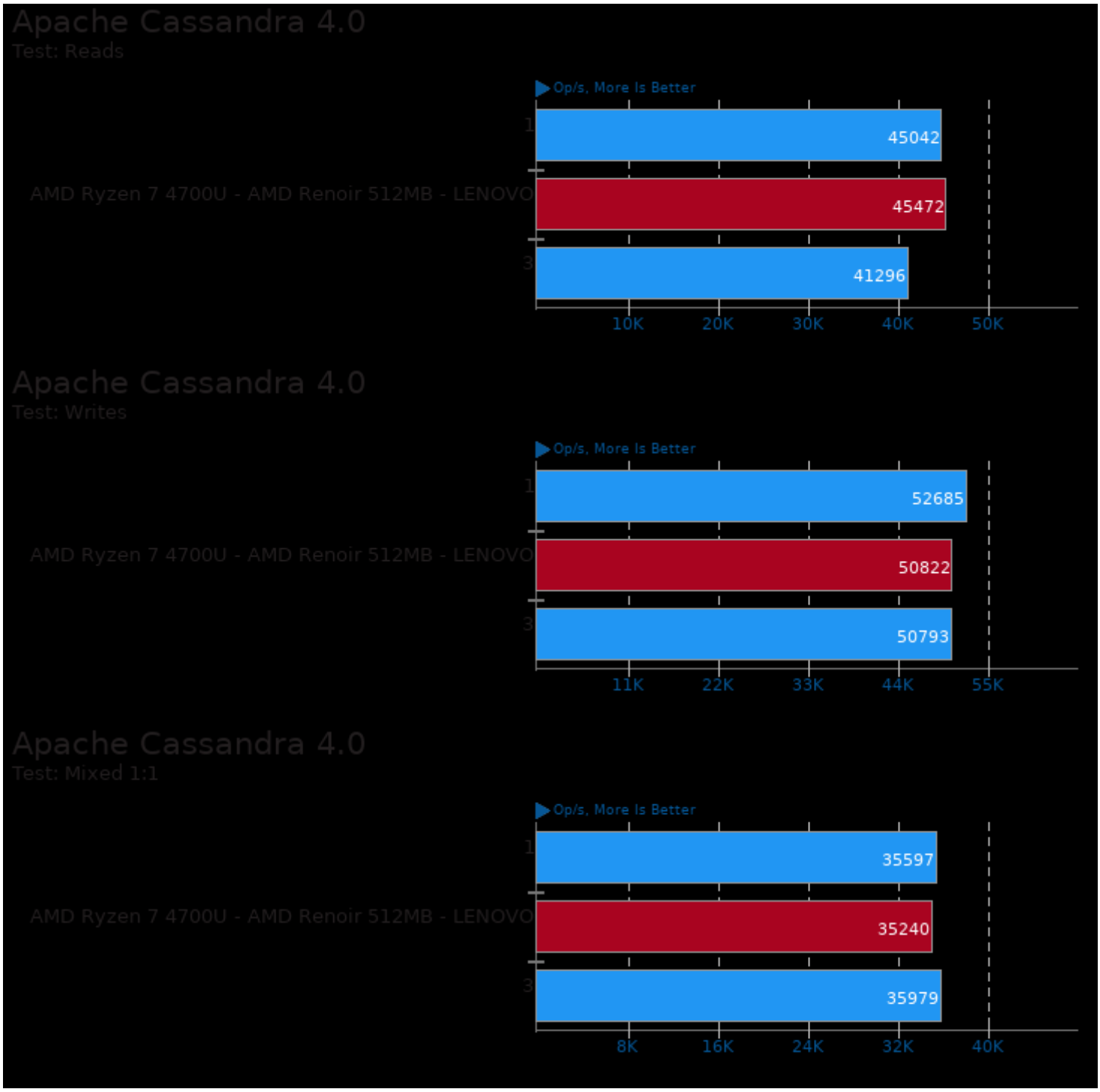
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread

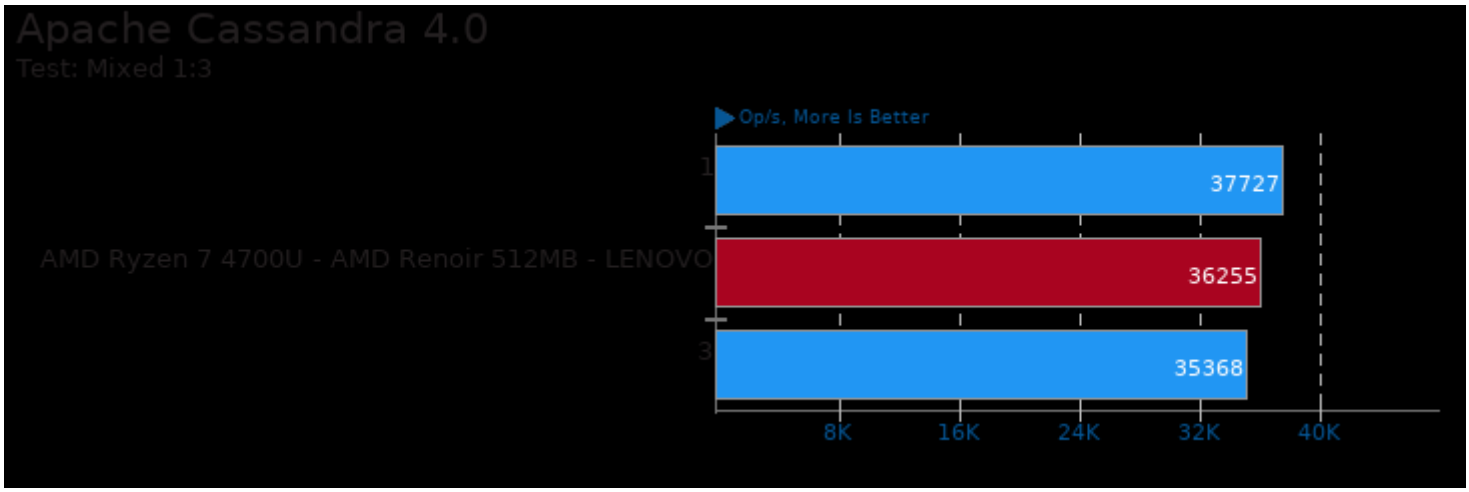
NCNN 20210720

Target: Vulkan GPU - Model: regnety_400m



1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread -pthread


Apache Cassandra 4.0
Test: Reads
Op/s, More Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
45042
45472
3
41296
10K
20K
30K
40K
50K
Apache Cassandra 4.0
Test: Writes
Op/s, More Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
52685
50822
3
50793
11K
22K
33K
44K
55K
Apache Cassandra 4.0
Test: Mixed 1:1
Op/s, More Is Better
AMD Ryzen 7 4700U - AMD Renoir 512MB - LENOVO
1
35597
35240
3
35979
8K
16K
24K
32K
40K



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