



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

**Quanta Cloud Technology**

(Test Sponsor: Quanta Computer Inc.)

SPECspeed®2017\_fp\_base = 337

**D54Q-2U (Intel Xeon Platinum 8480+, 2.0GHz)**

SPECspeed®2017\_fp\_peak = Not Run

CPU2017 License: 9050

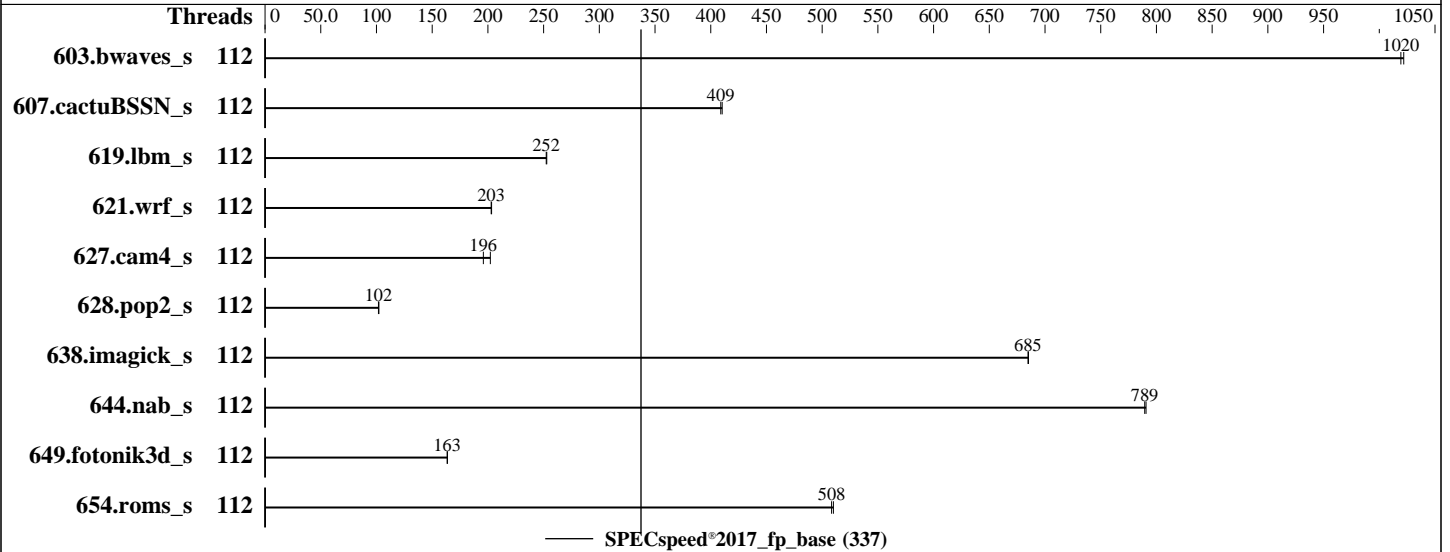
Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Dec-2022

Hardware Availability: Nov-2022

Software Availability: Nov-2022



## Hardware

CPU Name: Intel Xeon Platinum 8480+  
 Max MHz: 3800  
 Nominal: 2000  
 Enabled: 112 cores, 2 chips  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 2 MB I+D on chip per core  
 L3: 105 MB I+D on chip per chip  
 Other: None  
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 7.68 TB PCIe 4.0x4 NVMe SSD  
 Other: None

## Software

OS: Ubuntu 22.04.1 LTS  
 5.15.0-16-generic  
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;  
 Parallel: Yes  
 Firmware: Version 3A10 released Nov-2022  
 File System: ext4  
 System State: Run level 5  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: jemalloc memory allocator V5.0.1  
 Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.



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## Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	112	57.7	1020	<u>57.9</u>	<u>1020</u>									
607.cactuBSSN_s	112	40.6	410	<u>40.8</u>	<u>409</u>									
619.lbm_s	112	20.7	253	<u>20.8</u>	<u>252</u>									
621.wrf_s	112	<u>65.2</u>	<u>203</u>	65.1	203									
627.cam4_s	112	43.8	202	<u>45.2</u>	<u>196</u>									
628.pop2_s	112	<u>117</u>	<u>102</u>	116	102									
638.imagick_s	112	21.1	685	<u>21.1</u>	<u>685</u>									
644.nab_s	112	<u>22.1</u>	<u>789</u>	22.1	791									
649.fotonik3d_s	112	55.7	164	<u>55.8</u>	<u>163</u>									
654.roms_s	112	<u>31.0</u>	<u>508</u>	30.9	510									

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/root/cpu2017/lib/intel64:/root/cpu2017/je5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"
```

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Redhat Enterprise Linux 8.0  
 Transparent Huge Pages enabled by default  
 Prior to runcpu invocation  
 Filesystem page cache synced and cleared with:  

```
sync; echo 3> /proc/sys/vm/drop_caches
```

 NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.  
 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.  
 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.  
 jemalloc, a general purpose malloc implementation

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## General Notes (Continued)

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

### BIOS Configuration

Enable LP [Global] set to Single LP  
Patrol Scrub set to Disabled  
SNC set to Disabled  
DCU Streamer Prefetcher set to Disabled  
Hardware P-States set to Out Of Band Mode  
LLC dead line alloc set to Disabled

Sysinfo program /root/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on quanta Sat Dec 3 00:52:47 2022

SUT (System Under Test) info as seen by some common utilities.

### Table of contents

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.4)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent\_hugepage
18. /sys/kernel/mm/transparent\_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

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## Platform Notes (Continued)

1. `uname -a`

```
Linux quanta 5.15.0-56-generic #62-Ubuntu SMP Tue Nov 22 19:54:14 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux
```

2. `w`

```
00:52:47 up 1:13, 1 user, load average: 6.34, 5.71, 3.30
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU   WHAT
root      tty1    -                23:40   1:12m  0.80s  0.00s  /bin/bash ./S6Qtest.sh
```

3. Username

```
From environment variable $USER: root
```

4. `ulimit -a`

```
time(seconds)          unlimited
file(blocks)           unlimited
data(kbytes)           unlimited
stack(kbytes)          unlimited
coredump(blocks)       0
memory(kbytes)         unlimited
locked memory(kbytes)  132051020
process                 4126150
nofiles                 1024
vmemory(kbytes)        unlimited
locks                   unlimited
rtprio                  0
```

5. `sysinfo process ancestry`

```
/sbin/init
/bin/login -f
-bash
/bin/bash ./S6Qtest.sh
/bin/bash ./S6Qtest.sh
runcpu --nobuild --action validate --define default-platform-flags -c
ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=112 --tune base -o all --define drop_caches
fpspeed -n 2
runcpu --nobuild --action validate --define default-platform-flags --configfile
ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=112 --tune base --output_format all --define
drop_caches --iterations 2 --nopower --runmode speed --tune base --size refspeed fpspeed --nopreenv
--note-preenv --logfile $SPEC/tmp/CPU2017.010/temlogs/preenv.fpspeed.010.0.log --lognum 010.0
--from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /root/cpu2017
```

(Continued on next page)



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## Platform Notes (Continued)

```

6. /proc/cpuinfo
  model name      : Intel(R) Xeon(R) Platinum 8480+
  vendor_id       : GenuineIntel
  cpu family      : 6
  model           : 143
  stepping        : 8
  microcode       : 0x2b0000c0
  bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
  cpu cores       : 56
  siblings        : 56
  2 physical ids (chips)
  112 processors (hardware threads)
  physical id 0: core ids 0-55
  physical id 1: core ids 0-55
  physical id 0: apicids
  0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
  ,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110
  physical id 1: apicids
  128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
  80,182,184,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222,224,226,228,230,23
  2,234,236,238

```

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

### 7. lscpu

From lscpu from util-linux 2.37.2:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          52 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 112
On-line CPU(s) list:   0-111
Vendor ID:              GenuineIntel
Model name:             Intel(R) Xeon(R) Platinum 8480+
CPU family:            6
Model:                  143
Thread(s) per core:    1
Core(s) per socket:    56
Socket(s):              2
Stepping:               8
BogoMIPS:               4000.00
Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                        clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp

```

(Continued on next page)



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## Platform Notes (Continued)

```

lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmpperf tsc_known_freq pni pclmulqdq dtes64 monitor
ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2
smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
arat pln pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid
bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear serialize
tsxldtrk pconfig arch_lbr amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
arch_capabilities

```

Virtualization: VT-x

L1d cache: 5.3 MiB (112 instances)

L1i cache: 3.5 MiB (112 instances)

L2 cache: 224 MiB (112 instances)

L3 cache: 210 MiB (2 instances)

NUMA node(s): 2

NUMA node0 CPU(s): 0-55

NUMA node1 CPU(s): 56-111

Vulnerability Itlb multihit: Not affected

Vulnerability L1tf: Not affected

Vulnerability Mds: Not affected

Vulnerability Meltdown: Not affected

Vulnerability Mmio stale data: Not affected

Vulnerability Retbleed: Not affected

Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp

Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and \_\_user pointer sanitization

Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSE-eIBRS SW sequence

Vulnerability Srbds: Not affected

Vulnerability Tsx async abort: Not affected

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	5.3M	12	Data	1	64	1	64
L1i	32K	3.5M	8	Instruction	1	64	1	64
L2	2M	224M	16	Unified	2	2048	1	64
L3	105M	210M	15	Unified	3	114688	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

(Continued on next page)



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## Platform Notes (Continued)

```

available: 2 nodes (0-1)
node 0 cpus: 0-55
node 0 size: 515572 MB
node 0 free: 514650 MB
node 1 cpus: 56-111
node 1 size: 516076 MB
node 1 free: 510538 MB
node distances:
node  0  1
  0:  10  21
  1:  21  10

```

```

-----
9. /proc/meminfo
   MemTotal:      1056408172 kB

```

```

-----
10. who -r
    run-level 5 Dec 2 23:40

```

```

-----
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.4)
    Default Target  Status
    graphical      running

```

```

-----
12. Services, from systemctl list-unit-files
    STATE          UNIT FILES
    enabled        ModemManager apparmor blk-availability cloud-config cloud-final cloud-init
                    cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                    grub-common irqbalance keyboard-setup lvm2-monitor lxd-agent multipathd
                    networkd-dispatcher open-iscsi open-vm-tools pollinate rpcbind rsyslog secureboot-db
                    setvtrgb snapd ssh systemd-networkd systemd-networkd-wait-online systemd-pstore
                    systemd-resolved systemd-timesyncd thermald tuned ua-reboot-cmds ubuntu-advantage udisks2
                    ufw unattended-upgrades vgauth
    enabled-runtime netplan-ovs-cleanup rc-local systemd-fsck-root systemd-remount-fs
    disabled       console-getty debug-shell grub-initrd-fallback ipmievd iscsid nftables rsync serial-getty@
                    sysstat systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                    systemd-time-wait-sync upower
    generated      apport cpufrequtils loadcpufreq openipmi
    indirect       uidd
    masked         cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot nfs-common rc rcS
                    screen-cleanup sudo x11-common

```

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.15.0-56-generic

```

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## Platform Notes (Continued)

```
root=UUID=3fb9636c-5076-4302-a065-9aacfla50e3
ro
pcie_aspm=off
```

```
-----
14. cpupower frequency-info
analyzing CPU 0:
  Unable to determine current policy
  boost state support:
    Supported: yes
    Active: yes
```

```
-----
15. tuned-adm active
  Current active profile: balanced
```

```
-----
16. sysctl
kernel.numa_balancing          1
kernel.randomize_va_space      2
vm.compaction_proactiveness    20
vm.dirty_background_bytes      0
vm.dirty_background_ratio      10
vm.dirty_bytes                  0
vm.dirty_expire_centisecs      3000
vm.dirty_ratio                  20
vm.dirty_writeback_centisecs    500
vm.dirtytime_expire_seconds    43200
vm.extfrag_threshold            500
vm.min_unmapped_ratio          1
vm.nr_hugepages                 0
vm.nr_hugepages_mempolicy       0
vm.nr_overcommit_hugepages     0
vm.swappiness                    60
vm.watermark_boost_factor      15000
vm.watermark_scale_factor       10
vm.zone_reclaim_mode           0
```

```
-----
17. /sys/kernel/mm/transparent_hugepage
defrag          always defer defer+madvise [madvise] never
enabled         always [madvise] never
hpage_pmd_size 2097152
shmem_enabled   always within_size advise [never] deny force
```

```
-----
18. /sys/kernel/mm/transparent_hugepage/khugepaged
```

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## Platform Notes (Continued)

```

alloc_sleep_millisecs  60000
defrag                  1
max_ptes_none          511
max_ptes_shared        256
max_ptes_swap          64
pages_to_scan          4096
scan_sleep_millisecs  10000

```

### 19. OS release

```

From /etc/*-release /etc/*-version
os-release Ubuntu 22.04.1 LTS

```

### 20. Disk information

SPEC is set to: /root/cpu2017

```

Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/nvme0n1p2 ext4  7.0T  85G  6.5T   2% /

```

### 21. /sys/devices/virtual/dmi/id

```

Vendor:      Quanta Cloud Technology Inc.
Product:     QuantaGrid D54Q-2U

```

### 22. dmidecode

Additional information from dmidecode 3.3 follows. **WARNING:** Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:

```

16x Micron MTC40F2046S1RC48BA1 64 GB 2 rank 4800
16x NO DIMM NO DIMM

```

### 23. BIOS

(This section combines info from /sys/devices and dmidecode.)

```

BIOS Vendor:      American Megatrends International, LLC.
BIOS Version:     3A10
BIOS Date:        11/23/2022
BIOS Revision:    5.29
Firmware Revision: 3.8

```



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## Compiler Version Notes

=====  
C | 619.lbm\_s(base) 638.imagick\_s(base) 644.nab\_s(base)  
-----

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
-----

=====  
C++, C, Fortran | 607.cactuBSSN\_s(base)  
-----

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316  
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
-----

=====  
Fortran | 603.bwaves\_s(base) 649.fotonik3d\_s(base) 654.roms\_s(base)  
-----

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
-----

=====  
Fortran, C | 621.wrf\_s(base) 627.cam4\_s(base) 628.pop2\_s(base)  
-----

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
-----

## Base Compiler Invocation

C benchmarks:  
icx

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## Base Compiler Invocation (Continued)

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Base Portability Flags

```

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

```

## Base Optimization Flags

C benchmarks:

```

-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

```

Fortran benchmarks:

```

-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

```

Benchmarks using both Fortran and C:

```

-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

```

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

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**Quanta Cloud Technology**

(Test Sponsor: Quanta Computer Inc.)

SPECspeed®2017\_fp\_base = 337

**D54Q-2U (Intel Xeon Platinum 8480+, 2.0GHz)**

SPECspeed®2017\_fp\_peak = Not Run

**CPU2017 License:** 9050

**Test Sponsor:** Quanta Computer Inc.

**Tested by:** Quanta Computer Inc.

**Test Date:** Dec-2022

**Hardware Availability:** Nov-2022

**Software Availability:** Nov-2022

## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

The flags files that were used to format this result can be browsed at

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html)

[http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-Eagle\\_Stream-Platform-Settings-V1.1.html](http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-Eagle_Stream-Platform-Settings-V1.1.html)

You can also download the XML flags sources by saving the following links:

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml)

[http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-Eagle\\_Stream-Platform-Settings-V1.1.xml](http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-Eagle_Stream-Platform-Settings-V1.1.xml)

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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