



SPEC CPU®2017 Floating Point Rate Result

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Quanta Cloud Technology

(Test Sponsor: Quanta Computer Inc.)

QuantaGrid D43K-1U

(AMD EPYC 7742 64-Core, 2.25GHz)

SPECrate®2017_fp_base = 530

SPECrate®2017_fp_peak = 582

CPU2017 License: 9050

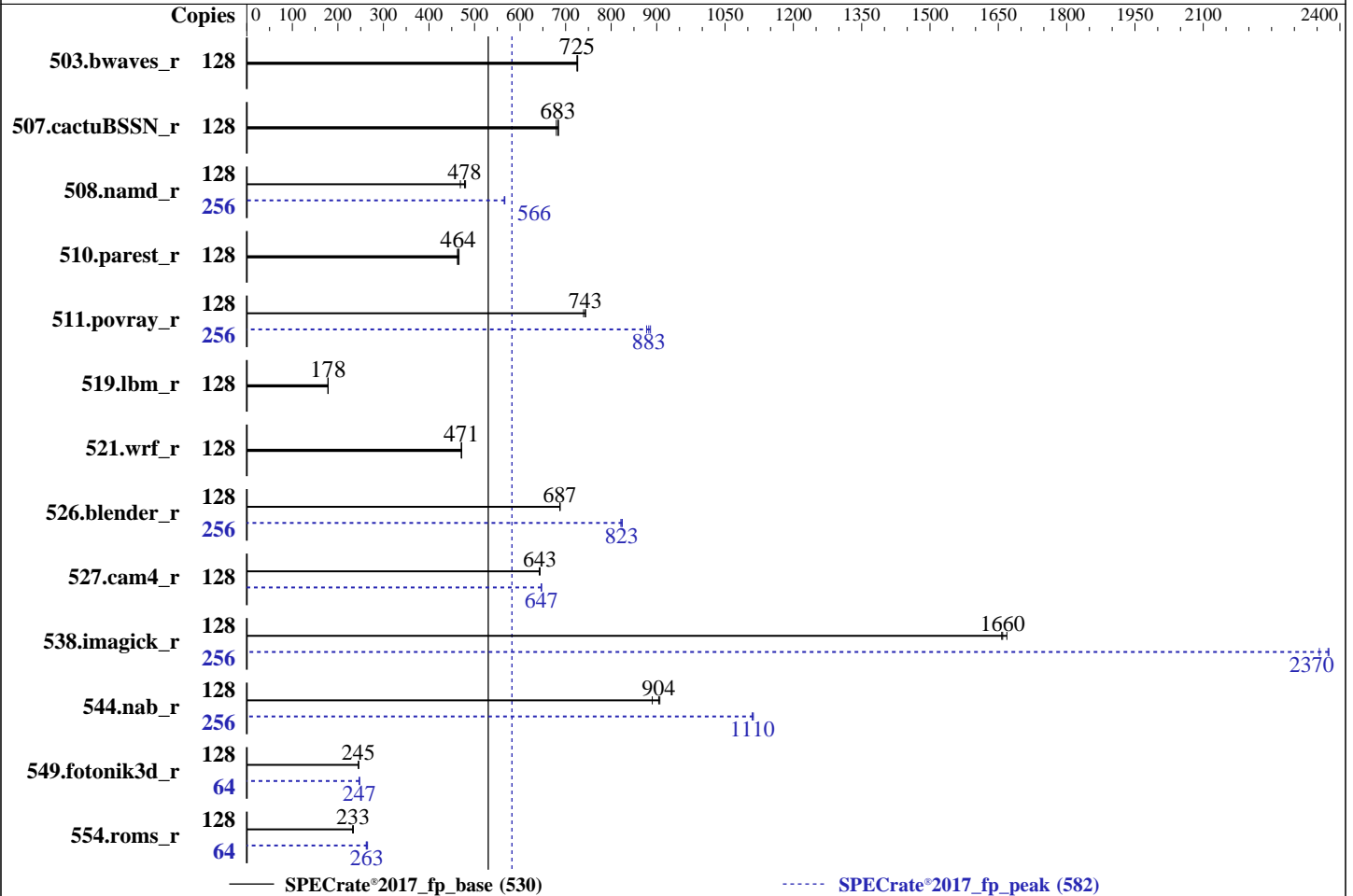
Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Aug-2020

Hardware Availability: Aug-2019

Software Availability: Nov-2019



Hardware

CPU Name: AMD EPYC 7742
 Max MHz: 3400
 Nominal: 2250
 Enabled: 128 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 256 MB I+D on chip per chip, 16 MB shared / 4 cores
 Other: None
 Memory: 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
 Storage: 1 x 512GB SATA M.2 SSD
 Other: None

Software

OS: Red Hat Enterprise Linux 8.1 (Ootpa) kernel 4.18.0-147.el8.x86_64
 Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
 Parallel: No
 Firmware: Version 3A07.09 released Jul-2020
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: jemalloc: jemalloc memory allocator library v5.2.0
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	1770	725	1767	726	<u>1770</u>	<u>725</u>	128	1770	725	1767	726	<u>1770</u>	<u>725</u>
507.cactuBSSN_r	128	<u>237</u>	<u>683</u>	237	684	238	680	128	<u>237</u>	<u>683</u>	237	684	238	680
508.namd_r	128	253	480	259	469	<u>254</u>	<u>478</u>	256	<u>430</u>	<u>566</u>	429	567	430	565
510.parest_r	128	719	466	<u>721</u>	<u>464</u>	724	462	128	719	466	<u>721</u>	<u>464</u>	724	462
511.povray_r	128	402	744	404	739	<u>402</u>	<u>743</u>	256	<u>677</u>	<u>883</u>	681	878	674	886
519.lbm_r	128	<u>756</u>	<u>178</u>	756	178	756	178	128	<u>756</u>	<u>178</u>	756	178	756	178
521.wrf_r	128	608	471	<u>608</u>	<u>471</u>	609	471	128	608	471	<u>608</u>	<u>471</u>	609	471
526.blender_r	128	284	687	283	688	<u>284</u>	<u>687</u>	256	475	821	473	824	<u>474</u>	<u>823</u>
527.cam4_r	128	348	644	349	642	<u>348</u>	<u>643</u>	128	346	646	346	647	<u>346</u>	<u>647</u>
538.imagick_r	128	192	1660	<u>192</u>	<u>1660</u>	191	1670	256	<u>268</u>	<u>2370</u>	270	2350	268	2380
544.nab_r	128	242	890	238	907	<u>238</u>	<u>904</u>	256	387	1110	388	1110	<u>388</u>	<u>1110</u>
549.fotonik3d_r	128	2034	245	2034	245	<u>2034</u>	<u>245</u>	64	1008	247	1009	247	<u>1009</u>	<u>247</u>
554.roms_r	128	876	232	869	234	<u>872</u>	<u>233</u>	64	384	265	388	262	<u>386</u>	<u>263</u>

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

Compiler Notes

The AMD64 AOCC Compiler Suite is available at <http://developer.amd.com/amd-aocc/>

Submit Notes

The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory
sync then drop_caches=3 to reset caches before invoking runcpu

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Operating System Notes (Continued)

dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

Transparent huge pages set to 'always' for this run (OS default)

Environment Variables Notes

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

LD_LIBRARY_PATH =

"/root/SPECCPU/amd_rate_aocc200_rome_C_lib/64;/root/SPECCPU/amd_rate_aocc200_rome_C_lib/32:"

MALLOC_CONF = "retain:true"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

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: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.2.0 is available here:

<https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2>

Platform Notes

BIOS settings:

Pwr and Perf Profile set to Performance

SMT Control is Auto

NUMA nodes per socket is NPS4

ACPI SRAT L3 Cache as NUMA Domain set to enable

cTDP Control is Manual

cTDP set to 240

Package Power Limit Control is Manual

Package Power Limit set to 240

Determinism Control is Manual

Determinism Slider set to Power

Sysinfo program /root/SPECCPU/bin/sysinfo

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Platform Notes (Continued)

Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on localhost.localdomain Sat Aug 1 10:13:19 2020

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
<https://www.spec.org/cpu2017/Docs/config.html#sysinfo>

From /proc/cpuinfo

```
model name : AMD EPYC 7742 64-Core Processor
 2 "physical id"s (chips)
256 "processors"
```

cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

```
cpu cores : 64
siblings  : 128
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59 60 61 62 63
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59 60 61 62 63
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
CPU(s):                 256
On-line CPU(s) list:   0-255
Thread(s) per core:    2
Core(s) per socket:    64
Socket(s):              2
NUMA node(s):          32
Vendor ID:              AuthenticAMD
CPU family:             23
Model:                  49
Model name:             AMD EPYC 7742 64-Core Processor
Stepping:               0
CPU MHz:                3383.311
BogoMIPS:               4491.36
Virtualization:        AMD-V
L1d cache:              32K
L1i cache:              32K
L2 cache:               512K
L3 cache:               16384K
NUMA node0 CPU(s):     0-3,128-131
NUMA node1 CPU(s):     4-7,132-135
NUMA node2 CPU(s):     8-11,136-139
```

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Platform Notes (Continued)

```

NUMA node3 CPU(s): 12-15,140-143
NUMA node4 CPU(s): 16-19,144-147
NUMA node5 CPU(s): 20-23,148-151
NUMA node6 CPU(s): 24-27,152-155
NUMA node7 CPU(s): 28-31,156-159
NUMA node8 CPU(s): 32-35,160-163
NUMA node9 CPU(s): 36-39,164-167
NUMA node10 CPU(s): 40-43,168-171
NUMA node11 CPU(s): 44-47,172-175
NUMA node12 CPU(s): 48-51,176-179
NUMA node13 CPU(s): 52-55,180-183
NUMA node14 CPU(s): 56-59,184-187
NUMA node15 CPU(s): 60-63,188-191
NUMA node16 CPU(s): 64-67,192-195
NUMA node17 CPU(s): 68-71,196-199
NUMA node18 CPU(s): 72-75,200-203
NUMA node19 CPU(s): 76-79,204-207
NUMA node20 CPU(s): 80-83,208-211
NUMA node21 CPU(s): 84-87,212-215
NUMA node22 CPU(s): 88-91,216-219
NUMA node23 CPU(s): 92-95,220-223
NUMA node24 CPU(s): 96-99,224-227
NUMA node25 CPU(s): 100-103,228-231
NUMA node26 CPU(s): 104-107,232-235
NUMA node27 CPU(s): 108-111,236-239
NUMA node28 CPU(s): 112-115,240-243
NUMA node29 CPU(s): 116-119,244-247
NUMA node30 CPU(s): 120-123,248-251
NUMA node31 CPU(s): 124-127,252-255

```

```

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx
f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse
3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
perfctr_llc mwaitx cpb cat_l3 cdp_l3 hw_pstate sme ssbd mba sev ibrs ibpb stibp
vmmcall fsgsbase bmi1 avx2 smep bmi2 cqm rdt_a rdseed adx smap clflushopt clwb
sha_ni xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local clzero irperf xsaveerptr wbnoinvd arat npt lbrv svm_lock nrip_save
tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic
v_omsave_omload vgif umip rdpid overflow_recov succor smca

```

```

/proc/cpuinfo cache data
cache size : 512 KB

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

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Platform Notes (Continued)

```

available: 32 nodes (0-31)
node 0 cpus: 0 1 2 3 128 129 130 131
node 0 size: 31803 MB
node 0 free: 31640 MB
node 1 cpus: 4 5 6 7 132 133 134 135
node 1 size: 32254 MB
node 1 free: 32081 MB
node 2 cpus: 8 9 10 11 136 137 138 139
node 2 size: 32254 MB
node 2 free: 32130 MB
node 3 cpus: 12 13 14 15 140 141 142 143
node 3 size: 32252 MB
node 3 free: 32051 MB
node 4 cpus: 16 17 18 19 144 145 146 147
node 4 size: 32254 MB
node 4 free: 32139 MB
node 5 cpus: 20 21 22 23 148 149 150 151
node 5 size: 32228 MB
node 5 free: 32103 MB
node 6 cpus: 24 25 26 27 152 153 154 155
node 6 size: 32254 MB
node 6 free: 32123 MB
node 7 cpus: 28 29 30 31 156 157 158 159
node 7 size: 32252 MB
node 7 free: 32097 MB
node 8 cpus: 32 33 34 35 160 161 162 163
node 8 size: 32254 MB
node 8 free: 32130 MB
node 9 cpus: 36 37 38 39 164 165 166 167
node 9 size: 32254 MB
node 9 free: 32136 MB
node 10 cpus: 40 41 42 43 168 169 170 171
node 10 size: 32254 MB
node 10 free: 32154 MB
node 11 cpus: 44 45 46 47 172 173 174 175
node 11 size: 32252 MB
node 11 free: 32151 MB
node 12 cpus: 48 49 50 51 176 177 178 179
node 12 size: 32254 MB
node 12 free: 32142 MB
node 13 cpus: 52 53 54 55 180 181 182 183
node 13 size: 32254 MB
node 13 free: 32147 MB
node 14 cpus: 56 57 58 59 184 185 186 187
node 14 size: 32254 MB
node 14 free: 32143 MB
node 15 cpus: 60 61 62 63 188 189 190 191

```

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Platform Notes (Continued)

```

node 15 size: 32240 MB
node 15 free: 32147 MB
node 16 cpus: 64 65 66 67 192 193 194 195
node 16 size: 32254 MB
node 16 free: 32137 MB
node 17 cpus: 68 69 70 71 196 197 198 199
node 17 size: 32254 MB
node 17 free: 32158 MB
node 18 cpus: 72 73 74 75 200 201 202 203
node 18 size: 32254 MB
node 18 free: 32158 MB
node 19 cpus: 76 77 78 79 204 205 206 207
node 19 size: 32252 MB
node 19 free: 32156 MB
node 20 cpus: 80 81 82 83 208 209 210 211
node 20 size: 32254 MB
node 20 free: 32155 MB
node 21 cpus: 84 85 86 87 212 213 214 215
node 21 size: 32254 MB
node 21 free: 32157 MB
node 22 cpus: 88 89 90 91 216 217 218 219
node 22 size: 32254 MB
node 22 free: 32157 MB
node 23 cpus: 92 93 94 95 220 221 222 223
node 23 size: 32252 MB
node 23 free: 32156 MB
node 24 cpus: 96 97 98 99 224 225 226 227
node 24 size: 32254 MB
node 24 free: 32160 MB
node 25 cpus: 100 101 102 103 228 229 230 231
node 25 size: 32254 MB
node 25 free: 32157 MB
node 26 cpus: 104 105 106 107 232 233 234 235
node 26 size: 32254 MB
node 26 free: 32159 MB
node 27 cpus: 108 109 110 111 236 237 238 239
node 27 size: 32252 MB
node 27 free: 32154 MB
node 28 cpus: 112 113 114 115 240 241 242 243
node 28 size: 32254 MB
node 28 free: 32156 MB
node 29 cpus: 116 117 118 119 244 245 246 247
node 29 size: 32254 MB
node 29 free: 32148 MB
node 30 cpus: 120 121 122 123 248 249 250 251
node 30 size: 32254 MB
node 30 free: 32157 MB

```

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Platform Notes (Continued)

node 31 cpus: 124 125 126 127 252 253 254 255

node 31 size: 32250 MB

node 31 free: 32149 MB

node distances:

node	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	10	11	11	11	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
21	11	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
22	11	11	10	11	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
23	11	11	11	10	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
24	11	11	11	11	10	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
25	11	11	11	11	11	10	11	11	11	12	12	12	12	12	12	12	32	32	32	32
26	11	11	11	11	11	11	10	11	11	12	12	12	12	12	12	12	32	32	32	32
27	11	11	11	11	11	11	11	10	11	12	12	12	12	12	12	12	32	32	32	32
28	12	12	12	12	12	12	12	12	10	11	11	11	11	11	11	11	32	32	32	32
29	12	12	12	12	12	12	12	12	11	10	11	11	11	11	11	11	32	32	32	32
30	12	12	12	12	12	12	12	12	11	11	10	11	11	11	11	11	32	32	32	32
31	12	12	12	12	12	12	12	12	11	11	11	10	11	11	11	11	32	32	32	32
0:	10	11	11	11	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
1:	11	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
2:	11	11	10	11	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
3:	11	11	11	10	11	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
4:	11	11	11	11	10	11	11	11	11	12	12	12	12	12	12	12	32	32	32	32
5:	11	11	11	11	11	10	11	11	11	12	12	12	12	12	12	12	32	32	32	32
6:	11	11	11	11	11	11	10	11	11	12	12	12	12	12	12	12	32	32	32	32
7:	11	11	11	11	11	11	11	10	11	12	12	12	12	12	12	12	32	32	32	32
8:	12	12	12	12	12	12	12	12	10	11	11	11	11	11	11	11	32	32	32	32
9:	12	12	12	12	12	12	12	12	11	10	11	11	11	11	11	11	32	32	32	32
10:	12	12	12	12	12	12	12	12	11	11	10	11	11	11	11	11	32	32	32	32
11:	12	12	12	12	12	12	12	12	11	11	11	10	11	11	11	11	32	32	32	32
12:	12	12	12	12	12	12	12	12	11	11	11	11	10	11	11	11	32	32	32	32
13:	12	12	12	12	12	12	12	12	11	11	11	11	11	10	11	11	32	32	32	32
14:	12	12	12	12	12	12	12	12	11	11	11	11	11	11	10	11	32	32	32	32
15:	12	12	12	12	12	12	12	12	11	11	11	11	11	11	10	11	32	32	32	32
16:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	10	11	11	11
17:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	10	11	11
18:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	10	11
19:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	10
20:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	11

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```

10  11  11  11  12  12  12  12  12  12  12  12
21:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11
11  10  11  11  12  12  12  12  12  12  12  12
22:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11
11  11  10  11  12  12  12  12  12  12  12  12
23:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11
11  11  11  10  12  12  12  12  12  12  12  12
24:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  10  11  11  11  11  11  11  11
25:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  11  10  11  11  11  11  11  11
26:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  11  11  10  11  11  11  11  11
27:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  11  11  11  10  11  11  11  11
28:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  11  11  11  11  10  11  11  11
29:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  11  11  11  11  11  10  11  11
30:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  11  11  11  11  11  11  10  11
31:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
12  12  12  12  11  11  11  11  11  11  11  10

```

```

From /proc/meminfo
MemTotal:      1056387024 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.1 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.1"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

```

```

uname -a:
Linux localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux

```

(Continued on next page)



SPEC CPU®2017 Floating Point Rate Result

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Quanta Cloud Technology

(Test Sponsor: Quanta Computer Inc.)

QuantaGrid D43K-1U

(AMD EPYC 7742 64-Core, 2.25GHz)

SPECrate®2017_fp_base = 530

SPECrate®2017_fp_peak = 582

CPU2017 License: 9050

Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Aug-2020

Hardware Availability: Aug-2019

Software Availability: Nov-2019

Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):	Not affected
Microarchitectural Data Sampling:	Not affected
CVE-2017-5754 (Meltdown):	Not affected
CVE-2018-3639 (Speculative Store Bypass):	Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):	Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Aug 1 00:36

SPEC is set to: /root/SPECCPU

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sdb4	xfs	472G	15G	457G	4%	/

From /sys/devices/virtual/dmi/id

BIOS: American Megatrends Inc. 3A07.09 07/08/2020

Vendor: Quanta Cloud Technology Inc.

Product: QuantaGrid D43K-1U

Additional information from dmidecode 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:

32x SK Hynix HMA84GR7CJR4N-XN 32 GB 2 rank 3200

(End of data from sysinfo program)

Compiler Version Notes

```

=====
C          | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
          | 544.nab_r(base, peak)
-----
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----

```

(Continued on next page)



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Tested by: Quanta Computer Inc.

Test Date: Aug-2020

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Compiler Version Notes (Continued)

=====
C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

=====
C++, C | 511.povray_r(base, peak) 526.blender_r(base, peak)

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

=====
C++, C, Fortran | 507.cactuBSSN_r(base, peak)

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

=====
Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)

(Continued on next page)



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CPU2017 License: 9050

Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Aug-2020

Hardware Availability: Aug-2019

Software Availability: Nov-2019

Compiler Version Notes (Continued)

| 554.roms_r(base, peak)

```

-----
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----

```

=====
Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(base, peak)

```

-----
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----

```

Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang



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Tested by: Quanta Computer Inc.

Test Date: Aug-2020

Hardware Availability: Aug-2019

Software Availability: Nov-2019

Base Portability Flags

```

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -D__BOOL_DEFINED -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

```

Base Optimization Flags

C benchmarks:

```

-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-freemap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -lmvec -lamdlibm -ljemalloc
-lflang

```

C++ benchmarks:

```

-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-partial-unswitch -z muldefs -lmvec -lamdlibm
-ljemalloc -lflang

```

Fortran benchmarks:

```

-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang

```

(Continued on next page)



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SPECrate®2017_fp_base = 530

SPECrate®2017_fp_peak = 582

CPU2017 License: 9050

Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Aug-2020

Hardware Availability: Aug-2019

Software Availability: Nov-2019

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -funroll-loops -Mrecursive -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using both C and C++:

```
-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch -z muldefs
-lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using Fortran, C, and C++:

```
-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only
-lmvec -lamdlibm -ljemalloc -lflang
```

Peak Compiler Invocation

C benchmarks:
clang

(Continued on next page)



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QuantaGrid D43K-1U

(AMD EPYC 7742 64-Core, 2.25GHz)

SPECrate®2017_fp_base = 530

SPECrate®2017_fp_peak = 582

CPU2017 License: 9050

Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Aug-2020

Hardware Availability: Aug-2019

Software Availability: Nov-2019

Peak Compiler Invocation (Continued)

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -lmvec -lamdlibm -ljemalloc
-lflang

544.nab_r: Same as 538.imagick_r

(Continued on next page)



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QuantaGrid D43K-1U

(AMD EPYC 7742 64-Core, 2.25GHz)

SPECrate®2017_fp_base = 530

SPECrate®2017_fp_peak = 582

CPU2017 License: 9050

Test Sponsor: Quanta Computer Inc.

Tested by: Quanta Computer Inc.

Test Date: Aug-2020

Hardware Availability: Aug-2019

Software Availability: Nov-2019

Peak Optimization Flags (Continued)

C++ benchmarks:

```
508.namd_r: -std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -lmvec -lamdlibm -ljemalloc
-lflang
```

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: basepeak = yes

```
549.fotonik3d_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3
-march=znver2 -funroll-loops -Mrecursive
-mllvm -vector-library=LIBMVEC -Kieee
-fno-finite-math-only -lmvec -lamdlibm -ljemalloc
-lflang
```

```
554.roms_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc
-lflang
```

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

```
527.cam4_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
```

(Continued on next page)



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Software Availability: Nov-2019

Peak Optimization Flags (Continued)

527.cam4_r (continued):

```

-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -O3 -funroll-loops
-Mrecursive -Kieee -fno-finite-math-only -lmvec
-lamdlibm -ljemalloc -lflang

```

Benchmarks using both C and C++:

511.povray_r: -std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize

```

-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000 -lmvec -lamdlibm
-ljemalloc -lflang

```

526.blender_r: -std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize

```

-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000 -lmvec -lamdlibm
-ljemalloc -lflang

```

(Continued on next page)



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SPECrate®2017_fp_peak = 582

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Software Availability: Nov-2019

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

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

<http://www.spec.org/cpu2017/flags/aocc200-flags-C4.html>

http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-amd-speccpu-setting-v5_AMD_ROME.html

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

<http://www.spec.org/cpu2017/flags/aocc200-flags-C4.xml>

http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-amd-speccpu-setting-v5_AMD_ROME.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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