SPEC CPU®2017 Floating Point Rate Result

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Quanta Cloud Technology
(Test Sponsor: Quanta Computer Inc.)

QuantaGrid D44N-1U
(2.40 GHz,AMD EPYC 9654)

$SPECrate®2017\_fp\_base =$ 1400
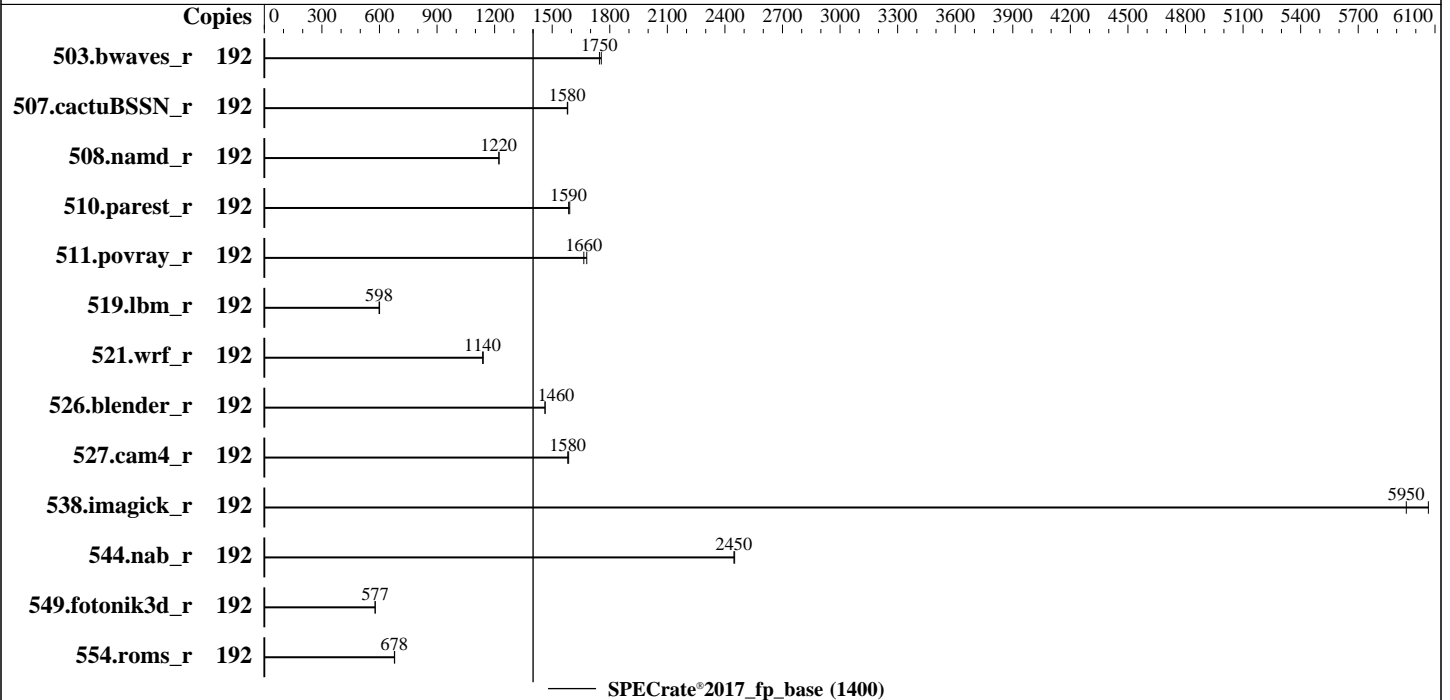
$SPECrate®2017\_fp\_peak =$ Not Run

CPU2017 License: 9050	**Test Date:** Oct-2023
Test Sponsor: Quanta Computer Inc.	**Hardware Availability:** Nov-2023
Tested by: Quanta Computer Inc.	**Software Availability:** Sep-2023

Copies

Benchmark	Copies	Value
503.bwaves_r	192	1750
507.cactuBSSN_r	192	1580
508.namd_r	192	1220
510.parest_r	192	1590
511.povray_r	192	1660
519.lbm_r	192	598
521.wrf_r	192	1140
526.blender_r	192	1460
527.cam4_r	192	1580
538.imagick_r	192	5950
544.nab_r	192	2450
549.fotonik3d_r	192	577
554.roms_r	192	678

SPECrate®2017_fp_base (1400)

Hardware

CPU Name: AMD EPYC 9654
 Max MHz: 3700
 Nominal: 2400
Enabled: 192 cores, 2 chips
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 384 MB I+D on chip per chip,
  32 MB shared / 8 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 3.84 TB NVMe SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
  Kernel 5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Version 3A02 released Sep-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage

Page 1 Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/

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Results Table

Benchmark	Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
503.bwaves_r	192	**1103**	**1750**	1097	1760									
507.cactuBSSN_r	192	**154**	**1580**	154	1580									
508.namd_r	192	**149**	**1220**	149	1220									
510.parest_r	192	316	1590	**317**	**1590**									
511.povray_r	192	**269**	**1660**	267	1680									
519.lbm_r	192	**338**	**598**	337	601									
521.wrf_r	192	377	1140	**378**	**1140**									
526.blender_r	192	**200**	**1460**	200	1460									
527.cam4_r	192	212	1590	**212**	**1580**									
538.imagick_r	192	**80.2**	**5950**	78.7	6070									
544.nab_r	192	**132**	**2450**	132	2450									
549.fotonik3d_r	192	**1296**	**577**	1296	578									
554.roms_r	192	449	679	**450**	**678**									

SPECrate®2017_fp_base =   1400

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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 limit
'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>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,
```

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Operating System Notes (Continued)

```
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/root/speccpu/amd_rate_aocc400_znver4_A_lib/lib:/root/speccpu/amd_rate_aocc400_znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

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.
```

Platform Notes

```
BIOS Configuration
 ACPI CST C2 Latency set to 18
 SMT set to disable
 Determinism Control is Manual
 Determinism Slider set to Power
 cTDP Control set to Manual
 cTDP set to 400
 PPT Control set to Manual
 PPT set to 400
 ACPI SRAT L3 Cache As NUMA Domain set to enable

 Sysinfo program /root/speccpu/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Oct 12 07:42:31 2023

 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+suse.124.g2bc0b2c447)
```

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Platform Notes (Continued)

```
 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
 ------------------------------------------------------------

 ------------------------------------------------------------
 1. uname -a
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222/lp)
   x86_64 x86_64 x86_64 GNU/Linux

 ------------------------------------------------------------
 2. w
    07:42:31 up  2:53,  1 user,  load average: 110.81, 169.48, 182.19
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                04:50    2:53m  1.50s  0.06s /bin/bash ./amd_rate_aocc400_znver4_A1.sh

 ------------------------------------------------------------
 3. Username
   From environment variable $USER:  root

 ------------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 6189287
   max locked memory       (kbytes, -l) 2097152
   max memory size         (kbytes, -m) unlimited
   open files                      (-n) 1024000
   pipe size            (512 bytes, -p) 8
   POSIX message queues     (bytes, -q) 819200
   real-time priority              (-r) 0
   stack size              (kbytes, -s) unlimited
   cpu time               (seconds, -t) unlimited
   max user processes              (-u) 6189287
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

 ------------------------------------------------------------
 5. sysinfo process ancestry
  /usr/lib/systemd/systemd --switched-root --system --deserialize 30
  login -- root
  -bash
  /bin/bash ./test.sh
  python3 ./run_amd_rate_aocc400_znver4_A1.py
  /bin/bash ./amd_rate_aocc400_znver4_A1.sh
  runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 2 fprate
  runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 2 --nopower
    --runmode rate --tune base --size test:train:refrate fprate --nopreenv --note-preenv --logfile
    $SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
```

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Platform Notes (Continued)

```
 specperl $SPEC/bin/sysinfo
$SPEC = /root/speccpu


 ------------------------------------------------------------
6. /proc/cpuinfo
   model name      : AMD EPYC 9654 96-Core Processor
   vendor_id       : AuthenticAMD
   cpu family      : 25
   model           : 17
   stepping        : 1
   microcode       : 0xa10113e
   bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
   TLB size        : 3584 4K pages
   cpu cores       : 96
   siblings        : 96
   2 physical ids (chips)
   192 processors (hardware threads)
   physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
   physical id 1: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
   physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
   physical id 1: apicids
   256-263,272-279,288-295,304-311,320-327,336-343,352-359,368-375,384-391,400-407,416-423,432-439
 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:          46 bits physical, 57 bits virtual
  Byte Order:             Little Endian
  CPU(s):                 192
  On-line CPU(s) list:    0-191
  Vendor ID:              AuthenticAMD
  Model name:             AMD EPYC 9654 96-Core Processor
  CPU family:             25
  Model:                  17
  Thread(s) per core:     1
  Core(s) per socket:     96
  Socket(s):              2
  Stepping:               1
  Frequency boost:        enabled
  CPU max MHz:            3707.8120
  CPU min MHz:            1500.0000
  BogoMIPS:               4792.47
  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 nonstop_tsc cpuid extd_apicid aperfmperf rapl
                          pni pclmulqdq monitor ssse3 fma cx16 pcid 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
                          invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1
                          avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                          avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
                          xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                          avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
                          svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
```

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Platform Notes (Continued)

```
                          pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
                          umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                          avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d sme
                          sev sev_es
  Virtualization:         AMD-V
  L1d cache:              6 MiB (192 instances)
  L1i cache:              6 MiB (192 instances)
  L2 cache:               192 MiB (192 instances)
  L3 cache:               768 MiB (24 instances)
  NUMA node(s):           24
  NUMA node0 CPU(s):      0-7
  NUMA node1 CPU(s):      8-15
  NUMA node2 CPU(s):      16-23
  NUMA node3 CPU(s):      24-31
  NUMA node4 CPU(s):      32-39
  NUMA node5 CPU(s):      40-47
  NUMA node6 CPU(s):      48-55
  NUMA node7 CPU(s):      56-63
  NUMA node8 CPU(s):      64-71
  NUMA node9 CPU(s):      72-79
  NUMA node10 CPU(s):     80-87
  NUMA node11 CPU(s):     88-95
  NUMA node12 CPU(s):     96-103
  NUMA node13 CPU(s):     104-111
  NUMA node14 CPU(s):     112-119
  NUMA node15 CPU(s):     120-127
  NUMA node16 CPU(s):     128-135
  NUMA node17 CPU(s):     136-143
  NUMA node18 CPU(s):     144-151
  NUMA node19 CPU(s):     152-159
  NUMA node20 CPU(s):     160-167
  NUMA node21 CPU(s):     168-175
  NUMA node22 CPU(s):     176-183
  NUMA node23 CPU(s):     184-191
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:       Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB
                                  filling
  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      32K       6M   8 Data             1    64        1            64
    L1i      32K       6M   8 Instruction      1    64        1            64
    L2        1M     192M   8 Unified          2  2048        1            64
    L3       32M     768M  16 Unified          3 32768        1            64

  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 24 nodes (0-23)
    node 0 cpus: 0-7
    node 0 size: 64038 MB
    node 0 free: 62396 MB
    node 1 cpus: 8-15
```

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Platform Notes (Continued)

```
    node 1 size: 64509 MB
    node 1 free: 64121 MB
    node 2 cpus: 16-23
    node 2 size: 64509 MB
    node 2 free: 63937 MB
    node 3 cpus: 24-31
    node 3 size: 64509 MB
    node 3 free: 64093 MB
    node 4 cpus: 32-39
    node 4 size: 64509 MB
    node 4 free: 63855 MB
    node 5 cpus: 40-47
    node 5 size: 64509 MB
    node 5 free: 64095 MB
    node 6 cpus: 48-55
    node 6 size: 64509 MB
    node 6 free: 64126 MB
    node 7 cpus: 56-63
    node 7 size: 64509 MB
    node 7 free: 64150 MB
    node 8 cpus: 64-71
    node 8 size: 64509 MB
    node 8 free: 64144 MB
    node 9 cpus: 72-79
    node 9 size: 64509 MB
    node 9 free: 64106 MB
    node 10 cpus: 80-87
    node 10 size: 64475 MB
    node 10 free: 64105 MB
    node 11 cpus: 88-95
    node 11 size: 64509 MB
    node 11 free: 64128 MB
    node 12 cpus: 96-103
    node 12 size: 64509 MB
    node 12 free: 64125 MB
    node 13 cpus: 104-111
    node 13 size: 64509 MB
    node 13 free: 64129 MB
    node 14 cpus: 112-119
    node 14 size: 64509 MB
    node 14 free: 64134 MB
    node 15 cpus: 120-127
    node 15 size: 64509 MB
    node 15 free: 64134 MB
    node 16 cpus: 128-135
    node 16 size: 64509 MB
    node 16 free: 64127 MB
    node 17 cpus: 136-143
    node 17 size: 64509 MB
    node 17 free: 64136 MB
    node 18 cpus: 144-151
    node 18 size: 64509 MB
    node 18 free: 64134 MB
    node 19 cpus: 152-159
    node 19 size: 64509 MB
    node 19 free: 64136 MB
    node 20 cpus: 160-167
    node 20 size: 64509 MB
    node 20 free: 64136 MB
    node 21 cpus: 168-175
```

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Platform Notes (Continued)

```
   node 21 size: 64509 MB
   node 21 free: 64136 MB
   node 22 cpus: 176-183
   node 22 size: 64509 MB
   node 22 free: 64136 MB
   node 23 cpus: 184-191
   node 23 size: 64125 MB
   node 23 free: 63761 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  21  22  23
     0:  10  11  11  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     1:  11  10  11  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     2:  11  11  10  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     3:  12  12  12  10  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     4:  12  12  12  11  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     5:  12  12  12  11  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     6:  12  12  12  12  12  12  10  11  11  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     7:  12  12  12  12  12  12  11  10  11  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     8:  12  12  12  12  12  12  11  11  10  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
     9:  12  12  12  12  12  12  12  12  12  10  11  11  32  32  32  32  32  32  32  32  32  32  32  32
    10:  12  12  12  12  12  12  12  12  12  11  10  11  32  32  32  32  32  32  32  32  32  32  32  32
    11:  12  12  12  12  12  12  12  12  12  11  11  10  32  32  32  32  32  32  32  32  32  32  32  32
    12:  32  32  32  32  32  32  32  32  32  32  32  32  10  11  11  12  12  12  12  12  12  12  12  12
    13:  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  12  12  12  12  12  12  12  12  12
    14:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  12  12  12  12  12  12  12  12  12
    15:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  10  11  11  12  12  12  12  12  12
    16:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  10  11  12  12  12  12  12  12
    17:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  11  10  12  12  12  12  12  12
    18:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11  11  12  12  12
    19:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10  11  12  12  12
    20:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11  10  12  12  12
    21:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  10  11  11
    22:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  11  10  11
    23:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  11  11  10

    -------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       1584482276 kB


    -------------------------------------------------------------
  10. who -r
     run-level 3 Oct 12 04:50


    -------------------------------------------------------------
  11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
     Default Target  Status
     multi-user      running


    -------------------------------------------------------------
  12. Services, from systemctl list-unit-files
     STATE             UNIT FILES
     enabled           YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged
                       irqbalance issue-generator kbdsettings kdump kdump-early klog lvm2-monitor nscd
                       nvmefc-boot-connections postfix purge-kernels rollback rsyslog smartd sshd wicked
                       wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
     enabled-runtime   systemd-remount-fs
     disabled          autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                       chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                       firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                       issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap
```

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SPEC CPU®2017 Floating Point Rate Result

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Quanta Cloud Technology

(Test Sponsor: Quanta Computer Inc.)

QuantaGrid D44N-1U
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_base =   1400

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9050

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Platform Notes (Continued)

```
                    nvmf-autoconnect rdisc rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts
                    snmpd snmptrapd systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                    systemd-time-wait-sync systemd-timesyncd tuned udisks2
    indirect        wickedd


  ----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=bf0d00d4-f1bc-4aa3-92ff-ff6ee387ef92
    mitigations=auto
    quiet
    security=apparmor
    crashkernel=290M,high
    crashkernel=72M,low


  ----------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 1.50 GHz and 2.40 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes


  ----------------------------------------------------------
  15. tuned-adm active
    Current active profile: latency-performance


  ----------------------------------------------------------
  16. sysctl
    kernel.numa_balancing            1
    kernel.randomize_va_space        0
    vm.compaction_proactiveness      20
    vm.dirty_background_bytes        0
    vm.dirty_background_ratio        3
    vm.dirty_bytes                   0
    vm.dirty_expire_centisecs        3000
    vm.dirty_ratio                   8
    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                    1
    vm.watermark_boost_factor        15000
    vm.watermark_scale_factor        10
    vm.zone_reclaim_mode             1


  ----------------------------------------------------------
  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 SUSE Linux Enterprise High Performance Computing 15 SP4

  -----------------------------------------------------------
  20. Disk information
  SPEC is set to: /root/speccpu
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p3 xfs   2.1T   94G  2.0T   5% /

  -----------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
    Vendor:         Quanta Cloud Technology Inc.
    Product:        QuantaGrid D44N-1U
    Product Family: S6N

  -----------------------------------------------------------
  22. dmidecode
    Additional information from dmidecode 3.2 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:
      24x Micron Technology MTC36F2046S1PC48BA1 64 GB 2 rank 4800


  -----------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:      American Megatrends International, LLC.
    BIOS Version:     3A02
    BIOS Date:        09/21/2023
    BIOS Revision:    5.27
    Firmware Revision: 3.24
```

Compiler Version Notes

```
==================================================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------------------------


==================================================================================================
C++             | 508.namd_r(base) 510.parest_r(base)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
```

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Test Date: Oct-2023

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Software Availability: Sep-2023

Compiler Version Notes (Continued)

```
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------------


==================================================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------------


==================================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------------


==================================================================================================
Fortran         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------------


==================================================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------------
```

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SPECrate®2017_fp_base =   1400

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9050

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Test Date: Oct-2023

Hardware Availability: Nov-2023

Software Availability: Sep-2023

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
```

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 -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:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
```

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Quanta Cloud Technology
(Test Sponsor: Quanta Computer Inc.)

SPECrate®2017_fp_base =   1400

QuantaGrid D44N-1U
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9050		**Test Date:**	Oct-2023
Test Sponsor:	Quanta Computer Inc.	**Hardware Availability:**	Nov-2023
Tested by:	Quanta Computer Inc.	**Software Availability:**	Sep-2023

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -lflang
```

C++ benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang
```

Fortran benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang
```

Benchmarks using both Fortran and C:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Benchmarks using both C and C++:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
```

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CPU2017 License: 9050	**Test Date:** Oct-2023
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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
```
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Base Other Flags

C benchmarks:
```
-Wno-unused-command-line-argument
```

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

Fortran benchmarks:
```
-Wno-unused-command-line-argument
```

Benchmarks using both Fortran and C:
```
-Wno-unused-command-line-argument
```

Benchmarks using both C and C++:
```
-Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:
```
-Wno-unused-command-line-argument
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/aocc400-flags-A1.2.html
http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-amd-speccpu-setting-v1.1_AMD_Genoa.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/aocc400-flags-A1.2.xml
http://www.spec.org/cpu2017/flags/Quanta-Computer-Inc-amd-speccpu-setting-v1.1_AMD_Genoa.xml

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

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