SPEC CPU®2017 Integer Speed Result

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

QuantaGrid D44N-1U
(2.25 GHz,AMD EPYC 9754)

$SPECspeed®2017\_int\_base = 11.3$

$SPECspeed®2017\_int\_peak = Not\ Run$
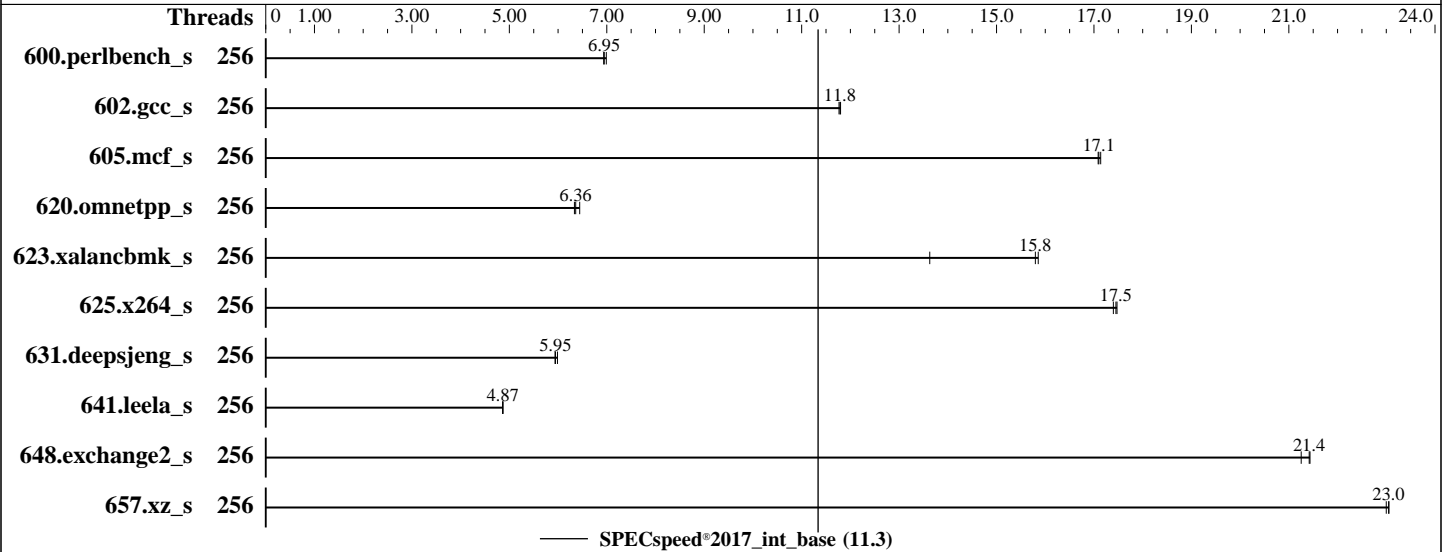
CPU2017 License: 9050
Test Sponsor: Quanta Computer Inc.
Tested by: Quanta Computer Inc.

Test Date: Dec-2023
Hardware Availability: Nov-2023
Software Availability: Nov-2022

Benchmark	Threads	Result
600.perlbench_s	256	6.95
602.gcc_s	256	11.8
605.mcf_s	256	17.1
620.omnetpp_s	256	6.36
623.xalancbmk_s	256	15.8
625.x264_s	256	17.5
631.deepsjeng_s	256	5.95
641.leela_s	256	4.87
648.exchange2_s	256	21.4
657.xz_s	256	23.0

SPECspeed®2017_int_base (11.3)

Hardware

CPU Name: AMD EPYC 9754
Max MHz: 3100
Nominal: 2250
Enabled: 256 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: 256 MB I+D on chip per chip,
16 MB shared / 8 cores
Other: None
Memory: 768 GB (24 x 32 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: Yes
Firmware: Version 3A05 released Oct-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
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
600.perlbench_s	256	256	6.94	254	6.99	**255**	**6.95**							
602.gcc_s	256	338	11.8	**338**	**11.8**	338	11.8							
605.mcf_s	256	**276**	**17.1**	275	17.1	276	17.1							
620.omnetpp_s	256	257	6.34	253	6.44	**256**	**6.36**							
623.xalancbmk_s	256	104	13.6	89.4	15.9	**89.7**	**15.8**							
625.x264_s	256	101	17.4	**101**	**17.5**	101	17.5							
631.deepsjeng_s	256	239	5.99	241	5.94	**241**	**5.95**							
641.leela_s	256	**351**	**4.87**	351	4.86	350	4.87							
648.exchange2_s	256	137	21.4	138	21.3	**137**	**21.4**							
657.xz_s	256	268	23.1	**268**	**23.0**	269	23.0							

SPECspeed®2017_int_base =	**11.3**
SPECspeed®2017_int_peak =	**Not Run**

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

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

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-255"
LD_LIBRARY_PATH = "/root/cpu2017/amd_speed_aocc400_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "256"
```

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
 NUMA nodes per socket set to NPS4
 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
 SMT set to disable

 Sysinfo program /root/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Fri Dec  8 08:54:13 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)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
```

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Platform Notes (Continued)

```
   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
      08:54:13 up 1 min,  1 user,  load average: 0.50, 0.15, 0.05
     USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
     root     tty1     -                08:53    1:01   1.37s  0.04s /bin/bash ./amd_speed_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) 3092499
     max locked memory       (kbytes, -l) 2097152
     max memory size         (kbytes, -m) unlimited
     open files                      (-n) 1024
     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) 3092499
     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_speed_aocc400_znver4_A1.py
    /bin/bash ./amd_speed_aocc400_znver4_A1.sh
    runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 intspeed
    runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 --nopower
      --runmode speed --tune base --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.001/templogs/preenv.intspeed.001.0.log --lognum 001.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
    $SPEC = /root/cpu2017
```

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Platform Notes (Continued)

```
        ----------------------------------------------------------
        6. /proc/cpuinfo
           model name        : AMD EPYC 9754 128-Core Processor
           vendor_id         : AuthenticAMD
           cpu family        : 25
           model             : 160
           stepping          : 1
           microcode         : 0xaa00116
           bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
           TLB size          : 3584 4K pages
           cpu cores         : 128
           siblings          : 128
           2 physical ids (chips)
           256 processors (hardware threads)
           physical id 0: core ids
           0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183,192-199,208-215,224-231,
           240-247
           physical id 1: core ids
           0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183,192-199,208-215,224-231,
           240-247
           physical id 0: apicids
           0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183,192-199,208-215,224-231,
           240-247
           physical id 1: apicids
           256-263,272-279,288-295,304-311,320-327,336-343,352-359,368-375,384-391,400-407,416-423,432-439,448-455,4
           64-471,480-487,496-503
         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):                  256
         On-line CPU(s) list:     0-255
         Vendor ID:               AuthenticAMD
         Model name:              AMD EPYC 9754 128-Core Processor
         CPU family:              25
         Model:                   160
         Thread(s) per core:      1
         Core(s) per socket:      128
         Socket(s):               2
         Stepping:                1
         Frequency boost:         enabled
         CPU max MHz:             3100.3411
         CPU min MHz:             1500.0000
         BogoMIPS:                4493.15
         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
```

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Platform Notes (Continued)

```
                        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
                        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:            8 MiB (256 instances)
  L1i cache:            8 MiB (256 instances)
  L2 cache:             256 MiB (256 instances)
  L3 cache:             512 MiB (32 instances)
  NUMA node(s):         8
  NUMA node0 CPU(s):    0-31
  NUMA node1 CPU(s):    32-63
  NUMA node2 CPU(s):    64-95
  NUMA node3 CPU(s):    96-127
  NUMA node4 CPU(s):    128-159
  NUMA node5 CPU(s):    160-191
  NUMA node6 CPU(s):    192-223
  NUMA node7 CPU(s):    224-255
  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       8M    8 Data            1    64        1             64
      L1i       32K       8M    8 Instruction     1    64        1             64
      L2         1M     256M    8 Unified         2  2048        1             64
      L3        16M     512M   16 Unified         3 16384        1             64

  -------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0-31
    node 0 size: 96290 MB
    node 0 free: 95257 MB
    node 1 cpus: 32-63
    node 1 size: 96759 MB
    node 1 free: 96051 MB
    node 2 cpus: 64-95
    node 2 size: 96759 MB
    node 2 free: 96477 MB
    node 3 cpus: 96-127
    node 3 size: 96759 MB
    node 3 free: 96479 MB
    node 4 cpus: 128-159
    node 4 size: 96759 MB
    node 4 free: 96491 MB
    node 5 cpus: 160-191
```

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Platform Notes (Continued)

```
   node 5 size: 96725 MB
   node 5 free: 96452 MB
   node 6 cpus: 192-223
   node 6 size: 96759 MB
   node 6 free: 96120 MB
   node 7 cpus: 224-255
   node 7 size: 96333 MB
   node 7 free: 96033 MB
   node distances:
   node   0    1    2    3    4    5    6    7
     0:  10   12   12   12   32   32   32   32
     1:  12   10   12   12   32   32   32   32
     2:  12   12   10   12   32   32   32   32
     3:  12   12   12   10   32   32   32   32
     4:  32   32   32   32   10   12   12   12
     5:  32   32   32   32   12   10   12   12
     6:  32   32   32   32   12   12   10   12
     7:  32   32   32   32   12   12   12   10


  ---------------------------------------------------------
9. /proc/meminfo
   MemTotal:       791704568 kB


  ---------------------------------------------------------
10. who -r
   run-level 3 Dec 8 08:53


  ---------------------------------------------------------
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 getty@ haveged irqbalance
                    issue-generator kbdsettings 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 display-manager ebtables
                    exchange-bmc-os-info firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi
                    ipmievd issue-add-ssh-keys kdump kdump-early kexec-load lunmask man-db-create multipathd
                    nfs nfs-blkmap 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
```

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Platform Notes (Continued)

```
        ----------------------------------------------------------
        14. cpupower frequency-info
          analyzing CPU 0:
            current policy: frequency should be within 1.50 GHz and 2.25 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
          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
```

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Platform Notes (Continued)

```
  SPEC is set to: /root/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p3 xfs   2.1T   47G  2.0T   3% /

    --------------------------------------------------------------
  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 SK Hynix HMCG88MEBRA113N 32 GB 2 rank 4800


    --------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:      American Megatrends International, LLC.
      BIOS Version:     3A05
      BIOS Date:        10/27/2023
      BIOS Revision:    5.27
      Firmware Revision: 3.29
```

Compiler Version Notes

```
==================================================================================================
C     | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(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++   | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(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 | 648.exchange2_s(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
--------------------------------------------------------------------------------------------------
```

SPEC CPU®2017 Integer Speed Result
Copyright 2017-2024 Standard Performance Evaluation Corporation

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

QuantaGrid D44N-1U
(2.25 GHz,AMD EPYC 9754)

SPECspeed®2017_int_base = 11.3

SPECspeed®2017_int_peak = Not Run

CPU2017 License: 9050	**Test Date:**	Dec-2023
Test Sponsor: Quanta Computer Inc.	**Hardware Availability:**	Nov-2023
Tested by: Quanta Computer Inc.	**Software Availability:**	Nov-2022

Base Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Base Portability Flags

600.perlbench_s: `-DSPEC_LINUX_X64 -DSPEC_LP64`
602.gcc_s: `-DSPEC_LP64`
605.mcf_s: `-DSPEC_LP64`
620.omnetpp_s: `-DSPEC_LP64`
623.xalancbmk_s: `-DSPEC_LINUX -DSPEC_LP64`
625.x264_s: `-DSPEC_LP64`
631.deepsjeng_s: `-DSPEC_LP64`
641.leela_s: `-DSPEC_LP64`
648.exchange2_s: `-DSPEC_LP64`
657.xz_s: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lflang
-lamdalloc
```

C++ benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fvirtual-function-elimination -fvisibility=hidden -fopenmp=libomp
```

(Continued on next page)

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

SPEC CPU®2017 Integer Speed Result

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Quanta Cloud Technology
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CPU2017 License: 9050	**Test Date:** Dec-2023
Test Sponsor: Quanta Computer Inc.	**Hardware Availability:** Nov-2023
Tested by: Quanta Computer Inc.	**Software Availability:** Nov-2022

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-lomp -lamdlibm -lflang -lamdalloc-ext
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc
```

Base Other Flags

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

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

Fortran benchmarks:
```
-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_AMD_Bergamo.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_AMD_Bergamo.xml

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