SPEC CPU®2017 Integer Speed Result

Supermicro

CloudDC A+ Server AS -2015CS-TNR
(H13SSW , AMD EPYC 9684X)

$SPECspeed^{®}2017\_int\_base = 14.1$
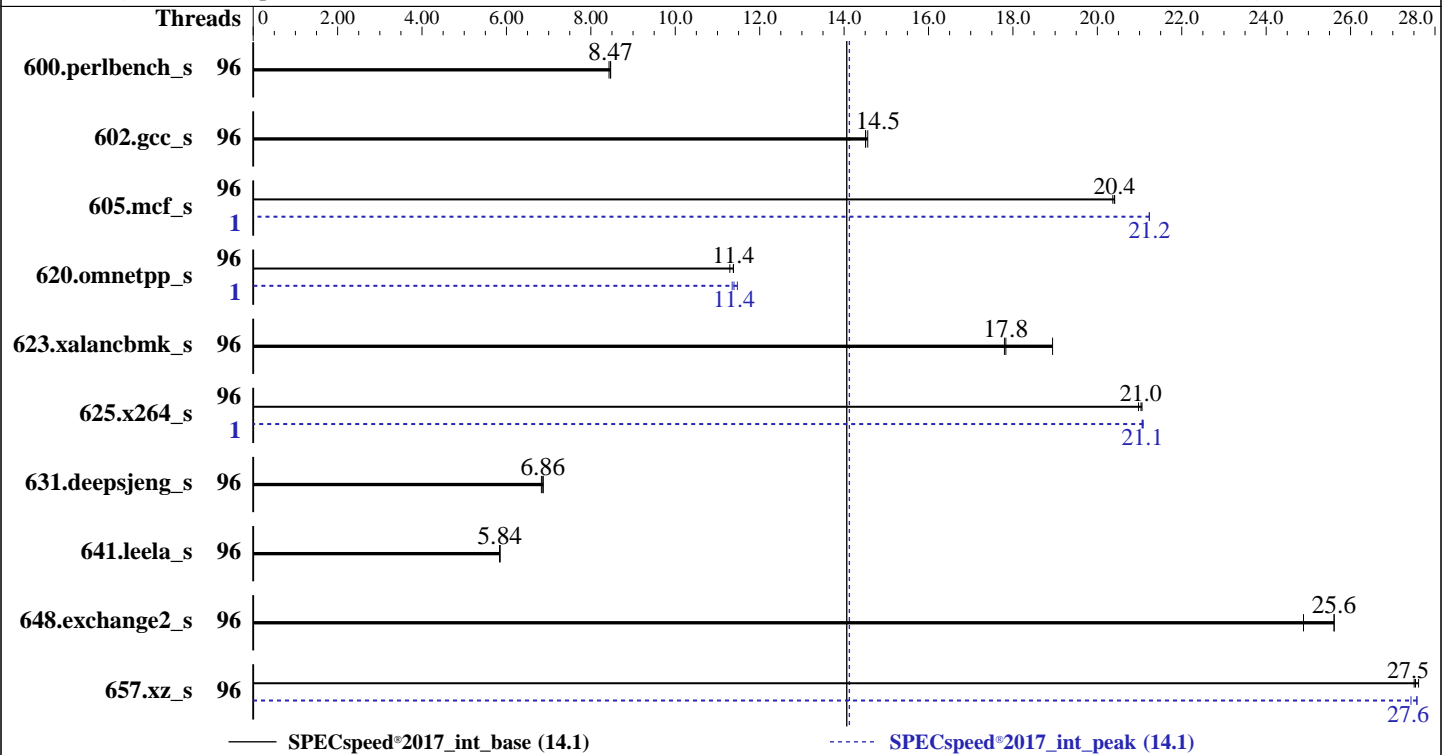
$SPECspeed^{®}2017\_int\_peak = 14.1$

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Aug-2023
Hardware Availability: Jun-2023
Software Availability: Jul-2023

Threads		
600.perlbench_s	96	8.47
602.gcc_s	96	14.5
605.mcf_s	96 / 1	20.4 / 21.2
620.omnetpp_s	96 / 1	11.4 / 11.4
623.xalancbmk_s	96	17.8
625.x264_s	96 / 1	21.0 / 21.1
631.deepsjeng_s	96	6.86
641.leela_s	96	5.84
648.exchange2_s	96	25.6
657.xz_s	96	27.5 / 27.6

SPECspeed®2017_int_base (14.1)   SPECspeed®2017_int_peak (14.1)

Hardware

CPU Name: AMD EPYC 9684X
  Max MHz: 3700
  Nominal: 2550
Enabled: 96 cores, 1 chip
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
  L2: 1 MB I+D on chip per core
  L3: 1152 MB I+D on chip per chip, 96 MB shared / 8
    cores
  Other: None
Memory: 768 GB (12 x 64 GB 2Rx4 PC5-5200B-R,
    running at 4800)
Storage: 1 x 2 TB SATA III SSD
Other: None

Software

OS: Ubuntu 22.04.3 LTS
    Kernel 5.15.0-79-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.5 released Jul-2023
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS and OS set to prefer performance at the cost
    of additional power usage.

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$SPECspeed®2017\_int\_peak = 14.1$

CPU2017 License: 001176	**Test Date:** Aug-2023
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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	96	210	8.47	**210**	**8.47**	211	8.43	96	210	8.47	**210**	**8.47**	211	8.43
602.gcc_s	96	273	14.6	274	14.5	**274**	**14.5**	96	273	14.6	274	14.5	**274**	**14.5**
605.mcf_s	96	231	20.4	232	20.4	**231**	**20.4**	1	**222**	**21.2**	222	21.2	222	21.2
620.omnetpp_s	96	144	11.3	143	11.4	**143**	**11.4**	1	144	11.3	**143**	**11.4**	142	11.5
623.xalancbmk_s	96	79.6	17.8	**79.5**	**17.8**	74.8	18.9	96	79.6	17.8	**79.5**	**17.8**	74.8	18.9
625.x264_s	96	83.8	21.1	84.1	21.0	**83.9**	**21.0**	1	**83.7**	**21.1**	83.7	21.1	83.8	21.1
631.deepsjeng_s	96	**209**	**6.86**	210	6.83	209	6.87	96	**209**	**6.86**	210	6.83	209	6.87
641.leela_s	96	292	5.85	292	5.84	**292**	**5.84**	96	292	5.85	292	5.84	**292**	**5.84**
648.exchange2_s	96	115	25.6	**115**	**25.6**	118	24.9	96	115	25.6	**115**	**25.6**	118	24.9
657.xz_s	96	225	27.5	224	27.6	**224**	**27.5**	96	225	27.4	224	27.6	**224**	**27.6**
SPECspeed®2017_int_base =			**14.1**											
SPECspeed®2017_int_peak =			**14.1**											

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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CPU2017 License: 001176
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Test Date: Aug-2023
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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-95"
LD_LIBRARY_PATH = "/home/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 = "96"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 620.omnetpp_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-95"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "8"
```

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 Settings:
SMT Control = Disabled
Determinism Control = Manual
Determinism Enable = Disable Performance Determinism
cTDP Control = Manual
cTDP = 400
Package Power Limit Control = Manual
Package Power Limit = 400

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on h13ssw-9684x Fri Aug 25 16:30:57 2023

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
```

(Continued on next page)

Supermicro

CloudDC A+ Server AS -2015CS-TNR
(H13SSW , AMD EPYC 9684X)

SPECspeed®2017_int_base = 14.1

SPECspeed®2017_int_peak = 14.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Aug-2023
Hardware Availability: Jun-2023
Software Availability: Jul-2023

Platform Notes (Continued)

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


  ----------------------------------------------------------
  1. uname -a
    Linux h13ssw-9684x 5.15.0-79-generic #86-Ubuntu SMP Mon Jul 10 16:07:21 UTC 2023 x86_64 x86_64 x86_64
    GNU/Linux


  ----------------------------------------------------------
  2. w
     16:30:57 up 2 min,  2 users,  load average: 0.41, 0.44, 0.19
    USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    lab       tty1     -                16:29    1:51   0.66s  0.01s -bash
    lab       pts/0    -                16:29    15.00s 1.18s  0.62s sudo su -

  ----------------------------------------------------------
  3. Username
    From environment variable $USER:  root
    From the command 'logname':       lab


  ----------------------------------------------------------
  4. ulimit -a
    time(seconds)        unlimited
    file(blocks)         unlimited
    data(kbytes)         unlimited
    stack(kbytes)        unlimited
    coredump(blocks)     0
    memory(kbytes)       unlimited
    locked memory(kbytes) 2097152
    process              3092858
    nofiles              1024
    vmemory(kbytes)      unlimited
    locks                unlimited
    rtprio               0


  ----------------------------------------------------------
  5. sysinfo process ancestry
   /sbin/init
   /bin/login -p --
   -bash
   sudo su -
```

(Continued on next page)

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Platform Notes (Continued)

```
sudo su -
su -
-bash
/bin/sh ./amd2017run.sh
python3 $SPEC/run_amd_speed_aocc400_znver4_A1.py
/bin/bash ./amd_speed_aocc400_znver4_A1.sh
runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 intspeed
runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
  --runmode speed --tune base:peak --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 = /home/cpu2017


    ----------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9684X 96-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 2
    microcode       : 0xa10123e
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 3584 4K pages
    cpu cores       : 96
    siblings        : 96
    1 physical ids (chips)
    96 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 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
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
  virtualized systems.  Use the above data carefully.


    ----------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.37.2:
  Architecture:                x86_64
  CPU op-mode(s):              32-bit, 64-bit
  Address sizes:               52 bits physical, 57 bits virtual
  Byte Order:                  Little Endian
  CPU(s):                      96
  On-line CPU(s) list:         0-95
  Vendor ID:                   AuthenticAMD
  Model name:                  AMD EPYC 9684X 96-Core Processor
  CPU family:                  25
  Model:                       17
  Thread(s) per core:          1
  Core(s) per socket:          96
  Socket(s):                   1
  Stepping:                    2
  Frequency boost:             enabled
  CPU max MHz:                 3715.4290
  CPU min MHz:                 1500.0000
  BogoMIPS:                    5099.76
  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
```

(Continued on next page)

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Platform Notes (Continued)

```
                    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 cppc 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
  Virtualization:             AMD-V
  L1d cache:                  3 MiB (96 instances)
  L1i cache:                  3 MiB (96 instances)
  L2 cache:                   96 MiB (96 instances)
  L3 cache:                   1.1 GiB (12 instances)
  NUMA node(s):               1
  NUMA node0 CPU(s):          0-95
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Mmio stale data:  Not affected
  Vulnerability Retbleed:         Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:       Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB
                                  filling, PBRSB-eIBRS Not affected
  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       3M   8 Data            1     64     1            64
     L1i      32K       3M   8 Instruction     1     64     1            64
     L2        1M      96M   8 Unified         2   2048     1            64
     L3       96M     1.1G  16 Unified         3  98304     1            64


------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0-95
  node 0 size: 773329 MB
  node 0 free: 771076 MB
  node distances:
  node   0
    0:  10


------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       791888996 kB


------------------------------------------------------------
10. who -r
   run-level 3 Aug 25 16:28


------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.9)
   Default Target  Status
   multi-user      running
```

(Continued on next page)

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Platform Notes (Continued)

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


     ----------------------------------------------------------
     13. Linux kernel boot-time arguments, from /proc/cmdline
       BOOT_IMAGE=/boot/vmlinuz-5.15.0-79-generic
       root=UUID=d0cc852e-9857-40c1-b230-5999cbe027bc
       ro


     ----------------------------------------------------------
     14. cpupower frequency-info
       analyzing CPU 0:
         current policy: frequency should be within 1.50 GHz and 2.55 GHz.
                         The governor "performance" may decide which speed to use
                         within this range.
       boost state support:
         Supported: yes
         Active: yes
         Boost States: 0
         Total States: 3
         Pstate-P0:  2550MHz


     ----------------------------------------------------------
     15. sysctl
       kernel.numa_balancing            0
       kernel.randomize_va_space        0
       vm.compaction_proactiveness      20
       vm.dirty_background_bytes        0
       vm.dirty_background_ratio        10
       vm.dirty_bytes                   0
       vm.dirty_expire_centisecs        3000
       vm.dirty_ratio                   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
```

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Platform Notes (Continued)

```
      ----------------------------------------------------------------
      16. /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


      ----------------------------------------------------------------
      17. /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


      ----------------------------------------------------------------
      18. OS release
        From /etc/*-release /etc/*-version
        os-release Ubuntu 22.04.3 LTS


      ----------------------------------------------------------------
      19. Disk information
      SPEC is set to: /home/cpu2017
        Filesystem     Type  Size  Used Avail Use% Mounted on
        /dev/sda2      ext4  1.8T  131G  1.6T   8% /


      ----------------------------------------------------------------
      20. /sys/devices/virtual/dmi/id
         Vendor:         Supermicro
         Product:        Super Server
         Product Family: SMC H13
         Serial:         123456789


      ----------------------------------------------------------------
      21. dmidecode
        Additional information from dmidecode 3.3 follows.  WARNING: Use caution when you interpret this section.
        The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
        determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
        "DMTF SMBIOS" standard.
        Memory:
          12x Micron Technology MTC40F2046S1RC52BAS 64 GB 2 rank 5200, configured at 4800



      ----------------------------------------------------------------
      22. BIOS
      (This section combines info from /sys/devices and dmidecode.)
         BIOS Vendor:       American Megatrends International, LLC.
         BIOS Version:      1.5
         BIOS Date:         07/25/2023
         BIOS Revision:     5.27
```

Compiler Version Notes

```
==================================================================================
C      | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
       | 657.xz_s(base, peak)
```

(Continued on next page)

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Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------------
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, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
       | 641.leela_s(base, peak)
--------------------------------------------------------------------------------
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, peak)
--------------------------------------------------------------------------------
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
--------------------------------------------------------------------------------
```

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`

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CloudDC A+ Server AS -2015CS-TNR
(H13SSW , AMD EPYC 9684X)

SPECspeed®2017_int_base = 14.1

SPECspeed®2017_int_peak = 14.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Aug-2023
Hardware Availability: Jun-2023
Software Availability: Jul-2023

Base Portability Flags (Continued)

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
-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
```

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CloudDC A+ Server AS -2015CS-TNR
(H13SSW , AMD EPYC 9684X)

SPECspeed®2017_int_base = 14.1

SPECspeed®2017_int_peak = 14.1

CPU2017 License: 001176
Test Sponsor: Supermicro
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Test Date: Aug-2023
Hardware Availability: Jun-2023
Software Availability: Jul-2023

Base Other Flags (Continued)

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```

Peak Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

600.perlbench_s: `basepeak = yes`

602.gcc_s: `basepeak = yes`

605.mcf_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-allow-multiple-definition -Ofast -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fopenmp -flto`
`-fstruct-layout=9 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt`
`-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

625.x264_s: `Same as 605.mcf_s`

657.xz_s: `Same as 605.mcf_s`

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CloudDC A+ Server AS -2015CS-TNR
(H13SSW , AMD EPYC 9684X)

SPECspeed®2017_int_base = 14.1

SPECspeed®2017_int_peak = 14.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Aug-2023
Hardware Availability: Jun-2023
Software Availability: Jul-2023

Peak Optimization Flags (Continued)

C++ benchmarks:

```
620.omnetpp_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fvirtual-function-elimination -fvisibility=hidden
-fopenmp=libomp -lomp -lamdlibm -lamdalloc-ext -lflang
```

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

Peak 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.2023-09-13.html`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Genoa-revC.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.xml`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Genoa-revC.xml`

SPEC CPU®2017 Integer Speed Result

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CloudDC A+ Server AS -2015CS-TNR
(H13SSW , AMD EPYC 9684X)

$SPECspeed®2017\_int\_base = 14.1$

$SPECspeed®2017\_int\_peak = 14.1$

CPU2017 License:	001176	**Test Date:**	Aug-2023
Test Sponsor:	Supermicro	**Hardware Availability:**	Jun-2023
Tested by:	Supermicro	**Software Availability:**	Jul-2023

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

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