SPEC CPU®2017 Integer Rate Result

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GIGA-BYTE TECHNOLOGY CO., LTD.

(Test Sponsor: Giga Computing Technology Co., Ltd.)

R263-Z32-AAD1-000
(AMD EPYC 9684X, 2.55GHz)

$SPECrate®2017\_int\_base = 911$

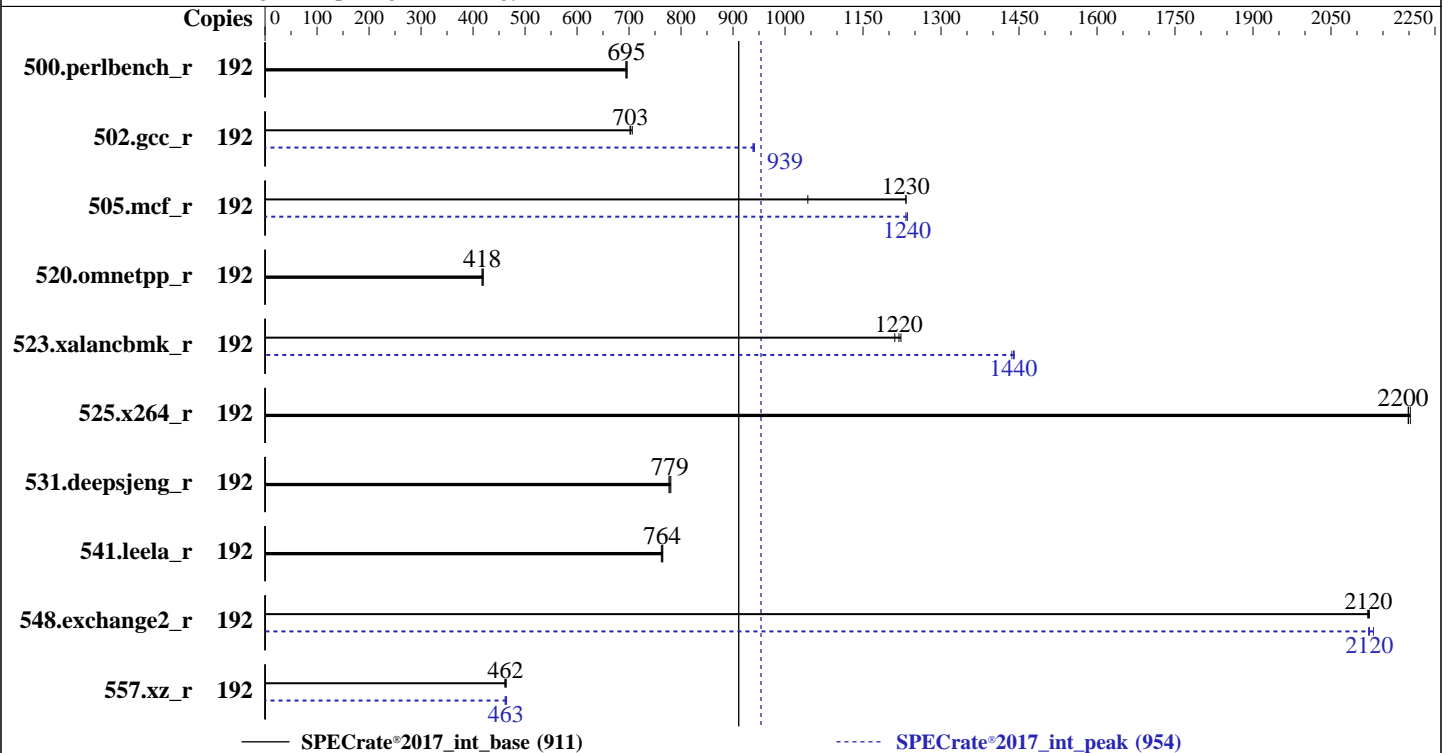$SPECrate®2017\_int\_peak = 954$

CPU2017 License: 9082
Test Sponsor: Giga Computing Technology Co., Ltd.
Tested by: Giga Computing Technology Co., Ltd.

Test Date: Oct-2023
Hardware Availability: Jun-2023
Software Availability: Nov-2022

Benchmark	Copies	Base	Peak
500.perlbench_r	192	695	
502.gcc_r	192	703	939
505.mcf_r	192	1230	1240
520.omnetpp_r	192	418	
523.xalancbmk_r	192	1220	1440
525.x264_r	192	2200	
531.deepsjeng_r	192	779	
541.leela_r	192	764	
548.exchange2_r	192	2120	2120
557.xz_r	192	462	463

SPECrate®2017_int_base (911)   SPECrate®2017_int_peak (954)

Hardware

CPU Name: AMD EPYC 9684X
 Max MHz: 3700
 Nominal: 2550
Enabled: 96 cores, 1 chip, 2 threads/core
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: 1536 GB (12 x 128 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 3.2TB PCIE NVME SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64) 5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Version F08 released Jul-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	192	439	696	**440**	**695**	441	694	192	439	696	**440**	**695**	441	694
502.gcc_r	192	385	706	387	702	**387**	**703**	192	**290**	**939**	290	938	289	941
505.mcf_r	192	**252**	**1230**	252	1230	297	1040	192	251	1240	252	1230	**251**	**1240**
520.omnetpp_r	192	603	418	600	420	**603**	**418**	192	603	418	600	420	**603**	**418**
523.xalancbmk_r	192	167	1210	166	1220	**166**	**1220**	192	141	1440	141	1440	**141**	**1440**
525.x264_r	192	**153**	**2200**	153	2200	153	2200	192	**153**	**2200**	153	2200	153	2200
531.deepsjeng_r	192	**283**	**779**	282	780	283	777	192	**283**	**779**	282	780	283	777
541.leela_r	192	416	765	**416**	**764**	417	762	192	416	765	**416**	**764**	417	762
548.exchange2_r	192	**237**	**2120**	237	2120	237	2120	192	237	2120	**237**	**2120**	236	2130
557.xz_r	192	447	464	**448**	**462**	450	461	192	447	464	**448**	**463**	449	462
SPECrate®2017_int_base =		**911**												
SPECrate®2017_int_peak =		**954**												

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/
```

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) only on request for base runs,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To enable THP for all allocations for peak runs,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/cpu2017_znver4_A12/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017_znver4_A12/amd_rate_aocc400_
     znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:never"
```

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:
SEV Control = Disable
TSME = Disabled
TDP Control = Manual
TDP = 400
PPT Control = Manual
PPT = 400

 Sysinfo program /home/cpu2017_znver4_A12/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Oct 10 06:31:03 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
 15. tuned-adm active
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
```

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Platform Notes (Continued)

```
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)
  x86_64 x86_64 x86_64 GNU/Linux

--------------------------------------------------------------
2. w
  06:31:03 up 22 min,  1 user,  load average: 0.14, 0.09, 0.45
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                06:14   15:26   1.48s  0.32s /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) 6190635
  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) 6190635
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

--------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 34
 login -- root
 -bash
 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 all --reportable --iterations 3 intrate
 runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017_znver4_A12

--------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9684X 96-Core Processor
    vendor_id       : AuthenticAMD
```

(Continued on next page)

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Platform Notes (Continued)

```
      cpu family      : 25
      model           : 17
      stepping        : 2
      microcode       : 0xa101235
      bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
      TLB size        : 3584 4K pages
      cpu cores       : 96
      siblings        : 192
      1 physical ids (chips)
      192 processors (hardware threads)
      physical id 0: core ids 0-95
      physical id 0: apicids 0-191
   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):                  192
     On-line CPU(s) list:     0-191
     Vendor ID:               AuthenticAMD
     Model name:              AMD EPYC 9684X 96-Core Processor
     CPU family:              25
     Model:                   17
     Thread(s) per core:      2
     Core(s) per socket:      96
     Socket(s):               1
     Stepping:                2
     Frequency boost:         enabled
     CPU max MHz:             3715.4290
     CPU min MHz:             1500.0000
     BogoMIPS:                5100.05
     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
                              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):            12
     NUMA node0 CPU(s):       0-7,96-103
```

(Continued on next page)

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Platform Notes (Continued)

```
  NUMA node1 CPU(s):            8-15,104-111
  NUMA node2 CPU(s):            16-23,112-119
  NUMA node3 CPU(s):            24-31,120-127
  NUMA node4 CPU(s):            32-39,128-135
  NUMA node5 CPU(s):            40-47,136-143
  NUMA node6 CPU(s):            48-55,144-151
  NUMA node7 CPU(s):            56-63,152-159
  NUMA node8 CPU(s):            64-71,160-167
  NUMA node9 CPU(s):            72-79,168-175
  NUMA node10 CPU(s):           80-87,176-183
  NUMA node11 CPU(s):           88-95,184-191
  Vulnerability Itlb multihit:  Not affected
  Vulnerability L1tf:           Not affected
  Vulnerability Mds:            Not affected
  Vulnerability Meltdown:       Not affected
  Vulnerability Spec store bypass: Vulnerable
  Vulnerability Spectre v1:     Vulnerable: __user pointer sanitization and usercopy barriers only; no
                                swapgs barriers
  Vulnerability Spectre v2:     Vulnerable, IBPB: disabled, STIBP: disabled
  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: 12 nodes (0-11)
    node 0 cpus: 0-7,96-103
    node 0 size: 128766 MB
    node 0 free: 127247 MB
    node 1 cpus: 8-15,104-111
    node 1 size: 129013 MB
    node 1 free: 128769 MB
    node 2 cpus: 16-23,112-119
    node 2 size: 129013 MB
    node 2 free: 128759 MB
    node 3 cpus: 24-31,120-127
    node 3 size: 129013 MB
    node 3 free: 128758 MB
    node 4 cpus: 32-39,128-135
    node 4 size: 129013 MB
    node 4 free: 128795 MB
    node 5 cpus: 40-47,136-143
    node 5 size: 129013 MB
    node 5 free: 128800 MB
    node 6 cpus: 48-55,144-151
    node 6 size: 129013 MB
    node 6 free: 128759 MB
    node 7 cpus: 56-63,152-159
    node 7 size: 129013 MB
    node 7 free: 128767 MB
    node 8 cpus: 64-71,160-167
    node 8 size: 129013 MB
    node 8 free: 128778 MB
```

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Platform Notes (Continued)

```
   node 9 cpus: 72-79,168-175
   node 9 size: 128978 MB
   node 9 free: 127995 MB
   node 10 cpus: 80-87,176-183
   node 10 size: 129013 MB
   node 10 free: 128699 MB
   node 11 cpus: 88-95,184-191
   node 11 size: 128818 MB
   node 11 free: 128574 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11
     0:  10  11  11  12  12  12  12  12  12  12  12  12
     1:  11  10  11  12  12  12  12  12  12  12  12  12
     2:  11  11  10  12  12  12  12  12  12  12  12  12
     3:  12  12  12  10  11  11  12  12  12  12  12  12
     4:  12  12  12  11  10  11  12  12  12  12  12  12
     5:  12  12  12  11  11  10  12  12  12  12  12  12
     6:  12  12  12  12  12  12  10  11  11  12  12  12
     7:  12  12  12  12  12  12  11  10  11  12  12  12
     8:  12  12  12  12  12  12  11  11  10  12  12  12
     9:  12  12  12  12  12  12  12  12  12  10  11  11
    10:  12  12  12  12  12  12  12  12  12  11  10  11
    11:  12  12  12  12  12  12  12  12  12  11  11  10


    ----------------------------------------------------------
 9. /proc/meminfo
    MemTotal:       1584827016 kB


    ----------------------------------------------------------
 10. who -r
    run-level 3 Oct 10 06:09


    ----------------------------------------------------------
 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 klog lvm2-monitor nscd nvmefc-boot-connections
                     postfix purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4
                     wickedd-nanny
    enabled-runtime  systemd-remount-fs
    disabled         accounts-daemon autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates
                     chrony-wait chronyd console-getty cups cups-browsed debug-shell ebtables
                     exchange-bmc-os-info fancontrol firewalld gpm grub2-once haveged-switch-root ipmi ipmievd
                     issue-add-ssh-keys kdump kdump-early kexec-load lm_sensors lunmask man-db-create
                     multipathd nfs nfs-blkmap nvmf-autoconnect rdisc rpcbind rpmconfigcheck rsyncd runssj
                     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 wickedd-dhcp6
    indirect         wickedd


    ----------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=858ea2c3-dac4-45b4-941b-86d7de94c38b
    splash=silent
```

(Continued on next page)

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Platform Notes (Continued)

```
    resume=/dev/disk/by-uuid/12c19d51-3466-4994-bf22-cb4ed2a427e3
    mitigations=off
    quiet
    security=apparmor


  ----------------------------------------------------------
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


  ----------------------------------------------------------
15. tuned-adm active
    It seems that tuned daemon is not running, preset profile is not activated.
    Preset profile: throughput-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          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


  ----------------------------------------------------------
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


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

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GIGA-BYTE TECHNOLOGY CO., LTD.
(Test Sponsor: Giga Computing Technology Co., Ltd.)

R263-Z32-AAD1-000
(AMD EPYC 9684X, 2.55GHz)

SPECrate®2017_int_base = 911

SPECrate®2017_int_peak = 954

CPU2017 License: 9082

Test Sponsor: Giga Computing Technology Co., Ltd.

Tested by: Giga Computing Technology Co., Ltd.

Test Date: Oct-2023

Hardware Availability: Jun-2023

Software Availability: Nov-2022

Platform Notes (Continued)

```
  19. OS release
    From /etc/*-release /etc/*-version
    os-release SUSE Linux Enterprise Server 15 SP4

  ---------------------------------------------------------------
  20. Disk information
  SPEC is set to: /home/cpu2017_znver4_A12
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p3 xfs   2.2T   99G  2.1T   5% /home

  ---------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Vendor:         Giga Computing
      Product:        R263-Z32-AAD1-000
      Product Family: Server
      Serial:         GNHWRT621A0001

  ---------------------------------------------------------------
  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:
        12x Samsung M321RAGA0B20-CWKBH 128 GB 2 rank 4800

  ---------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:      GIGABYTE
      BIOS Version:     F08
      BIOS Date:        07/05/2023
      BIOS Revision:    5.27
```

Compiler Version Notes

```
==========================================================================================================
C        | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------------------


==========================================================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
         | 557.xz_r(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
----------------------------------------------------------------------------------------------------------


==========================================================================================================
C        | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------------------
```

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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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------------


==============================================================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
         | 557.xz_r(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
-------------------------------------------------------------------------------------------------------


==============================================================================================================
C++      | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------------


==============================================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(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
-------------------------------------------------------------------------------------------------------


==============================================================================================================
C++      | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------------


==============================================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(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 | 548.exchange2_r(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
```

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Hardware Availability: Jun-2023

Software Availability: Nov-2022

Compiler Version Notes (Continued)

```
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

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-DSPEC_LP64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_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
-z muldefs -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 -lamdlibm -lflang
-lamdalloc
```

C++ benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3
```

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Tested by: Giga Computing Technology Co., Ltd.	**Software Availability:**	Nov-2022

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -lflang
-lamdalloc-ext
```

Fortran benchmarks:
```
-m64 -flto -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 -z muldefs -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc
```

Base Other Flags

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

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

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

Peak Compiler Invocation

C benchmarks:
```
clang
```

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

Fortran benchmarks:
```
flang
```

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Tested by:	Giga Computing Technology Co., Ltd.	**Software Availability:**	Nov-2022

Peak Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Peak Optimization Flags

C benchmarks:

500.perlbench_r: `basepeak = yes`

502.gcc_r: `-m32 -flto -z muldefs -Ofast -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline`
`-lamdalloc`

505.mcf_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math`
`-fstruct-layout=7 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -lamdlibm`
`-lflang -lamdalloc`

525.x264_r: `basepeak = yes`

557.xz_r: `Same as 505.mcf_r`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

523.xalancbmk_r: `-m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-do-block-reorder=aggressive`

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Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
```
-fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext
```

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:
```
-m64 -flto -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 -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc
```

Peak Other Flags

C benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

502.gcc_r: `-L/usr/lib32 -Wno-unused-command-line-argument`
`-L/home/work/cpu2017/v119/aocc4/znver4/rate/amd_rate_aocc400_znver4_A_lib/lib32`

C++ benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

523.xalancbmk_r: `-L/usr/lib32 -Wno-unused-command-line-argument`
`-L/home/work/cpu2017/v119/aocc4/znver4/rate/amd_rate_aocc400_znver4_A_lib/lib32`

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/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.0-GenoaX.html

SPEC CPU®2017 Integer Rate Result

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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/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.0-GenoaX.xml

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

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