SPEC CPU®2017 Integer Rate Result

GIGA-BYTE TECHNOLOGY CO., LTD.

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

R263-Z32-AAD1-000
(AMD EPYC 9754, 2.25GHz)

$SPECrate^{®}2017\_int\_base = 941$

$SPECrate^{®}2017\_int\_peak = 1030$

CPU2017 License: 9082	**Test Date:** Jun-2023
Test Sponsor: Giga Computing Technology Co., Ltd.	**Hardware Availability:** Jun-2023
Tested by: Giga Computing Technology Co., Ltd.	**Software Availability:** Nov-2022

Copies

Benchmark	Copies	base	peak
500.perlbench_r	256	793	
502.gcc_r	256	586	789
505.mcf_r	256	1240	1250
520.omnetpp_r	256	425	
523.xalancbmk_r	256	787	1420
525.x264_r	256	2590	
531.deepsjeng_r	256	937	
541.leela_r	256	908	909
548.exchange2_r	256	2590	2610
557.xz_r	256	496	

SPECrate®2017_int_base (941)   SPECrate®2017_int_peak (1030)

Hardware

CPU Name: AMD EPYC 9754
 Max MHz: 3100
 Nominal: 2250
Enabled: 128 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: 256 MB I+D on chip per chip, 16 MB shared / 8 cores
 Other: None
Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.92TB 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 F07 released May-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.

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

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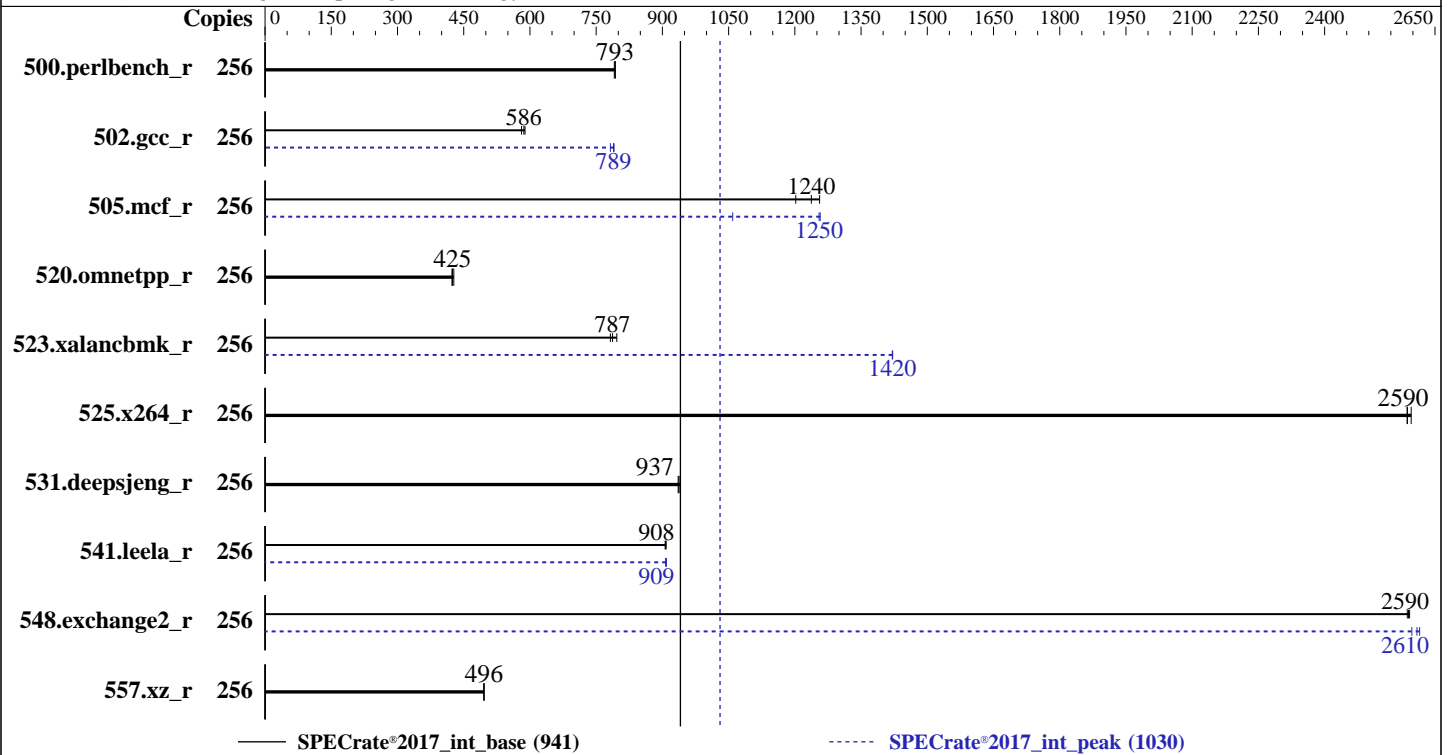SPECrate®2017_int_base = 941

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Results Table

Benchmark	Base 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
500.perlbench_r	256	514	793	515	791	**514**	**793**	256	514	793	515	791	**514**	**793**
502.gcc_r	256	616	589	**618**	**586**	624	581	256	459	791	463	782	**459**	**789**
505.mcf_r	256	329	1260	344	1200	**334**	**1240**	256	391	1060	329	1260	**330**	**1250**
520.omnetpp_r	256	793	423	786	428	**791**	**425**	256	793	423	786	428	**791**	**425**
523.xalancbmk_r	256	**343**	**787**	339	797	346	782	256	190	1420	**190**	**1420**	190	1420
525.x264_r	256	**173**	**2590**	173	2590	173	2600	256	**173**	**2590**	173	2590	173	2600
531.deepsjeng_r	256	**313**	**937**	312	940	314	936	256	**313**	**937**	312	940	314	936
541.leela_r	256	468	906	**467**	**908**	467	908	256	467	909	**467**	**909**	467	907
548.exchange2_r	256	**259**	**2590**	259	2590	259	2590	256	**257**	**2610**	258	2600	256	2620
557.xz_r	256	**557**	**496**	557	496	558	495	256	**557**	**496**	557	496	558	495
SPECrate®2017_int_base =		941												
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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) 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_A1/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017_znver4_A1/amd_rate_aocc400_zn
     ver4_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
Determinism Control = Manual
Determinism Enable = Power
TDP Control = Manual
TDP = 400
PPT Control = Manual
PPT = 400

 Sysinfo program /home/cpu2017_znver4_A1/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Mon Jun 19 18:36:21 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
```

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Platform Notes (Continued)

```
 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)
   x86_64 x86_64 x86_64 GNU/Linux


 -----------------------------------------------------------
 2. w
    18:36:21 up 19 min,  1 user,  load average: 0.15, 0.20, 0.67
   USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                18:18   15:15   1.62s  0.31s /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) 3094032
   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) 3094032
   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
  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_A1


 -----------------------------------------------------------
 6. /proc/cpuinfo
```

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Platform Notes (Continued)

```
      model name       : AMD EPYC 9754 128-Core Processor
      vendor_id        : AuthenticAMD
      cpu family       : 25
      model            : 160
      stepping         : 1
      microcode        : 0xaa00107
      bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
      TLB size         : 3584 4K pages
      cpu cores        : 128
      siblings         : 256
      1 physical ids (chips)
      256 processors (hardware threads)
      physical id 0: core ids 0-127
      physical id 0: apicids 0-255
   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):                       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:           2
   Core(s) per socket:           128
   Socket(s):                    1
   Stepping:                     1
   Frequency boost:              enabled
   CPU max MHz:                  3100.3411
   CPU min MHz:                  1500.0000
   BogoMIPS:                     4499.74
   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:                    4 MiB (128 instances)
   L1i cache:                    4 MiB (128 instances)
   L2 cache:                     128 MiB (128 instances)
   L3 cache:                     256 MiB (16 instances)
```

(Continued on next page)

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Platform Notes (Continued)

```
    NUMA node(s):                 16
    NUMA node0 CPU(s):            0-7,128-135
    NUMA node1 CPU(s):            8-15,136-143
    NUMA node2 CPU(s):            16-23,144-151
    NUMA node3 CPU(s):            24-31,152-159
    NUMA node4 CPU(s):            32-39,160-167
    NUMA node5 CPU(s):            40-47,168-175
    NUMA node6 CPU(s):            48-55,176-183
    NUMA node7 CPU(s):            56-63,184-191
    NUMA node8 CPU(s):            64-71,192-199
    NUMA node9 CPU(s):            72-79,200-207
    NUMA node10 CPU(s):           80-87,208-215
    NUMA node11 CPU(s):           88-95,216-223
    NUMA node12 CPU(s):           96-103,224-231
    NUMA node13 CPU(s):           104-111,232-239
    NUMA node14 CPU(s):           112-119,240-247
    NUMA node15 CPU(s):           120-127,248-255
    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 always-on, 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       4M  8 Data             1    64       1            64
      L1i       32K       4M  8 Instruction      1    64       1            64
      L2         1M     128M  8 Unified          2  2048       1            64
      L3        16M     256M 16 Unified          3 16384       1            64

    ----------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 16 nodes (0-15)
    node 0 cpus: 0-7,128-135
    node 0 size: 48125 MB
    node 0 free: 46412 MB
    node 1 cpus: 8-15,136-143
    node 1 size: 48375 MB
    node 1 free: 48178 MB
    node 2 cpus: 16-23,144-151
    node 2 size: 48375 MB
    node 2 free: 48236 MB
    node 3 cpus: 24-31,152-159
    node 3 size: 48375 MB
    node 3 free: 48202 MB
    node 4 cpus: 32-39,160-167
    node 4 size: 48375 MB
    node 4 free: 48227 MB
    node 5 cpus: 40-47,168-175
    node 5 size: 48375 MB
    node 5 free: 48232 MB
    node 6 cpus: 48-55,176-183
    node 6 size: 48375 MB
    node 6 free: 48232 MB
```

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Platform Notes (Continued)

```
  node 7 cpus: 56-63,184-191
  node 7 size: 48375 MB
  node 7 free: 48227 MB
  node 8 cpus: 64-71,192-199
  node 8 size: 48375 MB
  node 8 free: 48243 MB
  node 9 cpus: 72-79,200-207
  node 9 size: 48341 MB
  node 9 free: 48208 MB
  node 10 cpus: 80-87,208-215
  node 10 size: 48375 MB
  node 10 free: 48236 MB
  node 11 cpus: 88-95,216-223
  node 11 size: 48375 MB
  node 11 free: 48250 MB
  node 12 cpus: 96-103,224-231
  node 12 size: 48375 MB
  node 12 free: 46783 MB
  node 13 cpus: 104-111,232-239
  node 13 size: 48375 MB
  node 13 free: 48121 MB
  node 14 cpus: 112-119,240-247
  node 14 size: 48375 MB
  node 14 free: 47903 MB
  node 15 cpus: 120-127,248-255
  node 15 size: 48177 MB
  node 15 free: 47844 MB
  node distances:
  node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
    0:  10  11  11  11  12  12  12  12  12  12  12  12  12  12  12  12
    1:  11  10  11  11  12  12  12  12  12  12  12  12  12  12  12  12
    2:  11  11  10  11  12  12  12  12  12  12  12  12  12  12  12  12
    3:  11  11  11  10  12  12  12  12  12  12  12  12  12  12  12  12
    4:  12  12  12  12  10  11  11  11  12  12  12  12  12  12  12  12
    5:  12  12  12  12  11  10  11  11  12  12  12  12  12  12  12  12
    6:  12  12  12  12  11  11  10  11  12  12  12  12  12  12  12  12
    7:  12  12  12  12  11  11  11  10  12  12  12  12  12  12  12  12
    8:  12  12  12  12  12  12  12  12  10  11  11  11  12  12  12  12
    9:  12  12  12  12  12  12  12  12  11  10  11  11  12  12  12  12
   10:  12  12  12  12  12  12  12  12  11  11  10  11  12  12  12  12
   11:  12  12  12  12  12  12  12  12  11  11  11  10  12  12  12  12
   12:  12  12  12  12  12  12  12  12  12  12  12  12  10  11  11  11
   13:  12  12  12  12  12  12  12  12  12  12  12  12  11  10  11  11
   14:  12  12  12  12  12  12  12  12  12  12  12  12  11  11  10  11
   15:  12  12  12  12  12  12  12  12  12  12  12  12  11  11  11  10

  ------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       792096708 kB


  ------------------------------------------------------------
  10. who -r
     run-level 3 Jun 19 18:18


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

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

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Platform Notes (Continued)

```
  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-dhcp6 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
    indirect         wickedd

  -----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=d7640ab6-1cf7-45d7-8b8e-5805bbb10001
    splash=silent
    resume=/dev/disk/by-uuid/5c9fc2ce-054f-420c-8d23-68348791fb2a
    mitigations=auto
    quiet
    security=apparmor

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

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R263-Z32-AAD1-000
(AMD EPYC 9754, 2.25GHz)

SPECrate®2017_int_base =   941

SPECrate®2017_int_peak = 1030

CPU2017 License: 9082

Test Sponsor: Giga Computing Technology Co., Ltd.

Tested by: Giga Computing Technology Co., Ltd.

Test Date: Jun-2023

Hardware Availability: Jun-2023

Software Availability: Nov-2022

Platform Notes (Continued)

```
    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 Server 15 SP4


  -----------------------------------------------------------
  20. Disk information
  SPEC is set to: /home/cpu2017_znver4_A1
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p3 xfs   237G  6.7G  230G   3% /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 Micron Technology MTC40F2046S1RC48BA1 64 GB 2 rank 4800



  -----------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:      GIGABYTE
    BIOS Version:     F07
    BIOS Date:        05/15/2023
    BIOS Revision:    5.27
```

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CPU2017 License: 9082   **Test Date:**   Jun-2023
Test Sponsor: Giga Computing Technology Co., Ltd.   **Hardware Availability:** Jun-2023
Tested by: Giga Computing Technology Co., Ltd.   **Software Availability:** Nov-2022

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)
----------------------------------------------------------------------------------------------
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)
----------------------------------------------------------------------------------------------
```

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R263-Z32-AAD1-000
(AMD EPYC 9754, 2.25GHz)

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SPECrate®2017_int_peak = 1030

CPU2017 License: 9082

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Test Date: Jun-2023

Hardware Availability: Jun-2023

Software Availability: Nov-2022

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++    | 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
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`

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Test Date: Jun-2023

Hardware Availability: Jun-2023

Software Availability: Nov-2022

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
-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
```

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CPU2017 License: 9082

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Test Date: Jun-2023

Hardware Availability: Jun-2023

Software Availability: Nov-2022

Peak Compiler Invocation

C benchmarks:

`clang`

C++ benchmarks:

`clang++`

Fortran benchmarks:

`flang`

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`

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Peak Optimization Flags (Continued)

505.mcf_r (continued):
```
-lflang -lamdalloc
```

525.x264_r: basepeak = yes

557.xz_r: basepeak = yes

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
-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: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-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 -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
```

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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.html
http://www.spec.org/cpu2017/flags/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.1-Bergamo.html

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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.xml
http://www.spec.org/cpu2017/flags/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.1-Bergamo.xml

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

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