SPEC CPU®2017 Integer Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkEdge SE455 V3
(2.30 GHz,AMD EPYC 8534P)

$SPECrate^{®}2017\_int\_base = 474$
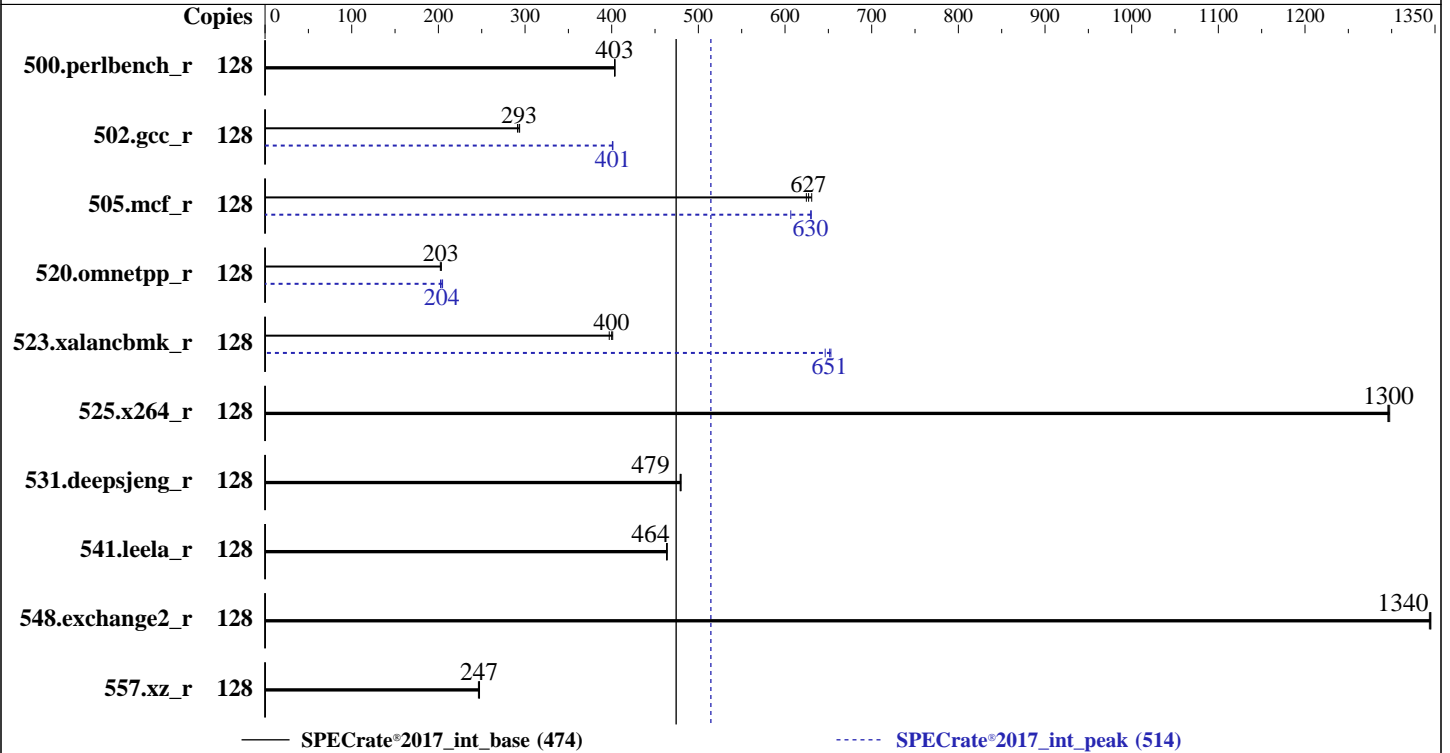
$SPECrate^{®}2017\_int\_peak = 514$

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

Benchmark	Copies	base	peak
500.perlbench_r	128	403	
502.gcc_r	128	293	401
505.mcf_r	128	627	630
520.omnetpp_r	128	203	204
523.xalancbmk_r	128	400	651
525.x264_r	128	1300	
531.deepsjeng_r	128	479	
541.leela_r	128	464	
548.exchange2_r	128	1340	
557.xz_r	128	247	

SPECrate®2017_int_base (474)   SPECrate®2017_int_peak (514)

Hardware

CPU Name: AMD EPYC 8534P
 Max MHz: 3100
 Nominal: 2300
Enabled: 64 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: 128 MB I+D on chip per chip
 16 MB shared / 8 cores
 Other: None
Memory: 192 GB (6 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB M.2 NVME SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64)
 Kernel 5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Lenovo BIOS Version MBE103E 1.10 released Aug-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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	128	505	403	505	404	**505**	**403**	128	505	403	505	404	**505**	**403**
502.gcc_r	128	617	294	622	291	**618**	**293**	128	**452**	**401**	452	401	452	401
505.mcf_r	128	**330**	**627**	331	625	328	631	128	328	630	**329**	**630**	341	607
520.omnetpp_r	128	830	202	826	203	**827**	**203**	128	820	205	829	202	**823**	**204**
523.xalancbmk_r	128	337	401	**338**	**400**	340	397	128	209	646	**207**	**651**	207	653
525.x264_r	128	173	1300	173	1300	**173**	**1300**	128	173	1300	173	1300	**173**	**1300**
531.deepsjeng_r	128	306	480	306	479	**306**	**479**	128	306	480	306	479	**306**	**479**
541.leela_r	128	**457**	**464**	457	464	457	463	128	**457**	**464**	457	464	457	463
548.exchange2_r	128	**249**	**1340**	249	1350	250	1340	128	**249**	**1340**	249	1350	250	1340
557.xz_r	128	**559**	**247**	559	247	562	246	128	**559**	**247**	559	247	562	246
SPECrate®2017_int_base =		**474**												
SPECrate®2017_int_peak =		**514**												

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/cpu2017-1.1.9-amd-aocc400_znver4_A1/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017-1.1.9-amd-a
     occ400_znver4_A1/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 configuration:
  Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
  NUMA Nodes per Socket set to NPS2
  L1 Stream HW Prefetcher set to Disabled

  Sysinfo program /home/cpu2017-1.1.9-amd-aocc400_znver4_A1/bin/sysinfo
  Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
  running on localhost Sun Aug 27 08:11:20 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. 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
```

(Continued on next page)

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Platform Notes (Continued)

```
    21. dmidecode
    22. 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
       08:11:20 up 2 min,  1 user,  load average: 0.15, 0.09, 0.03
       USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
       root     tty1     -                08:10   14.00s  1.35s  0.09s /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) 772451
       max locked memory       (kbytes, -l) 2097152
       max memory size         (kbytes, -m) unlimited
       open files                      (-n) 1024
       pipe size            (512 bytes, -p) 8
       POSIX message queues     (bytes, -q) 819200
       real-time priority              (-r) 0
       stack size              (kbytes, -s) unlimited
       cpu time               (seconds, -t) unlimited
       max user processes              (-u) 772451
       virtual memory          (kbytes, -v) unlimited
       file locks                      (-x) unlimited

    ------------------------------------------------------------
    5. sysinfo process ancestry
     /usr/lib/systemd/systemd --switched-root --system --deserialize 30
     login -- root
     -bash
     /bin/bash ./run_SR630V3.sh
     sh Run025-compliant-amd-rateint.sh
     python3 ./run_amd_rate_aocc400_znver4_A1.py
     /bin/bash ./amd_rate_aocc400_znver4_A1.sh
     runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune 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/CPU2017.131/templogs/preenv.intrate.131.0.log --lognum 131.0 --from_runcpu 2
     specperl $SPEC/bin/sysinfo
     $SPEC = /home/cpu2017-1.1.9-amd-aocc400_znver4_A1

    ------------------------------------------------------------
    6. /proc/cpuinfo
        model name      : AMD EPYC 8534P 64-Core Processor
        vendor_id       : AuthenticAMD
        cpu family      : 25
        model           : 160
```

(Continued on next page)

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Platform Notes (Continued)

```
      stepping        : 2
      microcode       : 0xaa00212
      bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
      TLB size        : 3584 4K pages
      cpu cores       : 64
      siblings        : 128
      1 physical ids (chips)
      128 processors (hardware threads)
      physical id 0: core ids 0-63
      physical id 0: apicids 0-127
  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):                   128
  On-line CPU(s) list:      0-127
  Vendor ID:                AuthenticAMD
  Model name:               AMD EPYC 8534P 64-Core Processor
  CPU family:               25
  Model:                    160
  Thread(s) per core:       2
  Core(s) per socket:       64
  Socket(s):                1
  Stepping:                 2
  Frequency boost:          enabled
  CPU max MHz:              3101.8550
  CPU min MHz:              1500.0000
  BogoMIPS:                 4593.00
  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:                2 MiB (64 instances)
  L1i cache:                2 MiB (64 instances)
  L2 cache:                 64 MiB (64 instances)
  L3 cache:                 128 MiB (8 instances)
  NUMA node(s):             2
  NUMA node0 CPU(s):        0-31,64-95
  NUMA node1 CPU(s):        32-63,96-127
  Vulnerability Itlb multihit:     Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
   Vulnerability Lltf:             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       2M    8 Data            1    64        1             64
       L1i       32K       2M    8 Instruction     1    64        1             64
       L2         1M      64M    8 Unified         2  2048        1             64
       L3        16M     128M   16 Unified         3 16384        1             64

   --------------------------------------------------------------
   8. numactl --hardware
   NOTE: a numactl 'node' might or might not correspond to a physical chip.
     available: 2 nodes (0-1)
     node 0 cpus: 0-31,64-95
     node 0 size: 96471 MB
     node 0 free: 95153 MB
     node 1 cpus: 32-63,96-127
     node 1 size: 96665 MB
     node 1 free: 96142 MB
     node distances:
     node   0   1
       0:  10  12
       1:  12  10


   --------------------------------------------------------------
   9. /proc/meminfo
     MemTotal:       197772276 kB


   --------------------------------------------------------------
   10. who -r
     run-level 3 Aug 27 08:09


   --------------------------------------------------------------
   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 getty@ haveged irqbalance
                     issue-generator kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections postfix
                     purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4
                     wickedd-dhcp6 wickedd-nanny
     enabled-runtime systemd-remount-fs
     disabled        autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                     chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                     firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                     issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap
                     nvmf-autoconnect rdisc rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts
                     snmpd snmptrapd systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                     systemd-time-wait-sync systemd-timesyncd
```

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Platform Notes (Continued)

```
    generated       ntp_sync
    indirect        wickedd


    -------------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=16cfcc2a-78c0-4035-9fc3-1137fe6f296c
    splash=silent
    mitigations=auto
    quiet
    security=apparmor


    -------------------------------------------------------------
 14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 1.50 GHz and 2.30 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes


    -------------------------------------------------------------
 15. 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


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

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Platform Notes (Continued)

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

    ----------------------------------------------------------------
    19. Disk information
    SPEC is set to: /home/cpu2017-1.1.9-amd-aocc400_znver4_A1
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/nvme0n1p2 xfs   447G   24G  424G   6% /

    ----------------------------------------------------------------
    20. /sys/devices/virtual/dmi/id
        Vendor:          Lenovo
        Product:         ThinkEdge SE455V3 Planar
        Product Family:  ThinkSystem
        Serial:          1234567890

    ----------------------------------------------------------------
    21. 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:
        3x SK Hynix HMCG88AEBRA115N 32 GB 2 rank 4800
        3x SK Hynix HMCG88AEBRA173N 32 GB 2 rank 4800


    ----------------------------------------------------------------
    22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
        BIOS Vendor:     Lenovo
        BIOS Version:    MBE103E-1.10
        BIOS Date:       08/17/2023
        BIOS Revision:   1.10
        Firmware Revision: 1.10
```

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

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Lenovo Global Technology

ThinkEdge SE455 V3
(2.30 GHz,AMD EPYC 8534P)

SPECrate®2017_int_base = 474

SPECrate®2017_int_peak = 514

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Aug-2023

Hardware Availability: Nov-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: 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`

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
```

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Lenovo Global Technology

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Base Optimization Flags (Continued)

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
```

Peak Compiler Invocation

C benchmarks:
```
clang
```

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

Fortran benchmarks:
```
flang
```

Lenovo Global Technology

ThinkEdge SE455 V3
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CPU2017 License: 9017		**Test Date:**	Aug-2023
Test Sponsor:	Lenovo Global Technology	**Hardware Availability:**	Nov-2023
Tested by:	Lenovo Global Technology	**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: basepeak = yes

C++ benchmarks:

520.omnetpp_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`

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Peak Optimization Flags (Continued)

520.omnetpp_r (continued):
```
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext
```

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: `basepeak = yes`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-T.html
http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.html

SPEC CPU®2017 Integer Rate Result

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ThinkEdge SE455 V3
(2.30 GHz,AMD EPYC 8534P)

SPECrate®2017_int_base = 474

SPECrate®2017_int_peak = 514

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-T.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.xml

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

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