SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL385 Gen11
(2.60 GHz, AMD EPYC 9655)

$SPECrate^{®}2017\_int\_base = 2020$
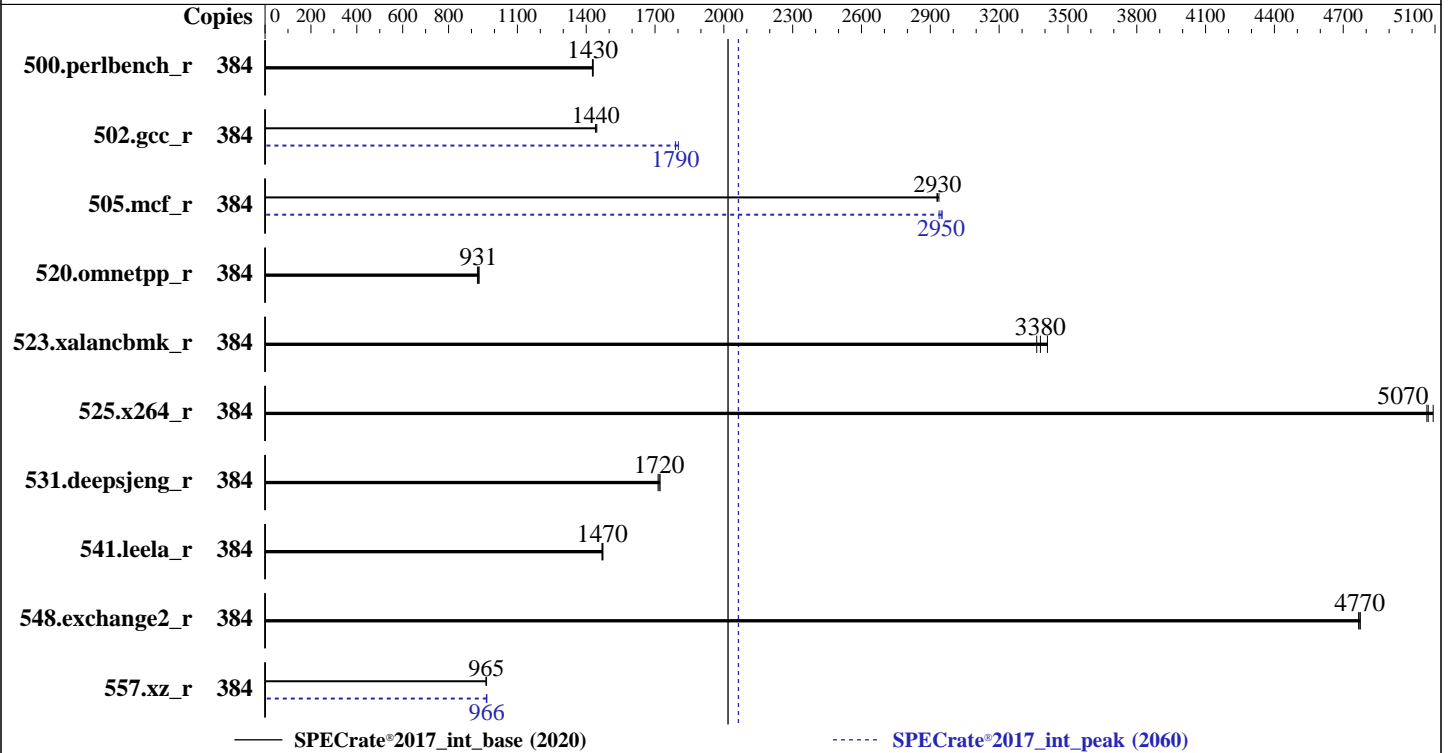
$SPECrate^{®}2017\_int\_peak = 2060$

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Oct-2024
Hardware Availability: Nov-2024
Software Availability: Sep-2024

Benchmark	Copies	Result (base)	Result (peak)
500.perlbench_r	384	1430	
502.gcc_r	384	1440	1790
505.mcf_r	384	2930	2950
520.omnetpp_r	384	931	
523.xalancbmk_r	384	3380	
525.x264_r	384	5070	
531.deepsjeng_r	384	1720	
541.leela_r	384	1470	
548.exchange2_r	384	4770	
557.xz_r	384	965	966

SPECrate®2017_int_base (2020) ---- SPECrate®2017_int_peak (2060)

Hardware

CPU Name: AMD EPYC 9655
  Max MHz: 4500
  Nominal: 2600
Enabled: 192 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
  L2: 1 MB I+D on chip per core
  L3: 384 MB I+D on chip per chip,
    32 MB shared / 8 cores
  Other: None
Memory: 768 GB (24 x 32 GB 2Rx8 PC5-6400B-R, running at 6000)
Storage: 1 x 480 GB SATA SSD
Other: CPU Cooling: DLC

Software

OS: SUSE Linux Enterprise Server 15 SP6
  Kernel 6.4.0-150600.21-default
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: HPE BIOS Version v2.10 09/11/2024 released Sep-2024
File System: btrfs
System State: Run level 5 (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

	Base							Peak						
Benchmark	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	384	427	1430	**428**	**1430**	428	1430	384	427	1430	**428**	**1430**	428	1430
502.gcc_r	384	376	1450	**377**	**1440**	377	1440	384	302	1800	**304**	**1790**	304	1790
505.mcf_r	384	212	2930	**212**	**2930**	211	2940	384	210	2950	211	2940	**211**	**2950**
520.omnetpp_r	384	544	926	540	933	**541**	**931**	384	544	926	540	933	**541**	**931**
523.xalancbmk_r	384	119	3410	**120**	**3380**	121	3360	384	119	3410	**120**	**3380**	121	3360
525.x264_r	384	133	5060	132	5090	**133**	**5070**	384	133	5060	132	5090	**133**	**5070**
531.deepsjeng_r	384	**256**	**1720**	257	1710	256	1720	384	**256**	**1720**	257	1710	256	1720
541.leela_r	384	433	1470	432	1470	**432**	**1470**	384	433	1470	432	1470	**432**	**1470**
548.exchange2_r	384	**211**	**4770**	211	4770	211	4770	384	**211**	**4770**	211	4770	211	4770
557.xz_r	384	430	966	431	963	**430**	**965**	384	**429**	**966**	430	965	429	967
SPECrate®2017_int_base =	**2020**													
SPECrate®2017_int_peak =	**2060**													

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.
tuned service was stopped using "systemctl stop tuned"

To enable Transparent Hugepages (THP) for all allocations,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

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

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/cpu2017/amd_rate_aocc500_znver5_A_lib/lib:/home/cpu2017/amd_rate_aocc500_znver5_A_lib/lib32:"
MALLOC_CONF = "retain:true"
```

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
 Workload Profile set to General Throughput Compute
 Determinism Control set to Manual
 Performance Determinism set to Power Deterministic
 Memory Patrol Scrubbing set to Disabled
 NUMA memory domains per socket set to Four memory domains per socket
 ACPI CST C2 Latency set to 18 microseconds
 Thermal Configuration set to Maximum Cooling
 AMD Periodic Directory Rinse set to Periodic
 Workload Profile set to Custom
  Power Regulator set to OS Control Mode
 The reference code/AGESA version used in this ROM is version Turin-PI 1.0.0.0

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Oct  8 23:05:42 2024

 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 254 (254.10+suse.84.ge8d77af424)
 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
```

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Platform Notes (Continued)

```
   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 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
     x86_64 x86_64 x86_64 GNU/Linux


   ---------------------------------------------------------------
   2. w
     23:05:42 up 1 min,  3 users,  load average: 15.83, 10.12, 3.96
     USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
     root     pts/0    10.30.195.96     23:05   22.00s  0.92s  0.12s /bin/bash ./amd_rate_aocc500_znver5_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) 3093781
     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) 3093781
     virtual memory          (kbytes, -v) unlimited
     file locks                     (-x) unlimited


   ---------------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize=42
    sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
    sshd: root [priv]
    sshd: root@pts/0
    -bash
    python3 ./run_intrate.py
    /bin/bash ./amd_rate_aocc500_znver5_A1.sh
    runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intrate
    runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
      --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.005/templogs/preenv.intrate.005.0.log --lognum 005.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
    $SPEC = /home/cpu2017


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

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Platform Notes (Continued)

```
6. /proc/cpuinfo
     model name        : AMD EPYC 9655 96-Core Processor
     vendor_id         : AuthenticAMD
     cpu family        : 26
     model             : 2
     stepping          : 1
     microcode         : 0xb002116
     bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size          : 192 4K pages
     cpu cores         : 96
     siblings          : 192
     2 physical ids (chips)
     384 processors (hardware threads)
     physical id 0: core ids 0-95
     physical id 1: core ids 0-95
     physical id 0: apicids 0-191
     physical id 1: apicids 256-447
  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 2.39.3:
  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):                           384
  On-line CPU(s) list:              0-383
  Vendor ID:                        AuthenticAMD
  BIOS Vendor ID:                   Advanced Micro Devices, Inc.
  Model name:                       AMD EPYC 9655 96-Core Processor
  BIOS Model name:                  AMD EPYC 9655 96-Core Processor            CPU @ 2.6GHz
  BIOS CPU family:                  107
  CPU family:                       26
  Model:                            2
  Thread(s) per core:               2
  Core(s) per socket:               96
  Socket(s):                        2
  Stepping:                         1
  Frequency boost:                  enabled
  CPU(s) scaling MHz:               101%
  CPU max MHz:                      2600.0000
  CPU min MHz:                      1500.0000
  BogoMIPS:                         5192.32
  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 amd_lbr_v2 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 hw_pstate ssbd mba perfmon_v2
                                    ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust 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 user_shstk avx_vnni avx512_bf16 clzero irperf
                                    xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
```

(Continued on next page)

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Platform Notes (Continued)

```
                        nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                        pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi
                        avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
                        avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid bus_lock_detect
                        movdiri movdir64b overflow_recov succor smca fsrm avx512_vp2intersect
                        flush_l1d debug_swap
   Virtualization:                      AMD-V
   L1d cache:                           9 MiB (192 instances)
   L1i cache:                           6 MiB (192 instances)
   L2 cache:                            192 MiB (192 instances)
   L3 cache:                            768 MiB (24 instances)
   NUMA node(s):                        8
   NUMA node0 CPU(s):                   0-23,192-215
   NUMA node1 CPU(s):                   24-47,216-239
   NUMA node2 CPU(s):                   48-71,240-263
   NUMA node3 CPU(s):                   72-95,264-287
   NUMA node4 CPU(s):                   96-119,288-311
   NUMA node5 CPU(s):                   120-143,312-335
   NUMA node6 CPU(s):                   144-167,336-359
   NUMA node7 CPU(s):                   168-191,360-383
   Vulnerability Gather data sampling:  Not affected
   Vulnerability Itlb multihit:         Not affected
   Vulnerability L1tf:                  Not affected
   Vulnerability Mds:                   Not affected
   Vulnerability Meltdown:              Not affected
   Vulnerability Mmio stale data:       Not affected
   Vulnerability Reg file data sampling: Not affected
   Vulnerability Retbleed:              Not affected
   Vulnerability Spec rstack overflow:  Not affected
   Vulnerability Spec store bypass:     Mitigation; Speculative Store Bypass disabled via prctl
   Vulnerability Spectre v1:            Mitigation; usercopy/swapgs barriers and __user pointer sanitization
   Vulnerability Spectre v2:            Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                        always-on; RSB filling; PBRSB-eIBRS Not affected; BHI Not affected
   Vulnerability Srbds:                 Not affected
   Vulnerability Tsx async abort:       Not affected

 From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d      48K       9M   12 Data              1    64       1              64
     L1i      32K       6M    8 Instruction       1    64       1              64
     L2        1M     192M   16 Unified           2  1024       1              64
     L3       32M     768M   16 Unified           3 32768       1              64


   ------------------------------------------------------------
   8. numactl --hardware
   NOTE: a numactl 'node' might or might not correspond to a physical chip.
     available: 8 nodes (0-7)
     node 0 cpus: 0-23,192-215
     node 0 size: 96372 MB
     node 0 free: 95923 MB
     node 1 cpus: 24-47,216-239
     node 1 size: 96755 MB
     node 1 free: 95999 MB
     node 2 cpus: 48-71,240-263
     node 2 size: 96755 MB
     node 2 free: 96354 MB
     node 3 cpus: 72-95,264-287
     node 3 size: 96755 MB
     node 3 free: 96338 MB
     node 4 cpus: 96-119,288-311
```

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Platform Notes (Continued)

```
  node 4 size: 96755 MB
  node 4 free: 96349 MB
  node 5 cpus: 120-143,312-335
  node 5 size: 96755 MB
  node 5 free: 96369 MB
  node 6 cpus: 144-167,336-359
  node 6 size: 96755 MB
  node 6 free: 96246 MB
  node 7 cpus: 168-191,360-383
  node 7 size: 96571 MB
  node 7 free: 96095 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  12  12  12  32  32  32  32
    1:  12  10  12  12  32  32  32  32
    2:  12  12  10  12  32  32  32  32
    3:  12  12  12  10  32  32  32  32
    4:  32  32  32  32  10  12  12  12
    5:  32  32  32  32  12  10  12  12
    6:  32  32  32  32  12  12  10  12
    7:  32  32  32  32  12  12  12  10


  -----------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       792039244 kB


  -----------------------------------------------------------
  10. who -r
    run-level 5 Oct 8 23:04


  -----------------------------------------------------------
  11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
    Default Target  Status
    graphical       running


  -----------------------------------------------------------
  12. Services, from systemctl list-unit-files
    STATE            UNIT FILES
    enabled          ModemManager YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd
                     bluetooth cron display-manager getty@ irqbalance issue-generator kbdsettings klog
                     lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked
                     wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny wpa_supplicant
    enabled-runtime  systemd-remount-fs
    disabled         NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon autofs
                     autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl ca-certificates
                     chrony-wait chronyd console-getty cups cups-browsed debug-shell dnsmasq ebtables
                     exchange-bmc-os-info firewalld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievd
                     issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nmb openvpn@
                     ostree-remount rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@
                     smartd_generate_opts smb snmpd snmptrapd speech-dispatcherd systemd-boot-check-no-failures
                     systemd-confext systemd-network-generator systemd-sysext systemd-time-wait-sync
                     systemd-timesyncd tuned udisks2 update-system-flatpaks upower vncserver@ wpa_supplicant@
    indirect         pcscd saned@ systemd-userdbd wickedd


  -----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
    root=UUID=c70d6b0a-e893-482b-b564-48624143e39e
    splash=silent
    mitigations=auto
```

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Platform Notes (Continued)

```
    quiet
    security=apparmor


  ----------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 25:
      current policy: frequency should be within 1.50 GHz and 2.60 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes


  ----------------------------------------------------------
  15. tuned-adm active
    No current active profile.


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


  ----------------------------------------------------------
  19. OS release
    From /etc/*-release /etc/*-version
    os-release SUSE Linux Enterprise Server 15 SP6
```

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Platform Notes (Continued)

```
         --------------------------------------------------------------
         20. Disk information
         SPEC is set to: /home/cpu2017
           Filesystem    Type   Size  Used Avail Use% Mounted on
           /dev/sda3     btrfs  407G   22G  383G   6% /home


         --------------------------------------------------------------
         21. /sys/devices/virtual/dmi/id
             Vendor:         HPE
             Product:        ProLiant DL385 Gen11
             Product Family: ProLiant
             Serial:         DL385G11-006


         --------------------------------------------------------------
         22. dmidecode
           Additional information from dmidecode 3.4 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:
             23x Hynix HMCG88AHBRA471N 32 GB 2 rank 6400, configured at 6000
             1x Hynix HMCG88AHBRA472N 32 GB 2 rank 6400, configured at 6000


         --------------------------------------------------------------
         23. BIOS
         (This section combines info from /sys/devices and dmidecode.)
             BIOS Vendor:        HPE
             BIOS Version:       2.10
             BIOS Date:          09/11/2024
             BIOS Revision:      2.10
             Firmware Revision: 1.63
```

Compiler Version Notes

```
==============================================================================================
C     | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C     | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL385 Gen11
(2.60 GHz, AMD EPYC 9655)

SPECrate®2017_int_base = 2020

SPECrate®2017_int_peak = 2060

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Oct-2024
Hardware Availability: Nov-2024
Software Availability: Sep-2024

Compiler Version Notes (Continued)

```
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------

================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
         | 541.leela_r(base, peak)
--------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------

================================================================================
Fortran | 548.exchange2_r(base, peak)
--------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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`

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL385 Gen11
(2.60 GHz, AMD EPYC 9655)

SPECrate®2017_int_base = 2020

SPECrate®2017_int_peak = 2060

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Oct-2024
Hardware Availability: Nov-2024
Software Availability: Sep-2024

Base Portability Flags (Continued)

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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-Wl,-mllvm -Wl,-extra-inliner -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-lamdalloc-ext -ldl
```

C++ benchmarks:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -fno-PIE -no-pie
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lflang -lamdalloc-ext
-ldl
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto
-fepilog-vectorization-of-inductions -mllvm -optimize-strided-mem-cost
-floop-transform -mllvm -unroll-aggressive -mllvm -unroll-threshold=500
-lamdlibm -lflang -lamdalloc -ldl
```

SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(2.60 GHz, AMD EPYC 9655)

SPECrate®2017_int_base = 2020

SPECrate®2017_int_peak = 2060

CPU2017 License: 3	**Test Date:** Oct-2024
Test Sponsor: HPE	**Hardware Availability:** Nov-2024
Tested by: HPE	**Software Availability:** Sep-2024

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`

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`

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_int_base = 2020

ProLiant DL385 Gen11
(2.60 GHz, AMD EPYC 9655)

SPECrate®2017_int_peak = 2060

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Oct-2024
Hardware Availability: Nov-2024
Software Availability: Sep-2024

Peak Optimization Flags (Continued)

502.gcc_r: `-m32 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand`
`-fenable-aggressive-gather -Wl,-mllvm -Wl,-extra-inliner`
`-z muldefs -Ofast -march=znver5 -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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5`
`-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -lamdlibm`
`-lflang -lamdalloc-ext -ldl`

525.x264_r: `basepeak = yes`

557.xz_r: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-ldist-scalar-expand`
`-fenable-aggressive-gather -Wl,-mllvm -Wl,-extra-inliner`
`-Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math -flto`
`-fstruct-layout=7 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -lamdlibm`
`-lflang -lamdalloc-ext -ldl`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

523.xalancbmk_r: `basepeak = yes`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `basepeak = yes`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_int_base = 2020

ProLiant DL385 Gen11
(2.60 GHz, AMD EPYC 9655)

SPECrate®2017_int_peak = 2060

CPU2017 License:	3		**Test Date:**	Oct-2024
Test Sponsor:	HPE		**Hardware Availability:**	Nov-2024
Tested by:	HPE		**Software Availability:**	Sep-2024

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/aocc5/1316/amd_rate_aocc500_znver5_A_lib/lib32
```

C++ benchmarks:

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

Fortran benchmarks:

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

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Turin-rev1.0.html
http://www.spec.org/cpu2017/flags/aocc500-flags.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Turin-rev1.0.xml
http://www.spec.org/cpu2017/flags/aocc500-flags.xml

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

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