SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL145 Gen11
(2.50 GHz, AMD EPYC 8434P)

$SPECrate^{®}2017\_int\_base = 423$

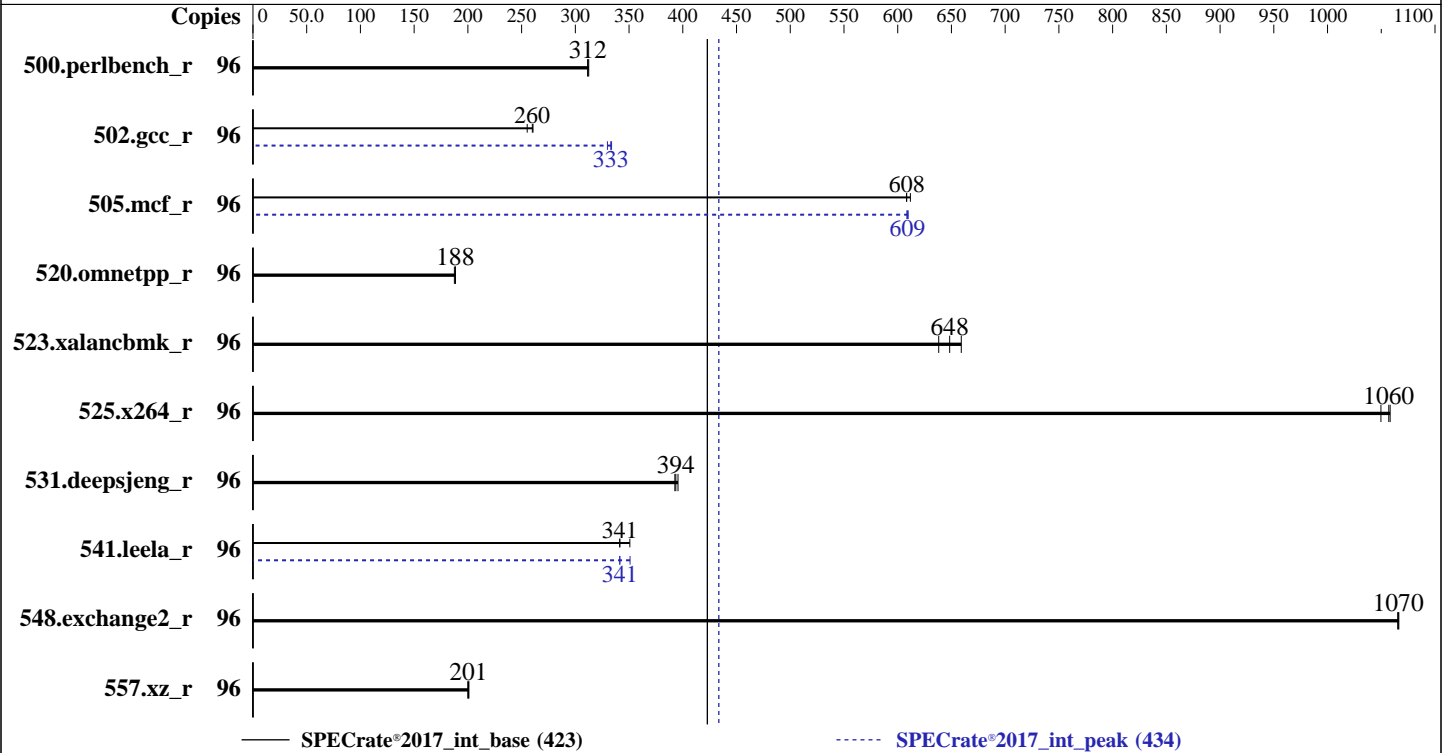$SPECrate^{®}2017\_int\_peak = 434$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Oct-2024

Hardware Availability: Oct-2024

Software Availability: Sep-2024

Copies

Benchmark	Copies	base	peak
500.perlbench_r	96	312	
502.gcc_r	96	260	333
505.mcf_r	96	608	609
520.omnetpp_r	96	188	
523.xalancbmk_r	96	648	
525.x264_r	96	1060	
531.deepsjeng_r	96	394	
541.leela_r	96	341	341
548.exchange2_r	96	1070	
557.xz_r	96	201	

—— SPECrate®2017_int_base (423)   ----- SPECrate®2017_int_peak (434)

Hardware

CPU Name: AMD EPYC 8434P
 Max MHz: 3100
 Nominal: 2500
Enabled: 48 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 / 6 cores
 Other: None
Memory: 192 GB (6 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB SATA SSD
Other: CPU Cooling: Air

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 v1.20 08/09/2024 released
 Aug-2024
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: None
Power Management: BIOS and OS set to prefer performance at
 the cost of additional power usage

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Results Table

Benchmark	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	96	491	311	489	312	**490**	**312**	96	491	311	489	312	**490**	**312**
502.gcc_r	96	522	261	**523**	**260**	533	255	96	**408**	**333**	412	330	407	334
505.mcf_r	96	**255**	**608**	254	612	255	608	96	255	609	254	610	**255**	**609**
520.omnetpp_r	96	672	187	**669**	**188**	668	188	96	672	187	**669**	**188**	668	188
523.xalancbmk_r	96	154	659	**156**	**648**	159	638	96	154	659	**156**	**648**	159	638
525.x264_r	96	160	1050	159	1060	**159**	**1060**	96	160	1050	159	1060	**159**	**1060**
531.deepsjeng_r	96	278	396	280	393	**280**	**394**	96	278	396	280	393	**280**	**394**
541.leela_r	96	**466**	**341**	453	351	466	341	96	453	351	**466**	**341**	466	341
548.exchange2_r	96	236	1070	**236**	**1070**	236	1070	96	236	1070	**236**	**1070**	236	1070
557.xz_r	96	516	201	**517**	**201**	519	200	96	516	201	**517**	**201**	519	200
SPECrate®2017_int_base =		**423**												
SPECrate®2017_int_peak =		**434**												

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/
```

Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.
```

Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

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

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/cpu2k17/amd_rate_aocc500_znver5_A_lib/lib:/home/cpu2k17/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
 AMD Periodic Directory Rinse Tuning set to Cache-Bound
 Memory Patrol Scrubbing set to Disabled
 Last-Level Cache (LLC) as NUMA Node set to Enabled
 NUMA memory domains per socket set to Two memory domains per socket
 ACPI CST C2 Latency set to 18 microseconds
 Thermal Configuration set to Maximum Cooling
 Workload Profile set to Custom
  Power Regulator set to OS Control Mode
 The reference code/AGESA version used in this ROM is version Siena-PI 1.0.0

 Sysinfo program /home/cpu2k17/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Sat Oct  5 11:49:56 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. sysctl
```

(Continued on next page)

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Platform Notes (Continued)

```
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
----------------------------------------------------------


----------------------------------------------------------
1. uname -a
  Linux 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
  11:49:56 up 11 min,  3 users,  load average: 0.00, 0.04, 0.05
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     pts/0    172.17.1.13      22Apr24 12.00s  1.32s  0.06s /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) 772296
  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) 772296
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited


----------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=31
 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/CPU2017.008/templogs/preenv.intrate.008.0.log --lognum 008.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2k17


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

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Platform Notes (Continued)

```
6. /proc/cpuinfo
     model name       : AMD EPYC 8434P 48-Core Processor
     vendor_id        : AuthenticAMD
     cpu family       : 25
     model            : 160
     stepping         : 2
     microcode        : 0xaa00215
     bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
     TLB size         : 3584 4K pages
     cpu cores        : 48
     siblings         : 96
     1 physical ids (chips)
     96 processors (hardware threads)
     physical id 0: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
     physical id 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
   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):                   96
  On-line CPU(s) list:      0-95
  Vendor ID:                AuthenticAMD
  BIOS Vendor ID:           Advanced Micro Devices, Inc.
  Model name:               AMD EPYC 8434P 48-Core Processor
  BIOS Model name:          AMD EPYC 8434P 48-Core Processor            CPU @ 2.5GHz
  BIOS CPU family:          107
  CPU family:               25
  Model:                    160
  Thread(s) per core:       2
  Core(s) per socket:       48
  Socket(s):                1
  Stepping:                 2
  Frequency boost:          enabled
  CPU(s) scaling MHz:       103%
  CPU max MHz:              2500.0000
  CPU min MHz:              1500.0000
  BogoMIPS:                 4992.05
  Flags:                    fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                            pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                            rdtscp lm constant_tsc rep_good amd_lbr_v2 nopl nonstop_tsc cpuid
                            extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid
                            sse4_1 sse4_2 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 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 avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd
                            amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean
                            flushbyasid decodeassists pausefilter pfthreshold avic
                            v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi avx512vbmi umip pku
```

(Continued on next page)

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Platform Notes (Continued)

```
                              ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                              avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
                              debug_swap
    Virtualization:           AMD-V
    L1d cache:                1.5 MiB (48 instances)
    L1i cache:                1.5 MiB (48 instances)
    L2 cache:                 48 MiB (48 instances)
    L3 cache:                 128 MiB (8 instances)
    NUMA node(s):             8
    NUMA node0 CPU(s):        0-5,48-53
    NUMA node1 CPU(s):        6-11,54-59
    NUMA node2 CPU(s):        12-17,60-65
    NUMA node3 CPU(s):        18-23,66-71
    NUMA node4 CPU(s):        24-29,72-77
    NUMA node5 CPU(s):        30-35,78-83
    NUMA node6 CPU(s):        36-41,84-89
    NUMA node7 CPU(s):        42-47,90-95
    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:  Mitigation; Safe RET
    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      32K     1.5M    8 Data            1    64       1              64
      L1i      32K     1.5M    8 Instruction     1    64       1              64
      L2        1M      48M    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: 8 nodes (0-7)
    node 0 cpus: 0-5,48-53
    node 0 size: 23877 MB
    node 0 free: 23408 MB
    node 1 cpus: 6-11,54-59
    node 1 size: 24188 MB
    node 1 free: 23976 MB
    node 2 cpus: 12-17,60-65
    node 2 size: 24188 MB
    node 2 free: 23994 MB
    node 3 cpus: 18-23,66-71
    node 3 size: 24188 MB
    node 3 free: 24031 MB
    node 4 cpus: 24-29,72-77
    node 4 size: 24188 MB
    node 4 free: 24014 MB
    node 5 cpus: 30-35,78-83
```

(Continued on next page)

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Platform Notes (Continued)

```
   node 5 size: 24127 MB
   node 5 free: 23955 MB
   node 6 cpus: 36-41,84-89
   node 6 size: 24150 MB
   node 6 free: 23954 MB
   node 7 cpus: 42-47,90-95
   node 7 size: 24188 MB
   node 7 free: 23949 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  11  11  11  12  12  12  12
     1:  11  10  11  11  12  12  12  12
     2:  11  11  10  11  12  12  12  12
     3:  11  11  11  10  12  12  12  12
     4:  12  12  12  12  10  11  11  11
     5:  12  12  12  12  11  10  11  11
     6:  12  12  12  12  11  11  10  11
     7:  12  12  12  12  11  11  11  10


   ----------------------------------------------------------------
   9. /proc/meminfo
     MemTotal:       197733528 kB


   ----------------------------------------------------------------
   10. who -r
     run-level 3 Apr 22 17:30


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


   ----------------------------------------------------------------
   12. Services, from systemctl list-unit-files
     STATE            UNIT FILES
     enabled          apparmor auditd cron getty@ irqbalance issue-generator kbdsettings lvm2-monitor postfix
                      purge-kernels rollback sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4
                      wickedd-dhcp6 wickedd-nanny
     enabled-runtime  systemd-remount-fs
     disabled         blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
                      grub2-once haveged hwloc-dump-hwdata issue-add-ssh-keys kexec-load lunmask rpmconfigcheck
                      serial-getty@ systemd-boot-check-no-failures systemd-confext systemd-network-generator
                      systemd-sysext systemd-time-wait-sync systemd-timesyncd
     indirect         systemd-userdbd wickedd


   ----------------------------------------------------------------
   13. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
     root=UUID=45afd261-73b0-43a7-a23e-94db089f1753
     splash=silent
     resume=/dev/disk/by-uuid/d6c60601-2238-4347-950d-7321063e97c9
     mitigations=auto
     quiet
     security=apparmor


   ----------------------------------------------------------------
   14. cpupower frequency-info
     analyzing CPU 13:
       current policy: frequency should be within 1.50 GHz and 2.50 GHz.
                       The governor "performance" may decide which speed to use
```

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Platform Notes (Continued)

```
                        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


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


      ----------------------------------------------------------
   19. Disk information
   SPEC is set to: /home/cpu2k17
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda3       xfs   476G  94G  383G  20% /home


      ----------------------------------------------------------
   20. /sys/devices/virtual/dmi/id
       Vendor:        HPE
       Product:       ProLiant DL145 Gen11
       Product Family: ProLiant
```

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Platform Notes (Continued)

```
     Serial:        DL145GEN11

    ------------------------------------------------------------
 21. 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:
      6x Hynix HMCG88MEBRA115N 32 GB 2 rank 4800


    ------------------------------------------------------------
 22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:       HPE
      BIOS Version:      1.20
      BIOS Date:         08/09/2024
      BIOS Revision:     1.20
      Firmware Revision: 1.62
```

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)
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
```

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SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL145 Gen11
(2.50 GHz, AMD EPYC 8434P)

$SPECrate^{®}2017\_int\_base = 423$

$SPECrate^{®}2017\_int\_peak = 434$

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

Compiler Version Notes (Continued)

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

================================================================================
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`
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`

SPEC CPU®2017 Integer Rate Result

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ProLiant DL145 Gen11
(2.50 GHz, AMD EPYC 8434P)

$SPECrate^{®}2017\_int\_base = 423$

$SPECrate^{®}2017\_int\_peak = 434$

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

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
```

Base Other Flags

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

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

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

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise
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ProLiant DL145 Gen11
(2.50 GHz, AMD EPYC 8434P)

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SPECrate®2017_int_peak = 434

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

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 -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`

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SPECrate®2017_int_base = 423

ProLiant DL145 Gen11
(2.50 GHz, AMD EPYC 8434P)

$SPECrate®2017\_int\_peak = 434$

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

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

Peak Optimization Flags (Continued)

505.mcf_r (continued):
```
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc-ext -ldl
```

525.x264_r: basepeak = yes

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: `-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 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-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:

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/aocc5/1316/amd_rate_aocc500_znver5_A_lib/lib32`

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

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ProLiant DL145 Gen11
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SPECrate®2017_int_peak = 434

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Test Sponsor: HPE
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Test Date: Oct-2024
Hardware Availability: Oct-2024
Software Availability: Sep-2024

Peak Other Flags (Continued)

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

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

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

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

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