SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)
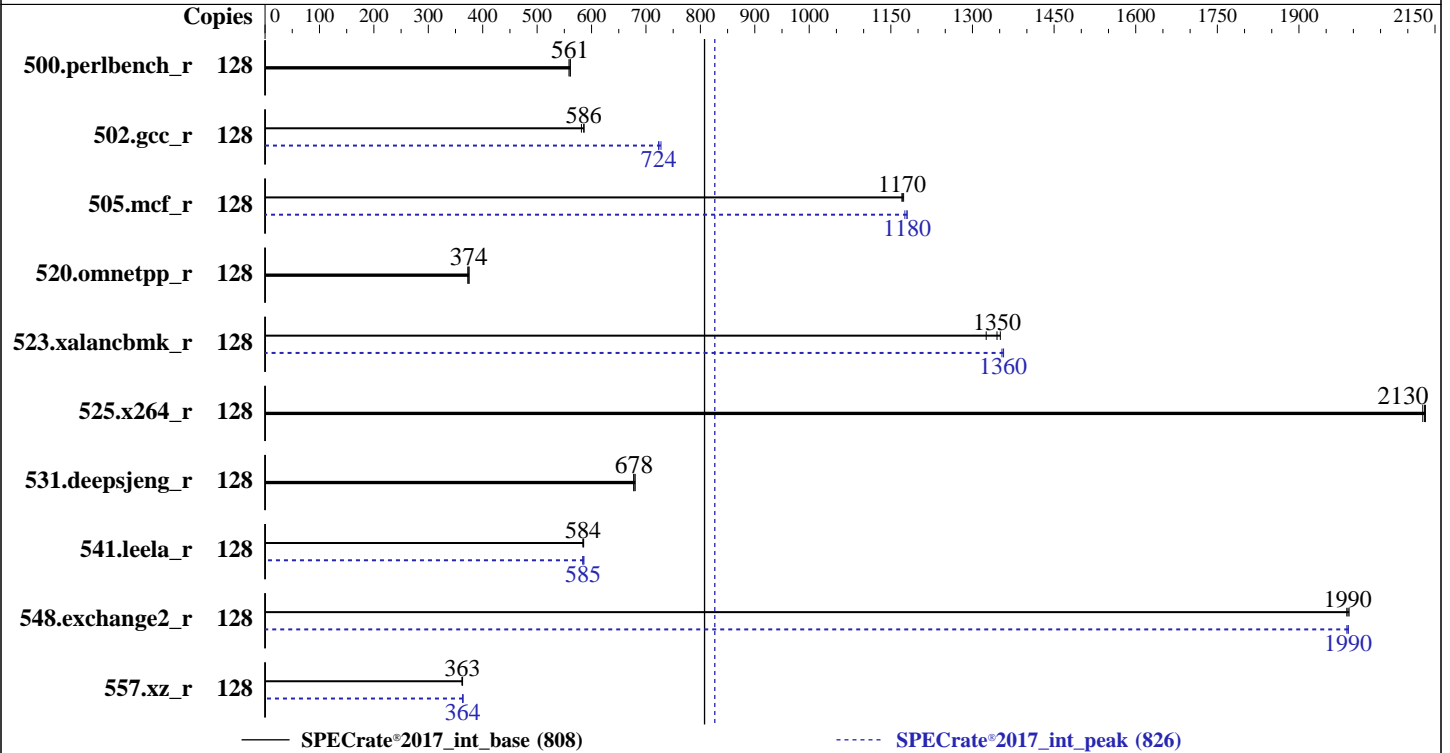
ProLiant DL325 Gen11
(3.30 GHz, AMD EPYC 9575F)

$SPECrate®2017\_int\_base = 808$

$SPECrate®2017\_int\_peak = 826$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Nov-2024

Hardware Availability: Oct-2024

Software Availability: Sep-2024

Copies	Benchmark results
500.perlbench_r 128	561
502.gcc_r 128	586 / 724
505.mcf_r 128	1170 / 1180
520.omnetpp_r 128	374
523.xalancbmk_r 128	1350 / 1360
525.x264_r 128	2130
531.deepsjeng_r 128	678
541.leela_r 128	584 / 585
548.exchange2_r 128	1990 / 1990
557.xz_r 128	363 / 364

——— SPECrate®2017_int_base (808)   - - - - - SPECrate®2017_int_peak (826)

Hardware

CPU Name: AMD EPYC 9575F

Max MHz: 5000

Nominal: 3300

Enabled: 64 cores, 1 chip, 2 threads/core

Orderable: 1 chip

Cache L1: 32 KB I + 48 KB D on chip per core

L2: 1 MB I+D on chip per core

L3: 256 MB I+D on chip per chip, 32 MB shared / 8 cores

Other: None

Memory: 384 GB (12 x 32 GB 2Rx8 PC5-6400B-R, running at 6000)

Storage: 1 x 480 GB SATA SSD

Other: CPU Cooling: CLC

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: xfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 32/64-bit

Other: None

Power Management: BIOS and OS set to prefer performance at the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	128	**363**	**561**	363	561	365	559	128	**363**	**561**	363	561	365	559
502.gcc_r	128	**310**	**586**	312	581	309	586	128	249	728	**250**	**724**	251	723
505.mcf_r	128	**177**	**1170**	177	1170	176	1170	128	175	1180	176	1180	**175**	**1180**
520.omnetpp_r	128	451	372	**449**	**374**	448	375	128	451	372	**449**	**374**	448	375
523.xalancbmk_r	128	102	1330	100	1350	**100**	**1350**	128	**99.6**	**1360**	99.8	1350	99.6	1360
525.x264_r	128	105	2130	105	2130	**105**	**2130**	128	105	2130	105	2130	**105**	**2130**
531.deepsjeng_r	128	**216**	**678**	216	680	217	677	128	**216**	**678**	216	680	217	677
541.leela_r	128	362	586	**363**	**584**	363	584	128	362	586	**362**	**585**	363	584
548.exchange2_r	128	168	1990	**169**	**1990**	169	1990	128	168	1990	**168**	**1990**	169	1990
557.xz_r	128	**381**	**363**	381	363	382	362	128	380	364	381	363	**380**	**364**
SPECrate®2017_int_base =		**808**												
SPECrate®2017_int_peak =		**826**												

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.
```

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"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:always"
```

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
 Package Power Limit Control Mode set to Manual
 Package Power Limit Value set to 400
 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.localdomain Wed Nov  6 12:39:06 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)
```

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Platform Notes (Continued)

```
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. tuned-adm active
 17. sysctl
 18. /sys/kernel/mm/transparent_hugepage
 19. /sys/kernel/mm/transparent_hugepage/khugepaged
 20. OS release
 21. Disk information
 22. /sys/devices/virtual/dmi/id
 23. dmidecode
 24. BIOS
    ----------------------------------------------------------

    ----------------------------------------------------------
 1. uname -a
   Linux localhost.localdomain 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
    12:39:06 up 14 min,  2 users,  load average: 0.24, 0.13, 0.12
   USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root      pts/0    172.17.1.114     22Apr24 16.00s  0.72s  0.05s /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) 1546240
   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) 1546240
   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
```

(Continued on next page)

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Platform Notes (Continued)

```
      --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
     $SPEC/tmp/CPU2017.006/templogs/preenv.intrate.006.0.log --lognum 006.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


   ----------------------------------------------------------------
6. /proc/cpuinfo
     model name        : AMD EPYC 9575F 64-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         : 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 2.39.3:
  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):                          128
  On-line CPU(s) list:             0-127
  Vendor ID:                       AuthenticAMD
  BIOS Vendor ID:                  Advanced Micro Devices, Inc.
  Model name:                      AMD EPYC 9575F 64-Core Processor
  BIOS Model name:                 AMD EPYC 9575F 64-Core Processor          CPU @ 3.3GHz
  BIOS CPU family:                 107
  CPU family:                      26
  Model:                           2
  Thread(s) per core:              2
  Core(s) per socket:              64
  Socket(s):                       1
  Stepping:                        1
  Frequency boost:                 enabled
  CPU(s) scaling MHz:              95%
  CPU max MHz:                     3300.0000
  CPU min MHz:                     1500.0000
  BogoMIPS:                        6590.22
  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 tsc_adjust bmi1 avx2
                                   smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
```

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Platform Notes (Continued)

```
                        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
                        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:                             3 MiB (64 instances)
  L1i cache:                             2 MiB (64 instances)
  L2 cache:                              64 MiB (64 instances)
  L3 cache:                              256 MiB (8 instances)
  NUMA node(s):                          4
  NUMA node0 CPU(s):                     0-15,64-79
  NUMA node1 CPU(s):                     16-31,80-95
  NUMA node2 CPU(s):                     32-47,96-111
  NUMA node3 CPU(s):                     48-63,112-127
  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       3M   12 Data             1    64        1              64
      L1i      32K       2M    8 Instruction      1    64        1              64
      L2        1M      64M   16 Unified          2  1024        1              64
      L3       32M     256M   16 Unified          3 32768        1              64


  -----------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0-15,64-79
    node 0 size: 96440 MB
    node 0 free: 96061 MB
    node 1 cpus: 16-31,80-95
    node 1 size: 96759 MB
    node 1 free: 96392 MB
    node 2 cpus: 32-47,96-111
    node 2 size: 96721 MB
    node 2 free: 96240 MB
    node 3 cpus: 48-63,112-127
    node 3 size: 96669 MB
    node 3 free: 96286 MB
    node distances:
```

(Continued on next page)

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Platform Notes (Continued)

```
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
    2:  12  12  10  12
    3:  12  12  12  10


  ------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       395868452 kB


  ------------------------------------------------------------
  10. who -r
     run-level 3 Apr 22 08:02


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


  ------------------------------------------------------------
  12. Failed units, from systemctl list-units --state=failed
       UNIT                            LOAD    ACTIVE SUB     DESCRIPTION
     * NetworkManager-wait-online.service loaded failed failed Network Manager Wait Online


  ------------------------------------------------------------
  13. Services, from systemctl list-unit-files
     STATE           UNIT FILES
     enabled         ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                     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 wpa_supplicant
     enabled-runtime systemd-remount-fs
     disabled        accounts-daemon autofs autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl
                     ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell
                     dmraid-activation 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@ wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny wpa_supplicant@
     indirect        pcscd saned@ systemd-userdbd wickedd


  ------------------------------------------------------------
  14. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
     root=UUID=2ecde7f3-1fd0-4b78-b405-d37301501b53
     splash=silent
     mitigations=auto
     quiet
     security=apparmor


  ------------------------------------------------------------
  15. cpupower frequency-info
     analyzing CPU 107:
       current policy: frequency should be within 1.50 GHz and 3.30 GHz.
                       The governor "performance" may decide which speed to use
                       within this range.
       boost state support:
         Supported: yes
```

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Platform Notes (Continued)

```
       Active: yes


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


    ------------------------------------------------------------
    17. 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


    ------------------------------------------------------------
    18. /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


    ------------------------------------------------------------
    19. /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


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


    ------------------------------------------------------------
    21. Disk information
    SPEC is set to: /home/cpu2017
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sdc4       xfs   436G  134G  302G  31% /home


    ------------------------------------------------------------
    22. /sys/devices/virtual/dmi/id
        Vendor:         HPE
        Product:        ProLiant DL325 Gen11
```

(Continued on next page)

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Platform Notes (Continued)

```
      Product Family: ProLiant
      Serial:         DL325G11-010


  ------------------------------------------------------------
  23. 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:
      12x Hynix HMCG88AHBRA471N 32 GB 2 rank 6400, configured at 6000


  ------------------------------------------------------------
  24. 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)
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
```

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(3.30 GHz, AMD EPYC 9575F)

$SPECrate^{®}2017\_int\_base = 808$

$SPECrate^{®}2017\_int\_peak = 826$

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

Compiler Version Notes (Continued)

```
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`
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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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(3.30 GHz, AMD EPYC 9575F)

SPECrate®2017_int_base = 808

SPECrate®2017_int_peak = 826

CPU2017 License:	3	**Test Date:**	Nov-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
```

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(3.30 GHz, AMD EPYC 9575F)

SPECrate®2017_int_base = 808

SPECrate®2017_int_peak = 826

CPU2017 License: 3		**Test Date:**	Nov-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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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(3.30 GHz, AMD EPYC 9575F)

SPECrate®2017_int_base = 808

SPECrate®2017_int_peak = 826

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

Test Date: Nov-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: `-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: `-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
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lflang
-lamdalloc-ext -ldl
```

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
```

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(3.30 GHz, AMD EPYC 9575F)

SPECrate®2017_int_base = 808

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

Peak Optimization Flags (Continued)

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 -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
```

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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