SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.15 GHz, AMD EPYC 9455)

$SPECrate®2017\_int\_base = 1200$

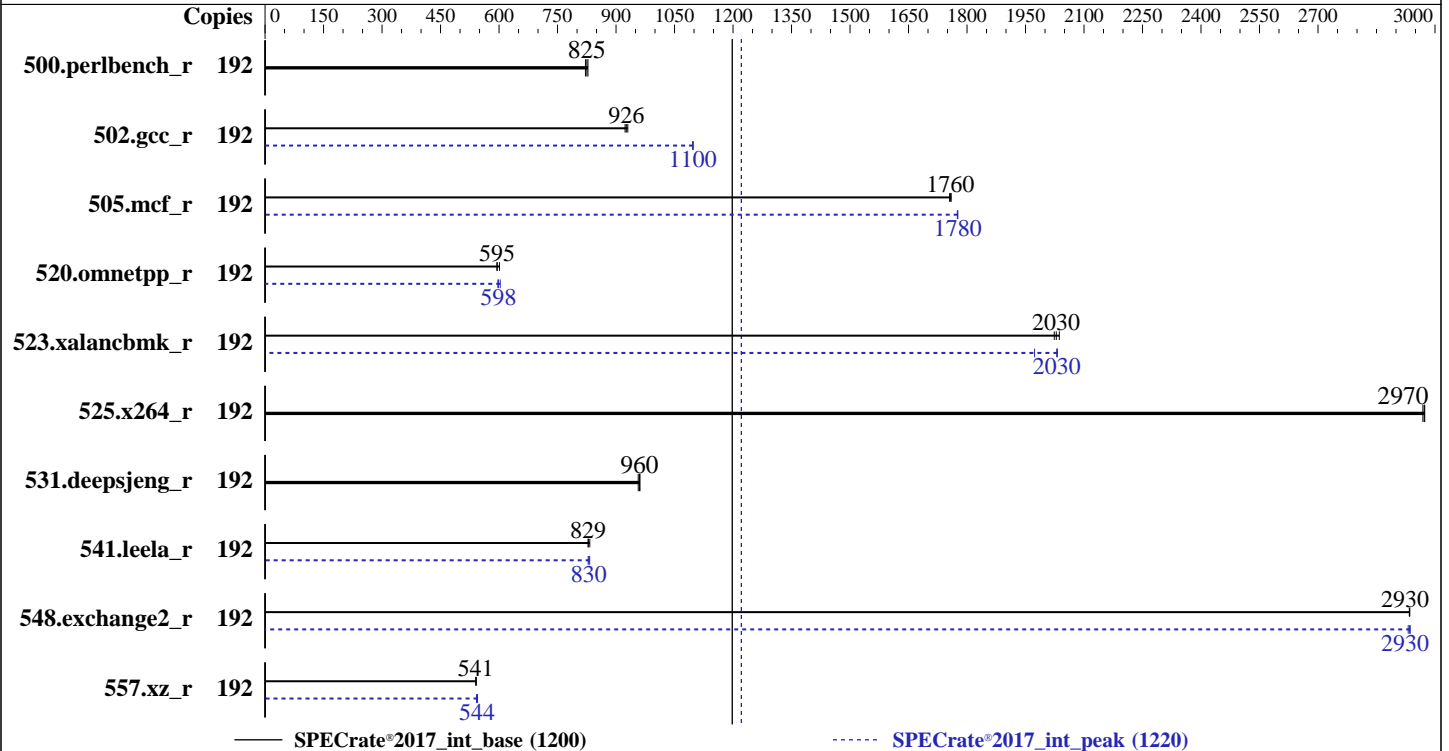$SPECrate®2017\_int\_peak = 1220$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Nov-2024

Hardware Availability: Jan-2025

Software Availability: Sep-2024

Benchmark	Copies	base	peak
500.perlbench_r	192	825	
502.gcc_r	192	926	1100
505.mcf_r	192	1760	1780
520.omnetpp_r	192	595	598
523.xalancbmk_r	192	2030	2030
525.x264_r	192	2970	
531.deepsjeng_r	192	960	
541.leela_r	192	829	830
548.exchange2_r	192	2930	2930
557.xz_r	192	541	544

SPECrate®2017_int_base (1200)   SPECrate®2017_int_peak (1220)

Hardware

CPU Name: AMD EPYC 9455

  Max MHz: 4400

  Nominal: 3150

Enabled: 96 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: 256 MB I+D on chip per chip,

    32 MB shared / 6 cores

  Other: None

Memory: 768 GB (24 x 32 GB 2Rx8 PC5-6400B-R, running at 6000)

Storage: 1 x 960 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 v2.20 10/31/2024 released Oct-2024

File System: xfs

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

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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CPU2017 License: 3	**Test Date:** Nov-2024
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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	192	369	828	372	822	**370**	**825**	192	369	828	372	822	**370**	**825**
502.gcc_r	192	**293**	**926**	292	930	294	923	192	**248**	**1100**	248	1100	248	1100
505.mcf_r	192	177	1760	**177**	**1760**	176	1760	192	175	1780	175	1780	**175**	**1780**
520.omnetpp_r	192	419	601	424	594	**423**	**595**	192	418	603	422	597	**421**	**598**
523.xalancbmk_r	192	100	2020	**99.9**	**2030**	99.6	2040	192	103	1970	99.8	2030	**99.9**	**2030**
525.x264_r	192	113	2970	**113**	**2970**	113	2970	192	113	2970	**113**	**2970**	113	2970
531.deepsjeng_r	192	230	957	**229**	**960**	229	961	192	230	957	**229**	**960**	229	961
541.leela_r	192	**384**	**829**	384	828	382	833	192	**383**	**830**	384	828	382	832
548.exchange2_r	192	171	2940	**171**	**2930**	171	2930	192	171	2940	172	2930	**171**	**2930**
557.xz_r	192	383	542	384	541	**384**	**541**	192	381	545	**381**	**544**	382	542
SPECrate®2017_int_base =	**1200**													
SPECrate®2017_int_peak =	**1220**													

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/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
 ACPI CST C2 Latency set to 18 microseconds
 Thermal Configuration set to Maximum Cooling
 NUMA memory domains per socket set to Four memory domains per socket
 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 1.0.0.2

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Wed Nov 20 16:47:35 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
```

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Platform Notes (Continued)

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


     -------------------------------------------------------------
     1. uname -a
       Linux localhost.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
        16:47:35 up 2 min,  3 users,  load average: 3.53, 3.94, 1.70
       USER      TTY      FROM             LOGIN@   IDLE   JCPU    PCPU WHAT
       root      :                         16:46   ?xdm?  22:28   0.01s gdm-session-worker [pam/gdm-password]
       root      seat0    login-           16:46    0.00s  0.00s  0.00s /usr/lib/gdm/gdm-x-session
       --register-session --run-script gnome
       root               :1               16:46   ?xdm?  22:28   0.00s /usr/lib/gdm/gdm-x-session
       --register-session --run-script gnome
       root      pts/1    172.17.1.96      16:46   15.00s  0.94s  0.15s /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) 3094427
       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) 3094427
       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/1
      -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
```

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Platform Notes (Continued)

```
 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/CPU2017.003/templogs/preenv.intrate.003.0.log --lognum 003.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


    -----------------------------------------------------------
6. /proc/cpuinfo
    model name       : AMD EPYC 9455 48-Core Processor
    vendor_id        : AuthenticAMD
    cpu family       : 26
    model            : 2
    stepping         : 1
    microcode        : 0xb00211a
    bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size         : 192 4K pages
    cpu cores        : 48
    siblings         : 96
    2 physical ids (chips)
    192 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 1: 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
    physical id 1: apicids 128-139,144-155,160-171,176-187,192-203,208-219,224-235,240-251
  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):                   192
  On-line CPU(s) list:      0-191
  Vendor ID:                AuthenticAMD
  BIOS Vendor ID:           Advanced Micro Devices, Inc.
  Model name:               AMD EPYC 9455 48-Core Processor
  BIOS Model name:          AMD EPYC 9455 48-Core Processor            CPU @ 3.1GHz
  BIOS CPU family:          107
  CPU family:               26
  Model:                    2
  Thread(s) per core:       2
  Core(s) per socket:       48
  Socket(s):                2
  Stepping:                 1
  Frequency boost:          enabled
  CPU(s) scaling MHz:       100%
  CPU max MHz:              3150.0000
  CPU min MHz:              1500.0000
  BogoMIPS:                 6289.90
  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
```

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Platform Notes (Continued)

```
                             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
                             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:                 4.5 MiB (96 instances)
  L1i cache:                 3 MiB (96 instances)
  L2 cache:                  96 MiB (96 instances)
  L3 cache:                  512 MiB (16 instances)
  NUMA node(s):              8
  NUMA node0 CPU(s):         0-11,96-107
  NUMA node1 CPU(s):         12-23,108-119
  NUMA node2 CPU(s):         24-35,120-131
  NUMA node3 CPU(s):         36-47,132-143
  NUMA node4 CPU(s):         48-59,144-155
  NUMA node5 CPU(s):         60-71,156-167
  NUMA node6 CPU(s):         72-83,168-179
  NUMA node7 CPU(s):         84-95,180-191
  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     4.5M  12 Data           1    64       1              64
      L1i      32K       3M   8 Instruction    1    64       1              64
      L2        1M      96M  16 Unified        2  1024       1              64
      L3       32M     512M  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: 0-11,96-107
    node 0 size: 96444 MB
    node 0 free: 95602 MB
    node 1 cpus: 12-23,108-119
    node 1 size: 96723 MB
    node 1 free: 96294 MB
```

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Platform Notes (Continued)

```
   node 2 cpus: 24-35,120-131
   node 2 size: 96761 MB
   node 2 free: 95718 MB
   node 3 cpus: 36-47,132-143
   node 3 size: 96761 MB
   node 3 free: 95900 MB
   node 4 cpus: 48-59,144-155
   node 4 size: 96761 MB
   node 4 free: 96403 MB
   node 5 cpus: 60-71,156-167
   node 5 size: 96761 MB
   node 5 free: 96422 MB
   node 6 cpus: 72-83,168-179
   node 6 size: 96761 MB
   node 6 free: 96336 MB
   node 7 cpus: 84-95,180-191
   node 7 size: 96662 MB
   node 7 free: 95983 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:       792204680 kB


   ------------------------------------------------------------
10. who -r
   run-level 5 Nov 20 16:46


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

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Platform Notes (Continued)

```
----------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
   root=UUID=03804bb9-43a7-4bf1-b551-5c912b239e58
   splash=silent
   mitigations=auto
   quiet
   security=apparmor


----------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 171:
      current policy: frequency should be within 1.50 GHz and 3.15 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
```

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Test Date: Nov-2024
Hardware Availability: Jan-2025
Software Availability: Sep-2024

Platform Notes (Continued)

```
   pages_to_scan           4096
   scan_sleep_millisecs    10000


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


  ------------------------------------------------------------
  20. Disk information
  SPEC is set to: /home/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sdd2       xfs   892G   47G  845G   6% /


  ------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
     Vendor:         HPE
     Product:        ProLiant DL385 Gen11
     Product Family: ProLiant
     Serial:         DL385GEN11-001


  ------------------------------------------------------------
  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:
      24x 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:      2.20
     BIOS Date:         10/31/2024
     BIOS Revision:     2.20
     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
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.15 GHz, AMD EPYC 9455)

SPECrate®2017_int_base = 1200

SPECrate®2017_int_peak = 1220

Compiler Version Notes (Continued)

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

==============================================================================
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++     | 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
```

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.15 GHz, AMD EPYC 9455)

SPECrate®2017_int_base = 1200

SPECrate®2017_int_peak = 1220

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

Test Date: Nov-2024
Hardware Availability: Jan-2025
Software Availability: Sep-2024

Base Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-DSPEC_LP64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-m64 -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
```

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https://www.spec.org/

SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_int_base = 1200

ProLiant DL385 Gen11
(3.15 GHz, AMD EPYC 9455)

SPECrate®2017_int_peak = 1220

CPU2017 License: 3		**Test Date:**	Nov-2024
Test Sponsor:	HPE	**Hardware Availability:**	Jan-2025
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`

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.15 GHz, AMD EPYC 9455)

SPECrate®2017_int_base = 1200

SPECrate®2017_int_peak = 1220

CPU2017 License: 3	**Test Date:**	Nov-2024
Test Sponsor: HPE	**Hardware Availability:**	Jan-2025
Tested by: HPE	**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: `-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 -lamdalloc-ext`
`-ldl`

523.xalancbmk_r: `-m64 -std=c++14`
`-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_int_base = 1200

ProLiant DL385 Gen11
(3.15 GHz, AMD EPYC 9455)

SPECrate®2017_int_peak = 1220

CPU2017 License: 3		**Test Date:**	Nov-2024
Test Sponsor:	HPE	**Hardware Availability:**	Jan-2025
Tested by:	HPE	**Software Availability:**	Sep-2024

Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
```
-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
```

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
```

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SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

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ProLiant DL385 Gen11
(3.15 GHz, AMD EPYC 9455)

SPECrate®2017_int_base = 1200

SPECrate®2017_int_peak = 1220

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

Test Date: Nov-2024
Hardware Availability: Jan-2025
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/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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