Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.25 GHz, AMD EPYC 97544)

SPEC CPU®2017 Integer Rate Result
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HPE

SPECrate®2017_int_base = 1840
SPECrate®2017_int_peak = 1970

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

Test Date: May-2023
Hardware Availability: Jun-2023
Software Availability: Nov-2022

Copies

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</table>

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**Hardware**

- **CPU Name:** AMD EPYC 9754
- **Max MHz:** 3100
- **Nominal:** 2250
- **Enabled:** 256 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 256 MB I+D on chip per chip, 16 MB shared / 8 cores
- **Other:** None
- **Memory:** 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux 9.0 (Plow)
- **Kernel:** 5.14.0-70.13.1.el9_0.x86_64
- **Compiler:** C/C++/Fortran: Version 4.0.0 of AOCC
- **Parallel:** No
- **Firmware:** HPE BIOS Version v1.30 03/06/2023 released Mar-2023
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** None
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
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</table>

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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  

#### 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 -1 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.swapappiness=1' run as root.  
To free node-local memory and avoid remote memory usage,  
'sysctl -w vm.zone_reclaim_mode=1' run as root.

To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.  
To disable address space layout randomization (ASLR) to reduce run-to-run variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) only on request for base runs,  
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.

To enable THP for all allocations for peak runs,  
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and  
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
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Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
"/home/cpu2017/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017/amd_rate_aocc400_genoa_B_lib/lib32:"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:never"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Platform Notes

BIOS Configuration
Workload Profile set to General Throughput Compute
Determinism Control set to Manual
Performance Determinism set to Power Deterministic
Last-Level Cache (LLC) as NUMA Node set to Enabled
NUMA memory domains per socket set to Four memory domains per socket
ACPI C1/C2 Latency set to 18 microseconds
Thermal Configuration set to Maximum Cooling
Data Fabric C-State Enable set to Force Enabled
Workload Profile set to Custom
Power Regulator set to OS Control Mode

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Thu May 18 11:16:08 2023

SUT (System Under Test) info as seen by some common utilities.

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**Platform Notes (Continued)**

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19. OS release
20. Disk information
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22. dmidecode
23. BIOS

----

1. `uname -a`
   
   Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64 x86_64 GNU/Linux

2. `w`
   
   11:16:08 up 27 min,  2 users,  load average: 0.14, 0.03, 0.01
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1      07Apr22 406days  0.00s  0.00s -bash
   root     pts/0     07Apr22 16.00s  1.38s  0.09s /bin/bash ./amd_rate_aocc400_genoa_B1.sh

3. Username
   
   From environment variable $USER: root

4. `ulimit -a`
   
   real-time non-blocking time (microseconds, -R) unlimited
   core file size (blocks, -c) 0
   data seg size (kbytes, -d) unlimited
   scheduling priority (-e) 0
   file size (blocks, -f) unlimited
   pending signals (-l) 6190826
   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) 6190826
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

5. `sysinfo process ancestry`
   
   /usr/lib/systemd/systemd --switched-root --system --deserialize 28
   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_aocc400_genoa_B1.sh
   runcpu --config amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 intrate
   runcpu --configfile amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2

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Platform Notes (Continued)

specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

6. /proc/cpuinfo
   
   model name      : AMD EPYC 9754 128-Core Processor
   vendor_id       : AuthenticAMD
   cpu family      : 25
   model           : 160
   stepping        : 2
   bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
   TLB size        : 3584 4K pages
   cpu cores       : 128
   siblings        : 256
   2 physical ids (chips)
   512 processors (hardware threads)
   physical id 0: core ids 0-127
   physical id 1: core ids 0-127
   physical id 2: apicids 0-255
   physical id 1: apicids 256-511
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

7. lscpu

From lscpu from util-linux 2.37.4:

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): 512
On-line CPU(s) list: 0-511
Vendor ID: AuthenticAMD
BIOS Vendor ID: Advanced Micro Devices, Inc.
Model name: AMD EPYC 9754 128-Core Processor
CPU family: 25
Model: 160
Thread(s) per core: 2
Core(s) per socket: 128
Socket(s): 2
Stepping: 2
Frequency boost: enabled
CPU max MHz: 2250.000
CPU min MHz: 1500.000
BogoMIPS: 4493.10

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 rtsscp lm
constant_t-c rep_good nopl nonstop_tsc cpuid extd_apicid aperfmerpf rapl
pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy
abm ssse4a misalignsse 3dnowprefetch osuw ibs kinit wdt tce topoext
perfctr_core perfctr_nb bptext perfctr_l1c mwaitx cpb cat_13 cdg_13
invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bm1
avx2 smep bm12 erms invpcid cmr rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb avx512cd sha ni avx512bw avx512v1 xsaveopt
xsaves kxgstbv1 xsaves cqm_l1c cqm_occup_l1c cmq_mmb_total cqm_mmb_local
avx512_bf16 clzero iperf xsaveprtr rdprru wboinvd amd_pini arat npt lbv
svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists

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Platform Notes (Continued)

Virtualization: AMD-V
L1d cache: 8 MiB (256 instances)
L1i cache: 8 MiB (256 instances)
L2 cache: 256 MiB (256 instances)
L3 cache: 512 MiB (32 instances)
NUMA node(s): 32
NUMA node0 CPU(s): 0-7, 256-263
NUMA node1 CPU(s): 8-15, 264-271
NUMA node2 CPU(s): 64-71, 320-327
NUMA node3 CPU(s): 72-79, 328-335
NUMA node4 CPU(s): 32-39, 288-295
NUMA node5 CPU(s): 40-47, 296-303
NUMA node6 CPU(s): 96-103, 352-359
NUMA node7 CPU(s): 104-111, 360-367
NUMA node8 CPU(s): 48-55, 304-311
NUMA node9 CPU(s): 56-63, 312-319
NUMA node10 CPU(s): 112-119, 368-375
NUMA node11 CPU(s): 120-127, 376-383
NUMA node12 CPU(s): 16-23, 272-279
NUMA node13 CPU(s): 24-31, 280-287
NUMA node14 CPU(s): 80-87, 336-343
NUMA node15 CPU(s): 88-95, 344-351
NUMA node16 CPU(s): 128-135, 384-391
NUMA node17 CPU(s): 136-143, 392-399
NUMA node18 CPU(s): 192-199, 448-455
NUMA node19 CPU(s): 200-207, 456-463
NUMA node20 CPU(s): 160-167, 416-423
NUMA node21 CPU(s): 168-175, 424-431
NUMA node22 CPU(s): 224-231, 480-487
NUMA node23 CPU(s): 232-239, 488-495
NUMA node24 CPU(s): 176-183, 432-439
NUMA node25 CPU(s): 184-191, 440-447
NUMA node26 CPU(s): 240-247, 496-503
NUMA node27 CPU(s): 248-255, 504-511
NUMA node28 CPU(s): 144-151, 400-407
NUMA node29 CPU(s): 152-159, 408-415
NUMA node30 CPU(s): 208-215, 464-471
NUMA node31 CPU(s): 216-223, 472-479
Vulnerability Itlb multihit: Not affected
Vulnerability Ltf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre v1 bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling
Vulnerability Srbd: Not affected
Vulnerability Tso async abort: Not affected

From lscpu --cache:

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<td>1</td>
<td>1</td>
<td>1</td>
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<td>32K</td>
<td>8M</td>
<td>8</td>
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**Platform Notes (Continued)**

8. `numactl --hardware`  
   **NOTE:** a `numactl 'node'` might or might not correspond to a physical chip.
   ```
   available: 32 nodes (0-31)
   node 0 cpus: 0-7,256-263
   node 0 size: 48133 MB
   node 0 free: 47478 MB
   node 1 cpus: 8-15,264-271
   node 1 size: 48380 MB
   node 1 free: 48190 MB
   node 2 cpus: 64-71,320-327
   node 2 size: 48380 MB
   node 2 free: 48116 MB
   node 3 cpus: 72-79,328-335
   node 3 size: 48380 MB
   node 3 free: 48203 MB
   node 4 cpus: 32-39,288-295
   node 4 size: 48380 MB
   node 4 free: 48052 MB
   node 5 cpus: 40-47,296-303
   node 5 size: 48380 MB
   node 5 free: 48075 MB
   node 6 cpus: 96-103,352-359
   node 6 size: 48380 MB
   node 6 free: 47642 MB
   node 7 cpus: 104-111,360-367
   node 7 size: 48380 MB
   node 7 free: 48089 MB
   node 8 cpus: 48-55,304-311
   node 8 size: 48380 MB
   node 8 free: 48105 MB
   node 9 cpus: 56-63,312-319
   node 9 size: 48380 MB
   node 9 free: 48145 MB
   node 10 cpus: 112-119,368-375
   node 10 size: 48380 MB
   node 10 free: 48166 MB
   node 11 cpus: 120-127,376-383
   node 11 size: 48380 MB
   node 11 free: 48137 MB
   node 12 cpus: 16-23,272-279
   node 12 size: 48380 MB
   node 12 free: 47711 MB
   node 13 cpus: 24-31,280-287
   node 13 size: 48380 MB
   node 13 free: 48157 MB
   node 14 cpus: 80-87,336-343
   node 14 size: 48380 MB
   node 14 free: 48140 MB
   node 15 cpus: 88-95,344-351
   node 15 size: 48380 MB
   node 15 free: 48136 MB
   node 16 cpus: 128-135,384-391
   node 16 size: 48344 MB
   node 16 free: 48074 MB
   node 17 cpus: 136-143,392-399
   node 17 size: 48380 MB
   node 17 free: 48101 MB
   node 18 cpus: 192-199,448-455
   node 18 size: 48380 MB
   node 18 free: 48229 MB
   ```

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<td>node 19 cpus: 200–207,456–463</td>
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<td>node 19 size: 48380 MB</td>
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<td>node 19 free: 48238 MB</td>
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<td>node 20 cpus: 160–167,416–423</td>
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<td>node 20 size: 48380 MB</td>
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<td>node 20 free: 48189 MB</td>
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<td>node 21 cpus: 168–175,424–431</td>
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<td>node 21 size: 48380 MB</td>
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<td>node 21 free: 48106 MB</td>
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<td>node 22 cpus: 224–231,480–487</td>
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<td>node 22 free: 48222 MB</td>
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<tr>
<td>node 23 cpus: 232–239,488–495</td>
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<tr>
<td>node 23 size: 48380 MB</td>
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<tr>
<td>node 23 free: 48228 MB</td>
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<tr>
<td>node 24 cpus: 176–183,432–439</td>
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<tr>
<td>node 24 size: 48380 MB</td>
</tr>
<tr>
<td>node 24 free: 48229 MB</td>
</tr>
<tr>
<td>node 25 cpus: 184–191,440–447</td>
</tr>
<tr>
<td>node 25 size: 48380 MB</td>
</tr>
<tr>
<td>node 25 free: 48229 MB</td>
</tr>
<tr>
<td>node 26 cpus: 240–247,496–503</td>
</tr>
<tr>
<td>node 26 size: 48380 MB</td>
</tr>
<tr>
<td>node 26 free: 48098 MB</td>
</tr>
<tr>
<td>node 27 cpus: 248–255,504–511</td>
</tr>
<tr>
<td>node 27 size: 48380 MB</td>
</tr>
<tr>
<td>node 27 free: 48117 MB</td>
</tr>
<tr>
<td>node 28 cpus: 144–151,400–407</td>
</tr>
<tr>
<td>node 28 size: 48380 MB</td>
</tr>
<tr>
<td>node 28 free: 48230 MB</td>
</tr>
<tr>
<td>node 29 cpus: 152–159,408–415</td>
</tr>
<tr>
<td>node 29 size: 48380 MB</td>
</tr>
<tr>
<td>node 29 free: 48228 MB</td>
</tr>
<tr>
<td>node 30 cpus: 208–215,464–471</td>
</tr>
<tr>
<td>node 30 size: 48380 MB</td>
</tr>
<tr>
<td>node 30 free: 48120 MB</td>
</tr>
<tr>
<td>node 31 cpus: 216–223,472–479</td>
</tr>
<tr>
<td>node 31 size: 48298 MB</td>
</tr>
<tr>
<td>node 31 free: 48166 MB</td>
</tr>
<tr>
<td>node distances:</td>
</tr>
</tbody>
</table>

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL385 Gen11
(2.25 GHz, AMD EPYC 9754)

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

SPEC CPU®2017 Integer Rate Result

SPECrate®2017_int_base = 1840
SPECrate®2017_int_peak = 1970

Copyright 2017-2023 Standard Performance Evaluation Corporation

Test Date: May-2023
Hardware Availability: Jun-2023
Software Availability: Nov-2022

Platform Notes (Continued)

9. /proc/meminfo
   MemTotal: 1584958704 kB

10. who -r
    run-level 3 Apr 7 05:30

11. Systemd service manager version: systemd 250 (250-6.el9_0)
    Default Target Status
    multi-user running

(Continued on next page)
Platform Notes (Continued)

12. Services, from systemctl list-unit-files

<table>
<thead>
<tr>
<th>STATE</th>
<th>UNIT FILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>enabled</td>
<td>NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond</td>
</tr>
<tr>
<td></td>
<td>dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode</td>
</tr>
<tr>
<td></td>
<td>nis-domainname rhsmcertd rayslog selinux-autorelabel-mark sshd sssd</td>
</tr>
<tr>
<td></td>
<td>systemd-network-generator tuned udisks2</td>
</tr>
<tr>
<td>enabled-runtime</td>
<td>systemd-remount-fs</td>
</tr>
<tr>
<td>disabled</td>
<td>blk-availability chrony-wait console-getty cpupower debug-shell hwloc-dump-hwdata kvm_stat</td>
</tr>
<tr>
<td></td>
<td>man-db-restart-cache-update nftables powertop rdisc rhsm rhsm-facts rpmdb-rebuild</td>
</tr>
<tr>
<td></td>
<td>serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysext</td>
</tr>
<tr>
<td>indirect</td>
<td>ssd-autofs ssdsd-kcm ssdss-ns ssdsc-pac ssdsc-pam ssdss-ssh ssdss-sudo</td>
</tr>
</tbody>
</table>

13. Linux kernel boot-time arguments, from /proc/cmdline

BOOT_IMAGE=(hd1,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
root=/dev/mapper/rhel-root
ro
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap

14. cpupower frequency-info

analyzing CPU 0:

current policy: frequency should be within 1.50 GHz and 2.25 GHz.
The governor "performance" may decide which speed to use within this range.

boost state support:
  Supported: yes
  Active: yes
  Boost States: 0
  Total States: 3
  Pstate-P0:  2250MHz

15. tuned-adm active

Current active profile: throughput-performance

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

(Continued on next page)
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<td>ProLiant DL385 Gen11</td>
<td>SPECrated®2017_int_peak = 1970</td>
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<td>(2.25 GHz, AMD EPYC 9754)</td>
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<td>Tested by: HPE</td>
<td>Software Availability: Nov-2022</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

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/hugepaged
alloc_sleep_millisecs 60000
defrag 1
max_ptes_none 511
max_ptes_shared 256
max_ptes_swap 64
pages_to_scan 4096
scan_sleep_millisecs 10000

19. OS release
From /etc/*-release /etc/*-version
os-release     Red Hat Enterprise Linux 9.0 (Plow)
redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
system-release Red Hat Enterprise Linux release 9.0 (Plow)

20. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 372G 9.4G 363G 3% /home

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

22. dmidecode
Additional information from dmidecode 3.3 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:
7x Hynix HMCG94AEBA103N 64 GB 2 rank 4800
15x Hynix HMCG94MEBRA121N 64 GB 2 rank 4800
2x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: HPE
BIOS Version: 1.30
BIOS Date: 03/06/2023
BIOS Revision: 1.30
Firmware Revision: 1.10
Compiler Version Notes

---

C       | 502.gcc_r(peak)
---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
---

C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)
---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
---

C       | 502.gcc_r(peak)
---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
---

C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)
---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
---

C++     | 523.xalancbmk_r(peak)
---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
---

C++     | 520.omnetpp_r(base, peak) 523.xalanchbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
---

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
---

C++     | 523.xalanchbmk_r(peak)
---

(Continued on next page)
COMPILER VERSION NOTES (CONTINUED)

C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Fortran | 548.exchange2_r(base, peak)

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Base Portability Flags

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

### C benchmarks:
- `-m64` -flto `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather`  
- `-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math`  
- `-fstruct-layout=7 -mllvm -unroll-threshold=50`  
- `-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining`  
- `-mllvm -reduce-array-computations=3 -zopt -lamdlibm -flang`  
- `-lamdalloc`

### C++ benchmarks:
- `-m64` -flto `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3`  
- `-march=znver4 -fveclib=AMDLIBM -ffast-math`  
- `-mllvm -unroll-threshold=100 -finline-aggressive`  
- `-mllvm -loop-unswitch-threshold=200000`  
- `-mllvm -reduce-array-computations=3 -zopt`  
- `-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -flang`  
- `-lamdalloc-ext`

### Fortran benchmarks:
- `-m64` -flto `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-inline-recursion=4 `-Wl,-mllvm -Wl,-lsr-in-nested-loop`  
- `-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver4`  
- `-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions`  
- `-mllvm -optimize-strided-mem-cost -floop-transform`  
- `-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm`  
- `-flang -lamdalloc`

## Base Other Flags

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

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

### Fortran benchmarks:
- `-Wno-unused-command-line-argument`
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.25 GHz, AMD EPYC 9754)

SPECrater®2017_int_base = 1840
SPECrater®2017_int_peak = 1970

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

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 -z muldefs -Ofast -march=znver4
-fvecclib=AMDLIBM -ffast-math -fstruct-layout=7
-mlvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mlvm -inline-threshold=1000
-mlvm -reduce-array-computations=3 -zopt -fgnu89-inline
-landalloc
505.mcf_r: -m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthruth-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fvecclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mlllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mlllvm -inline-threshold=1000
-mlllvm -reduce-array-computations=3 -zopt -lamdlibm

(Continued on next page)
Peak Optimization Flags (Continued)

505.mcf_r (continued):
-llflang -lamdalloc

525.x264_r: basepeak = yes
557.xz_r: basepeak = yes

C++ benchmarks:
520.omnetpp_r: basepeak = yes
523.xalancbmk_r: -m32 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3
-Wl,-mlllvm -Wl,-do-block-reorder=aggressive
-fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mlllvm -unroll-threshold=100
-mlllvm -reduce-array-computations=3 -zopt
-mlllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext

531.deepsjeng_r: -m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mlllvm -unroll-threshold=100 -finline-aggressive
-mlllvm -loop-unswitch-threshold=200000
-mlllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext

541.leela_r: basepeak = yes

Fortran benchmarks:
-m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3
-Wl,-mlllvm -Wl,-inline-recursion=4 -Wl,-mlllvm -Wl,-lsr-in-nested-loop
-Wl,-mlllvm -Wl,-enable-iv-split -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fepilog-vectorization-of-inductions
-mlllvm -optimize-strided-mm-cost -floop-transform
-mlllvm -unroll-aggressive -mlllvm -unroll-threshold=500 -lamdlibm
-llflang -lamdalloc
**SPEC CPU®2017 Integer Rate Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL385 Gen11  
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**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/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32`

C++ benchmarks (except as noted below):
- `-Wno-unused-command-line-argument`

523.xalancbmk_r: `-L/usr/lib32 -Wno-unused-command-line-argument`
`-L/home/work/cpu2017/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32`

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

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


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

- [http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Bergamo-rev1.0.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Bergamo-rev1.0.xml)

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Tested with SPEC CPU®2017 v1.1.9 on 2023-05-18 01:46:07-0400.