## SPEC CPU®2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL385 Gen11  
(2.20 GHz, AMD EPYC 9734)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>HPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td></td>
</tr>
<tr>
<td>CPU Name</td>
<td>AMD EPYC 9734</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2200</td>
</tr>
<tr>
<td>Enabled</td>
<td>224 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
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<tr>
<td>L3</td>
<td>256 MB I+D on chip per chip, 16 MB shared / 7 cores</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

| Software      |     |
| OS            | Red Hat Enterprise Linux 9.0 (Plow) |
| 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 | 64-bit |
| Other         | None |
| Power Management | BIOS and OS set to prefer performance at the cost of additional power usage |

| Test Date      | Jun-2023 |
| Hardware Availability | Sep-2023 |
| Software Availability | Apr-2023 |

### SPECrate®2017_fp_base = 1350
### SPECrate®2017_fp_peak = 1350

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<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<td>1750</td>
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<tr>
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<td>511.povray_r</td>
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<td>526.blender_r</td>
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<tr>
<td>527.cam4_r</td>
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<tr>
<td>538.imagick_r</td>
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<td>544.nab_r</td>
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<tr>
<td>554.roms_r</td>
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</tbody>
</table>

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**Note:** The results are based on the given hardware and software configurations. The SPEC CPU®2017 benchmark suite evaluates the computational performance of the system under various programs.
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.20 GHz, AMD EPYC 9734)  

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 1350
SPECrate®2017_fp_peak = 1350

Results Table

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</tbody>
</table>

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 -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.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,

(Continued on next page)
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SPECrater®2017_fp_base = 1350
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
   "/home/cpu2017/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017/amd_rate_aocc400_znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"

General Notes

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

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

Platform Notes

BIOS Configuration
Workload Profile set to General Throughput Compute
AMD SMT Option set to Disabled
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 CST C2 Latency set to 18 microseconds
Thermal Configuration set to Maximum Cooling
Data Fabric C-State Enable set to Force Enabled
Memory PStates set to Disabled
Workload Profile set to Custom
Power Regulator set to OS Control Mode
L2 HW Prefetcher set to Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Jun 27 20:29:27 2023

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

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SPEC CPU®2017 Floating Point Rate Result

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SPECrate®2017_fp_base = 1350
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jun-2023
Hardware Availability: Sep-2023
Software Availability: Apr-2023

Platform Notes (Continued)

7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-6.e19_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/klhugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
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
20:29:27 up 8 min, 2 users, load average: 0.14, 0.06, 0.02
USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
root     tty1      23May22 400days  0.00s  0.00s -bash
root     pts/0     23May22 23.00s  1.36s  0.09s /bin/bash ./amd_rate_aocc400_znver4_A1.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 (-i) 6191102
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) 6191102
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 27
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]

(Continued on next page)
Platform Notes (Continued)

sshd: root@pts/0
-bash
 python3 ./run_fprate_znver4_A1.py
 /bin/bash ./amd_rate_aocc400_znver4_A1.sh
 runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fprate
 runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
 --runmode rate --tune base:peak --size test:train:reffrate fprate --nopreenv --note-preenv --logfile
 $SPEC/tmp/CPU2017.009/templogs/preenv.fprate.009.0.log --lognum 009.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo

   model name : AMD EPYC 9734 112-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 : 112
   siblings : 112
   2 physical ids (chips)
   224 processors (hardware threads)
   physical id 0: core ids
   0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,240-246
   physical id 1: core ids
   0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,240-246
   physical id 0: apicids
   0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,240-246
   physical id 1: apicids

   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): 224
   On-line CPU(s) list: 0-223
   Vendor ID: AuthenticAMD
   BIOS Vendor ID: Advanced Micro Devices, Inc.
   BIOS Model name: AMD EPYC 9734 112-Core Processor
   CPU family: 25
   Model: 160
   Thread(s) per core: 1
   Core(s) per socket: 112
   Socket(s): 2
   Stepping: 2
   Frequency boost: enabled

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Hewlett Packard Enterprise
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

Virtualization:
AMD-V

L1d cache:    7 MiB (224 instances)
L1i cache:    7 MiB (224 instances)
L2 cache:     224 MiB (224 instances)
L3 cache:     512 MiB (32 instances)

NUMA node(s):
    32

NUMA node0 CPU(s):  0-6
NUMA node1 CPU(s):  7-13
NUMA node2 CPU(s):  56-62
NUMA node3 CPU(s):  63-69
NUMA node4 CPU(s):  28-34
NUMA node5 CPU(s):  35-41
NUMA node6 CPU(s):  84-90
NUMA node7 CPU(s):  91-97
NUMA node8 CPU(s):  42-48
NUMA node9 CPU(s):  49-55
NUMA node10 CPU(s): 98-104
NUMA node11 CPU(s): 105-111
NUMA node12 CPU(s): 14-20
NUMA node13 CPU(s): 21-27
NUMA node14 CPU(s):  70-76
NUMA node15 CPU(s):  77-83
NUMA node16 CPU(s): 112-118
NUMA node17 CPU(s): 119-125
NUMA node18 CPU(s): 168-174
NUMA node19 CPU(s): 175-181
NUMA node20 CPU(s): 140-146
NUMA node21 CPU(s): 147-153
NUMA node22 CPU(s): 196-202
NUMA node23 CPU(s): 203-209
NUMA node24 CPU(s): 154-160
NUMA node25 CPU(s): 161-167
NUMA node26 CPU(s): 210-216
NUMA node27 CPU(s): 217-223
NUMA node28 CPU(s): 126-132
NUMA node29 CPU(s): 133-139
NUMA node30 CPU(s): 182-188
NUMA node31 CPU(s): 189-195

Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected

(Continued on next page)
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ProLiant DL385 Gen11
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Tested by: HPE
Test Date: Jun-2023
Hardware Availability: Sep-2023
Software Availability: Apr-2023

SPECrate®2017_fp_base = 1350
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Platform Notes (Continued)

- Vulnerability Meltdown: Not affected
- Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
- Vulnerability Spectre v1: Mitigation; usercopy/swapsps barriers and __user pointer sanitization
- Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB filling
- Vulnerability Srbds: Not affected
- Vulnerability Tsx async abort: Not affected

From lscpu --cache:

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<td>1</td>
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8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

available: 32 nodes (0-31)
node 0 cpus: 0-6
node 0 size: 48136 MB
node 0 free: 47960 MB
node 1 cpus: 7-13
node 1 size: 48382 MB
node 1 free: 48227 MB
node 2 cpus: 56-62
node 2 size: 48345 MB
node 2 free: 48229 MB
node 3 cpus: 63-69
node 3 size: 48382 MB
node 3 free: 48246 MB
node 4 cpus: 28-34
node 4 size: 48382 MB
node 4 free: 48228 MB
node 5 cpus: 35-41
node 5 size: 48382 MB
node 5 free: 48239 MB
node 6 cpus: 84-90
node 6 size: 48382 MB
node 6 free: 48247 MB
node 7 cpus: 91-97
node 7 size: 48382 MB
node 7 free: 48239 MB
node 8 cpus: 42-48
node 8 size: 48382 MB
node 8 free: 48143 MB
node 9 cpus: 49-55
node 9 size: 48382 MB
node 9 free: 47786 MB
node 10 cpus: 98-104
node 10 size: 48382 MB
node 10 free: 48209 MB
node 11 cpus: 105-111
node 11 size: 48382 MB
node 11 free: 48226 MB
node 12 cpus: 14-20
node 12 size: 48382 MB
node 12 free: 48227 MB
node 13 cpus: 21-27
node 13 size: 48382 MB

(Continued on next page)
## Platform Notes (Continued)

node 13 free: 48222 MB
node 14 cpus: 70-76
node 14 size: 48382 MB
node 14 free: 48225 MB
node 15 cpus: 77-83
node 15 size: 48382 MB
node 15 free: 48170 MB
node 16 cpus: 112-118
node 16 size: 48382 MB
node 16 free: 48240 MB
node 17 cpus: 119-125
node 17 size: 48382 MB
node 17 free: 48257 MB
node 18 cpus: 168-174
node 18 size: 48382 MB
node 18 free: 48230 MB
node 19 cpus: 175-181
node 19 size: 48382 MB
node 19 free: 48282 MB
node 19 free: 48226 MB
node 20 cpus: 140-146
node 20 size: 48382 MB
node 20 free: 48234 MB
node 21 cpus: 147-153
node 21 size: 48382 MB
node 21 free: 48246 MB
node 22 cpus: 196-202
node 22 size: 48382 MB
node 22 free: 48243 MB
node 22 free: 48243 MB
node 23 cpus: 203-209
node 23 size: 48382 MB
node 23 free: 48236 MB
node 24 cpus: 154-160
node 24 size: 48382 MB
node 24 free: 48240 MB
node 25 cpus: 161-167
node 25 size: 48382 MB
node 25 free: 48237 MB
node 26 cpus: 210-216
node 26 size: 48382 MB
node 26 free: 48227 MB
node 27 cpus: 217-223
node 27 size: 48382 MB
node 27 free: 48179 MB
node 27 free: 48179 MB
node 28 cpus: 126-132
node 28 size: 48382 MB
node 28 free: 48243 MB
node 29 cpus: 133-139
node 29 size: 48382 MB
node 29 free: 48234 MB
node 30 cpus: 182-188
node 30 size: 48382 MB
node 30 free: 48226 MB
node 31 cpus: 189-195
node 31 size: 48309 MB
node 31 free: 48148 MB

(node distances:)

(Continued on next page)
### Platform Notes (Continued)

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SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.20 GHz, AMD EPYC 9734)

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

---

**SPECrate®2017_fp_base = 1350**  
**SPECrate®2017_fp_peak = 1350**

---

**Platform Notes (Continued)**

---

9. `/proc/meminfo`  
   MemTotal: 1585029256 kB  

---

10. `who -r`  
   run-level 3 May 23 16:49

---

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

---

12. Services, from `systemctl list-unit-files`  

---

13. Linux kernel boot-time arguments, from `/proc/cmdline`  
   BOOT_IMAGE=(hd2,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 2.20 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: 2200MHz

---

15. `tuned-adm active`  
   Current active profile: throughput-performance

---

16. `sysctl`  
   kernel.numa_balancing 1  
   kernel.randomize_va_space 0

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.20 GHz, AMD EPYC 9734)

**Platform Notes (Continued)**

```
vm.compaction_proactiveness        20
vm.dirty_background_bytes           0
vm.dirty_background_ratio          10
vm.dirty_bytes                      0
vm.dirty_expire_centisecs         3000
vm.dirty_ratio                     8
vm.dirty_writeback_centisecs      500
vm.dirtytime_expire_seconds     43200
vm.extfrag_threshold         500
vm.min_unmapped_ratio           1
vm.nr_hugepages                   0
vm.nr_hugepages_mempolicy       0
vm.nr_overcommit_hugepages      0
vm.swappiness                      1
vm.watermark_boost_factor       15000
vm.watermark_scale_factor        10
vm.zone_reclaim_mode             1
```

```
17. /sys/kernel/mm/transparent_hugepage
   defrag          [always] defer defer+madvise madvise never
   enabled         [always] madvise never
   hpage_pmd_size  2097152
   shmem_enabled   always within_size advise [never] deny force
```

```
18. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleep_millisecs   60000
   defrag                   1
   max_ptes_none            511
   max_ptes_shared          256
   max_ptes_swap            64
   pages_to_scan            4096
   scan_sleep_millisecs     10000
```

```
19. OS release
   From /etc/*-release /etc/*-version
   os-release     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   18G  355G   5% /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
```
(Continued on next page)
## Platform Notes (Continued)

"DMTF SMBIOS" standard.
Memory:
24x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800

---

### 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
-----------------------------------------------
| 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak) |
-----------------------------------------------

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

C++
-----------------------------------------------
| 508.namd_r(base, peak) 510.parest_r(base, peak) |
-----------------------------------------------

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

C++, C
-----------------------------------------------
| 511.povray_r(base, peak) 526.blender_r(base, peak) |
-----------------------------------------------

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

C++, C, Fortran
-----------------------------------------------
| 507.cactuBSSN_r(base, peak) |
-----------------------------------------------

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

(Continued on next page)
Compiler Version Notes (Continued)

Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
-----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
-----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using both C and C++:
clang++ clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang
SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.20 GHz, AMD EPYC 9734)

SPECrate®2017_fp_base = 1350
SPECrate®2017_fp_peak = 1350

CPU2017 License: 3
Test Sponsor: HPE
Test Date: Jun-2023
Tested by: HPE
Hardware Availability: Sep-2023
Software Availability: Apr-2023

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.ibm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

(Continued on next page)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL385 Gen11  
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</tbody>
</table>

**Base Optimization Flags (Continued)**

Benchmarks using both Fortran and C:
- `-m64`  
- `-flto`  
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -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 -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop`  
- `-fepilog-vectorization-of- inductions -lamdlibm -lamdalloc -lflang`

Benchmarks using both C and C++:
- `-m64`  
- `-flto`  
- `-mllvm -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -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 -mllvm -unroll-threshold=100 -finline-aggressive`  
- `-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang`

Benchmarks using Fortran, C, and C++:
- `-m64`  
- `-flto`  
- `-mllvm -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -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 -mllvm -unroll-threshold=100 -finline-aggressive`  
- `-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive`  
- `-funroll-loops -mllvm -lsr-in-nested-loop`  
- `-fepilog-vectorization-of- inductions -lamdlibm -lamdalloc -lflang`

**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 DL385 Gen11  
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**SPECrate®2017_fp_base = 1350**

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---

### Base Other Flags (Continued)

Benchmarks using both Fortran and C:
- `-Wno-unused-command-line-argument`

Benchmarks using both C and C++:
- `-Wno-unused-command-line-argument`

Benchmarks using Fortran, C, and C++:
- `-Wno-unused-command-line-argument`

---

### Peak Compiler Invocation

C benchmarks:
- clang

C++ benchmarks:
- clang++

Fortran benchmarks:
- flang

Benchmarks using both Fortran and C:
- flang clang

Benchmarks using both C and C++:
- clang++ clang

Benchmarks using Fortran, C, and C++:
- clang++ clang flang

---

### Peak Portability Flags

Same as Base Portability Flags

---

### Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

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

538.imagick_r: basepeak = yes

544.nab_r: -m64 -flto -Wl,-ml1vm -Wl,-ldist-scalar-expand
-fenable-aggressive-gather -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-ml1vm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-ml1vm -inline-threshold=1000
-ml1vm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc

C++ benchmarks:

508.namd_r: -m64 -flto -Wl,-ml1vm -Wl,-align-all-nofallthru-blocks=6
-Wl,-ml1vm -Wl,-reduce-array-computations=3
-Wl,-ml1vm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -ml1vm -unroll-threshold=100
-ml1vm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: -m64 -flto -Wl,-ml1vm -Wl,-align-all-nofallthru-blocks=6
-Wl,-ml1vm -Wl,-reduce-array-computations=3
-Wl,-ml1vm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Mrecursive
-ml1vm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -lflang

549.fotonik3d_r: basepeak = yes

554.roms_r: basepeak = yes

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: -m64 -flto -Wl,-ml1vm -Wl,-align-all-nofallthru-blocks=6
-Wl,-ml1vm -Wl,-reduce-array-computations=3
-Wl,-ml1vm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-ml1vm -unroll-threshold=50 -ml1vm -inline-threshold=1000
-fremap-arrays -ml1vm -reduce-array-computations=3 -zopt

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

527.cam4_r (continued):
- Kieee  -Mrecursive  -funroll-loops
- mllvm  -lsl-in-nested-loop
- fepilog-vectorization-of-inductions  -lamdlibm  -lamdalloc
- lflang

Benchmarks using both C and C++:

511.povray_r: basepeak = yes
526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

**Peak Other Flags**

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

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

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

Benchmarks using both Fortran and C:
- Wno-unused-command-line-argument

Benchmarks using both C and C++:
- Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:
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The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Bergamo-rev1.0.html
http://www.spec.org/cpu2017/flags/aocc400-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-Bergamo-rev1.0.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.xml
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**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL385 Gen11  
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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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