



SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL365 Gen11

(2.55 GHz, AMD EPYC 9684X)

SPECrate®2017_fp_base = 1540

SPECrate®2017_fp_peak = 1600

CPU2017 License: 3

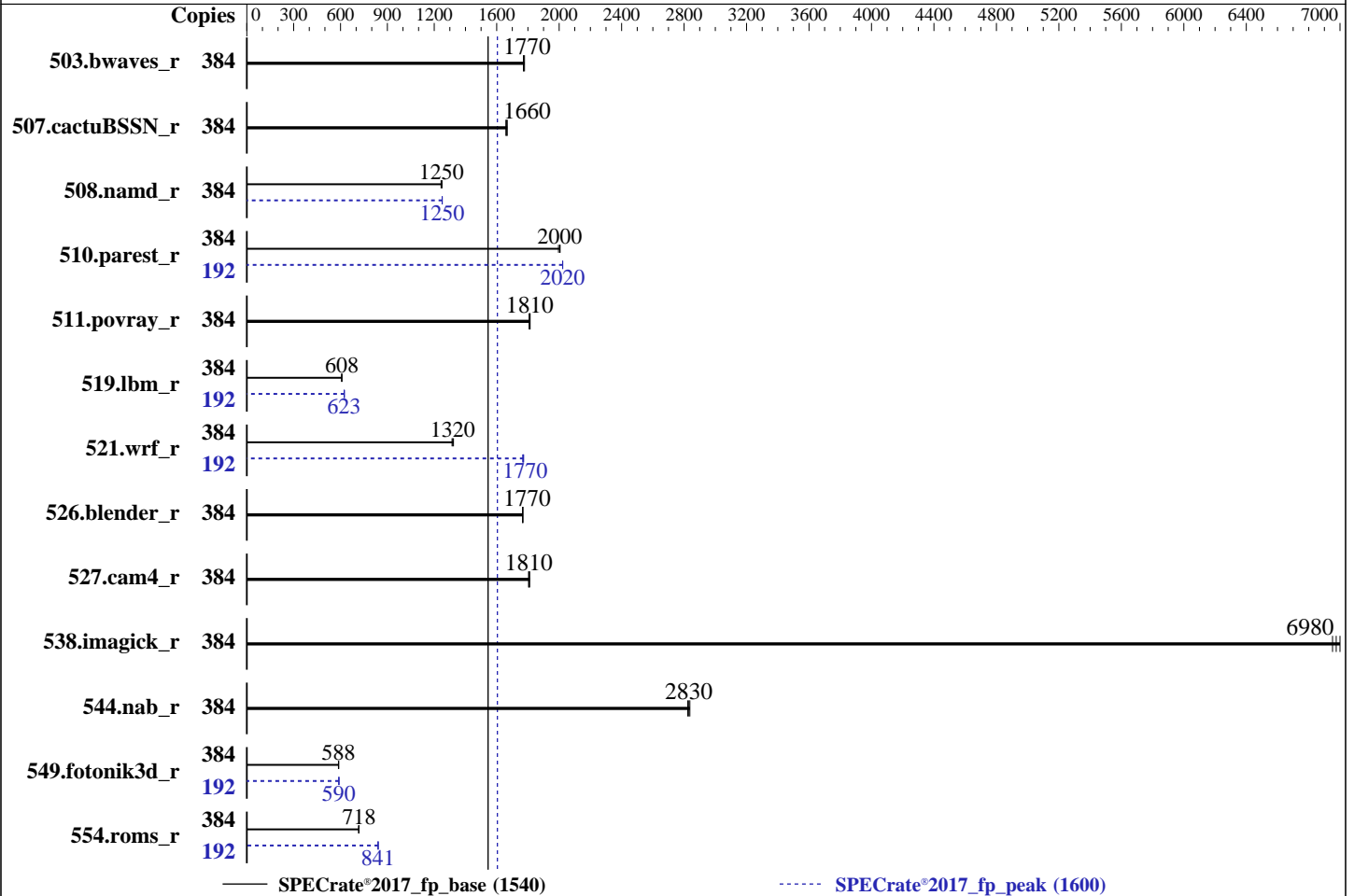
Test Sponsor: HPE

Tested by: HPE

Test Date: Sep-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023



Hardware

CPU Name: AMD EPYC 9684X
 Max MHz: 3700
 Nominal: 2550
 Enabled: 192 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: 1152 MB I+D on chip per chip,
 96 MB shared / 8 cores
 Other: None
 Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
 Storage: 1 x 960 GB SATA SSD
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 Kernel 5.14.21-150400.24.60-default
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
 Parallel: No
 Firmware: HPE BIOS Version v1.40 07/12/2023 released Jul-2023
 File System: xfs
 System State: Run level 5 (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



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	384	<u>2171</u>	<u>1770</u>	2166	1780	2174	1770	384	<u>2171</u>	<u>1770</u>	2166	1780	2174	1770
507.cactuBSSN_r	384	<u>292</u>	<u>1660</u>	292	1670	293	1660	384	<u>292</u>	<u>1660</u>	292	1670	293	1660
508.namd_r	384	292	1250	<u>292</u>	<u>1250</u>	293	1240	384	291	1250	292	1250	<u>292</u>	<u>1250</u>
510.parest_r	384	501	2010	<u>501</u>	<u>2000</u>	503	2000	192	248	2020	<u>248</u>	<u>2020</u>	248	2020
511.povray_r	384	494	1810	<u>495</u>	<u>1810</u>	496	1810	384	494	1810	<u>495</u>	<u>1810</u>	496	1810
519.lbm_r	384	666	607	<u>665</u>	<u>608</u>	665	608	192	325	623	<u>325</u>	<u>623</u>	324	625
521.wrf_r	384	655	1310	650	1320	<u>652</u>	<u>1320</u>	192	244	1770	<u>243</u>	<u>1770</u>	243	1770
526.blender_r	384	331	1770	<u>331</u>	<u>1770</u>	331	1770	384	331	1770	<u>331</u>	<u>1770</u>	331	1770
527.cam4_r	384	<u>372</u>	<u>1810</u>	371	1810	372	1800	384	<u>372</u>	<u>1810</u>	371	1810	372	1800
538.imagick_r	384	136	7000	<u>137</u>	<u>6980</u>	137	6950	384	136	7000	<u>137</u>	<u>6980</u>	137	6950
544.nab_r	384	229	2820	<u>228</u>	<u>2830</u>	228	2840	384	229	2820	<u>228</u>	<u>2830</u>	228	2840
549.fotonik3d_r	384	2544	588	2551	587	<u>2545</u>	<u>588</u>	192	1269	590	1270	589	<u>1269</u>	<u>590</u>
554.roms_r	384	853	715	<u>850</u>	<u>718</u>	849	719	192	363	841	<u>363</u>	<u>841</u>	363	840

SPECrate®2017_fp_base = **1540**

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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
<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,

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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
Determinism Control set to Manual
Performance Determinism set to Power Deterministic
Memory Patrol Scrubbing set to Disabled
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
Workload Profile set to Custom
Power Regulator set to OS Control Mode
L2 HW Prefetcher set to Disabled

The system ROM used for this result contains microcode version 0xa10123e for the AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this ROM is version Genoa-XPI 1.0.0.8

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Fri Sep 15 12:40:07 2023

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

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1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry

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Platform Notes (Continued)

```

6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
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/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

```

```

-----
1. uname -a
Linux localhost 5.14.21-150400.24.60-default #1 SMP PREEMPT_DYNAMIC Wed Apr 12 12:13:32 UTC 2023 (93dbe2e)
x86_64 x86_64 x86_64 GNU/Linux

```

```

-----
2. w
12:40:07 up 5 min, 1 user, load average: 0.25, 0.28, 0.17
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root pts/0 10.3.198.173 12:37 31.00s 1.26s 0.13s /bin/bash ./amd_rate_aocc400_znver4_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) 3094146
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) 3094146
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root@pts/0
-bash

```

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Platform Notes (Continued)

```
python3 ./run_fprate.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:refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.012/templogs/preenv.fprate.012.0.log --lognum 012.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

```
-----
6. /proc/cpuinfo
model name      : AMD EPYC 9684X 96-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model          : 17
stepping       : 2
microcode      : 0xa10123e
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size       : 3584 4K pages
cpu cores      : 96
siblings       : 192
2 physical ids (chips)
384 processors (hardware threads)
physical id 0: core ids 0-95
physical id 1: core ids 0-95
physical id 0: apicids 0-191
physical id 1: apicids 256-447
```

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 2.37.2:

```
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):                 384
On-line CPU(s) list:   0-383
Vendor ID:              AuthenticAMD
Model name:             AMD EPYC 9684X 96-Core Processor
CPU family:             25
Model:                  17
Thread(s) per core:    2
Core(s) per socket:    96
Socket(s):              2
Stepping:               2
Frequency boost:        enabled
CPU max MHz:            2550.0000
CPU min MHz:            1500.0000
BogoMIPS:               5092.27
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 nopl nonstop_tsc cpuid extd_apicid aperfmperf 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 sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext
                        perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3
                        invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1
```

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Platform Notes (Continued)

```
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
avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
svm_lock nrrip_save tsc_scale vmcb_clean flushbyasid decodeassists
pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
```

Virtualization:

```
L1d cache: 6 MiB (192 instances)
L1i cache: 6 MiB (192 instances)
L2 cache: 192 MiB (192 instances)
L3 cache: 2.3 GiB (24 instances)
```

NUMA node(s):

```
24
NUMA node0 CPU(s): 0-7,192-199
NUMA node1 CPU(s): 8-15,200-207
NUMA node2 CPU(s): 16-23,208-215
NUMA node3 CPU(s): 24-31,216-223
NUMA node4 CPU(s): 32-39,224-231
NUMA node5 CPU(s): 40-47,232-239
NUMA node6 CPU(s): 48-55,240-247
NUMA node7 CPU(s): 56-63,248-255
NUMA node8 CPU(s): 64-71,256-263
NUMA node9 CPU(s): 72-79,264-271
NUMA node10 CPU(s): 80-87,272-279
NUMA node11 CPU(s): 88-95,280-287
NUMA node12 CPU(s): 96-103,288-295
NUMA node13 CPU(s): 104-111,296-303
NUMA node14 CPU(s): 112-119,304-311
NUMA node15 CPU(s): 120-127,312-319
NUMA node16 CPU(s): 128-135,320-327
NUMA node17 CPU(s): 136-143,328-335
NUMA node18 CPU(s): 144-151,336-343
NUMA node19 CPU(s): 152-159,344-351
NUMA node20 CPU(s): 160-167,352-359
NUMA node21 CPU(s): 168-175,360-367
NUMA node22 CPU(s): 176-183,368-375
NUMA node23 CPU(s): 184-191,376-383
```

Vulnerability Itlb multihit:

Not affected

Vulnerability L1tf:

Not affected

Vulnerability Mds:

Not affected

Vulnerability Meltdown:

Not affected

Vulnerability Mmio stale data:

Not affected

Vulnerability Retbleed:

Not affected

Vulnerability Spec store bypass:

Mitigation; Speculative Store Bypass disabled via prctl and seccomp

Vulnerability Spectre v1:

Mitigation; usercopy/swagps barriers and __user pointer sanitization

Vulnerability Spectre v2:

Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB

filling, PBRSE-eIBRS Not affected

Vulnerability Srbds:

Not affected

Vulnerability Tsx async abort:

Not affected

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	32K	6M	8	Data	1	64	1	64
L1i	32K	6M	8	Instruction	1	64	1	64
L2	1M	192M	8	Unified	2	2048	1	64
L3	96M	2.3G	16	Unified	3	98304	1	64

8. numactl --hardware

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Platform Notes (Continued)

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

```

available: 24 nodes (0-23)
node 0 cpus: 0-7,192-199
node 0 size: 31941 MB
node 0 free: 31789 MB
node 1 cpus: 8-15,200-207
node 1 size: 32251 MB
node 1 free: 32114 MB
node 2 cpus: 16-23,208-215
node 2 size: 32251 MB
node 2 free: 32109 MB
node 3 cpus: 24-31,216-223
node 3 size: 32251 MB
node 3 free: 32068 MB
node 4 cpus: 32-39,224-231
node 4 size: 32251 MB
node 4 free: 32138 MB
node 5 cpus: 40-47,232-239
node 5 size: 32251 MB
node 5 free: 32113 MB
node 6 cpus: 48-55,240-247
node 6 size: 32251 MB
node 6 free: 32103 MB
node 7 cpus: 56-63,248-255
node 7 size: 32251 MB
node 7 free: 32008 MB
node 8 cpus: 64-71,256-263
node 8 size: 32251 MB
node 8 free: 32049 MB
node 9 cpus: 72-79,264-271
node 9 size: 32251 MB
node 9 free: 32119 MB
node 10 cpus: 80-87,272-279
node 10 size: 32251 MB
node 10 free: 32089 MB
node 11 cpus: 88-95,280-287
node 11 size: 32251 MB
node 11 free: 32092 MB
node 12 cpus: 96-103,288-295
node 12 size: 32251 MB
node 12 free: 32062 MB
node 13 cpus: 104-111,296-303
node 13 size: 32251 MB
node 13 free: 32048 MB
node 14 cpus: 112-119,304-311
node 14 size: 32251 MB
node 14 free: 32101 MB
node 15 cpus: 120-127,312-319
node 15 size: 32251 MB
node 15 free: 32118 MB
node 16 cpus: 128-135,320-327
node 16 size: 32251 MB
node 16 free: 32093 MB
node 17 cpus: 136-143,328-335
node 17 size: 32251 MB
node 17 free: 32132 MB
node 18 cpus: 144-151,336-343
node 18 size: 32251 MB
node 18 free: 32124 MB
node 19 cpus: 152-159,344-351

```

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Platform Notes (Continued)

node 19 size: 32251 MB
node 19 free: 32118 MB
node 20 cpus: 160-167,352-359
node 20 size: 32251 MB
node 20 free: 32071 MB
node 21 cpus: 168-175,360-367
node 21 size: 32251 MB
node 21 free: 32083 MB
node 22 cpus: 176-183,368-375
node 22 size: 32251 MB
node 22 free: 32045 MB
node 23 cpus: 184-191,376-383
node 23 size: 32085 MB
node 23 free: 31596 MB

node distances:

node	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0:	10	11	11	12	12	12	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
1:	11	10	11	12	12	12	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
2:	11	11	10	12	12	12	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
3:	12	12	12	10	11	11	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
4:	12	12	12	11	10	11	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
5:	12	12	12	11	11	10	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
6:	12	12	12	12	12	12	10	11	11	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
7:	12	12	12	12	12	12	11	10	11	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
8:	12	12	12	12	12	12	11	11	10	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
9:	12	12	12	12	12	12	12	12	12	10	11	11	12	32	32	32	32	32	32	32	32	32	32	32
10:	12	12	12	12	12	12	12	12	12	11	10	11	12	32	32	32	32	32	32	32	32	32	32	32
11:	12	12	12	12	12	12	12	12	12	11	11	10	12	32	32	32	32	32	32	32	32	32	32	32
12:	32	32	32	32	32	32	32	32	32	32	32	32	10	11	11	12	12	12	12	12	12	12	12	12
13:	32	32	32	32	32	32	32	32	32	32	32	32	11	10	11	12	12	12	12	12	12	12	12	12
14:	32	32	32	32	32	32	32	32	32	32	32	32	11	11	10	12	12	12	12	12	12	12	12	12
15:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	10	11	11	12	12	12	12	12	12
16:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	11	10	11	12	12	12	12	12	12
17:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	11	11	10	12	12	12	12	12	12
18:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	10	11	11	12	12	12
19:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	11	10	11	12	12	12
20:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	11	11	10	12	12	12
21:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	12	12	12	10	11	11
22:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	12	12	12	11	10	11
23:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	12	12	12	11	11	10

9. /proc/meminfo
MemTotal: 792133380 kB

10. who -r
run-level 5 Sep 15 12:35

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
Default Target Status
graphical running

12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled ModemManager YaST2-Firstboot YaST2-Second-Stage ahslog amsd apparmor auditd bluetooth
cpqFca cpqIde cpqScsi cron display-manager getty@ haveged irqbalance iscsi issue-generator
kbdsettings klog lvm2-monitor mr_cpqScsi nsd postfix purge-kernels rollback rsyslog smad

(Continued on next page)



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ProLiant DL365 Gen11

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SPECrate®2017_fp_base = 1540

SPECrate®2017_fp_peak = 1600

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Sep-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023

Platform Notes (Continued)

```

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
amsd_rev appstream-sync-cache autofs autoyast-initscripts blk-availability bluetooth-mesh
boot-sysctl ca-certificates chrony-wait chronyd console-getty cpqFca_rev cpqIde_rev
cpqScsi_rev cpqiScsi cups cups-browsed debug-shell dnsmasq ebttables exchange-bmc-os-info
firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd iscsi-init
iscsid iscsiuiio issue-add-ssh-keys kexec-load lunmask man-db-create mr_cpqScsi_rev
multipathd nfs nfs-blkmap nm-cloud-setup nmb openvpn@ ostree-remount pppoe pppoe-server
rdisc rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smad_rev
smartd_generate_opts smb snmpd snmptrapd speech-dispatcherd systemd-boot-check-no-failures
systemd-network-generator systemd-sysextd systemd-time-wait-sync systemd-timesyncd tuned
udisks2 upower wpa_supplicant@
indirect pcsd saned@ wickedd

```

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.24.60-default
root=UUID=af6eea5e-5963-48ca-a7f4-0b72956acc3a
splash=silent
resume=/dev/disk/by-uuid/63bf54de-4969-47d8-93f2-85cee73bb4e8
mitigations=auto
quiet
security=apparmor

```

```

-----
14. cpupower frequency-info
analyzing CPU 0:
  current policy: frequency should be within 1.50 GHz and 2.55 GHz.
                   The governor "performance" may decide which speed to use
                   within this range.

boost state support:
  Supported: yes
  Active: yes

```

```

-----
15. tuned-adm active
It seems that tuned daemon is not running, preset profile is not activated.
Preset 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

```

(Continued on next page)



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Platform Notes (Continued)

```
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 SUSE Linux Enterprise Server 15 SP4
```

```
-----
20. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3  xfs  791G  7.7G  784G  1% /home
```

```
-----
21. /sys/devices/virtual/dmi/id
Vendor:      HPE
Product:     ProLiant DL365 Gen11
Product Family: ProLiant
Serial:      DL3x5GEN11
```

```
-----
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:
  3x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
  21x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800
```

```
-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      HPE
BIOS Version:     1.40
BIOS Date:        07/12/2023
BIOS Revision:    1.40
Firmware Revision: 1.45
```



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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
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
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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)

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Compiler Version Notes (Continued)

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
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

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.lbm_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



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Software Availability: Apr-2023

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 -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 -lamdalloc -lflang
```

C++ benchmarks:

```
-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 -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang
```

Fortran benchmarks:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang
```

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,-enable-X86-prefetching -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 -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
```

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, 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 -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

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++

(Continued on next page)



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Peak Compiler Invocation (Continued)

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: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -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 -lamdlibm
-lamdalloc
```

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

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

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Peak Optimization Flags (Continued)

```
510.parest_r: -m64 -flto -Wl,-mllvm -Wl,-suppress-fmas
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

Fortran benchmarks:

```
503.bwaves_r: basepeak = yes
```

```
549.fotonik3d_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Kieee
-Mrecursive -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlibm -lamdalloc -lflang
```

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

Benchmarks using both Fortran and C:

```
521.wrf_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -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 -Mrecursive
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-lflang
```

```
527.cam4_r: basepeak = yes
```

Benchmarks using both C and C++:

(Continued on next page)



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Peak Optimization Flags (Continued)

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++:

-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-Genoa-X-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-Genoa-X-rev1.0.xml>

<http://www.spec.org/cpu2017/flags/aocc400-flags.xml>

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