



# SPEC CPU®2017 Floating Point Speed Result

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## Dell Inc.

SPECspeed®2017\_fp\_base = 384

SPECspeed®2017\_fp\_peak = 393

PowerEdge R7625 (AMD EPYC 9474F 48-Core Processor)

CPU2017 License: 6573

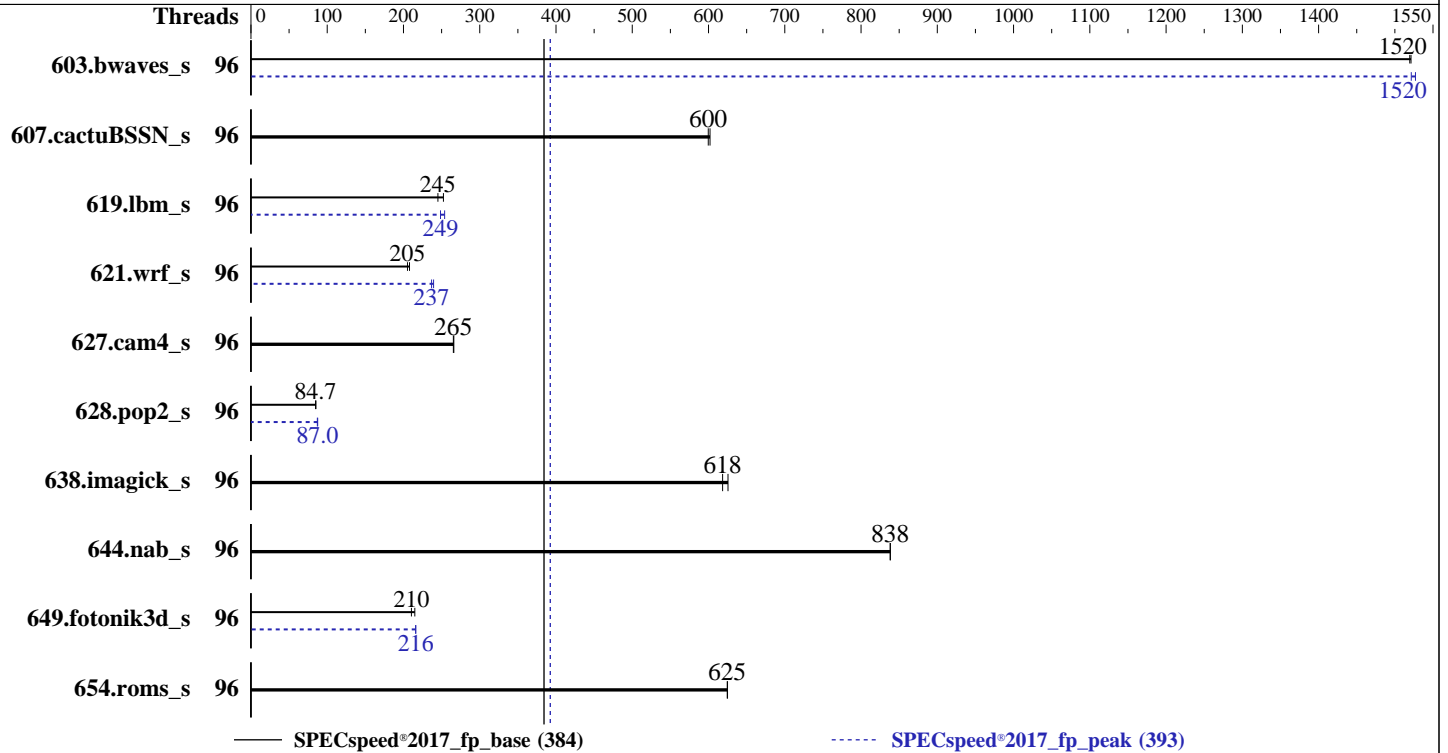
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Nov-2022

Hardware Availability: Feb-2023

Software Availability: Nov-2022



### Hardware

CPU Name: AMD EPYC 9474F  
 Max MHz: 4100  
 Nominal: 3600  
 Enabled: 96 cores, 2 chips  
 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, 32 MB shared / 6 cores  
 Other: None  
 Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 125 GB on tmpfs  
 Other: None

### Software

OS: Ubuntu 22.04.1 LTS  
 5.15.0-46-generic  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: Yes  
 Firmware: Version 1.0.2 released Oct-2022  
 File System: tmpfs  
 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.



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	96	38.8	1520	<b><u>38.8</u></b>	<b><u>1520</u></b>			96	<b><u>38.8</u></b>	<b><u>1520</u></b>	38.6	1530		
607.cactuBSSN_s	96	<b><u>27.8</u></b>	<b><u>600</u></b>	27.7	602			96	<b><u>27.8</u></b>	<b><u>600</u></b>	27.7	602		
619.lbm_s	96	20.8	252	<b><u>21.4</u></b>	<b><u>245</u></b>			96	<b><u>21.1</u></b>	<b><u>249</u></b>	20.6	254		
621.wrf_s	96	<b><u>64.4</u></b>	<b><u>205</u></b>	63.6	208			96	<b><u>55.8</u></b>	<b><u>237</u></b>	55.2	239		
627.cam4_s	96	<b><u>33.4</u></b>	<b><u>265</u></b>	33.3	266			96	<b><u>33.4</u></b>	<b><u>265</u></b>	33.3	266		
628.pop2_s	96	139	85.2	<b><u>140</u></b>	<b><u>84.7</u></b>			96	136	87.5	<b><u>136</u></b>	<b><u>87.0</u></b>		
638.imagick_s	96	23.1	626	<b><u>23.3</u></b>	<b><u>618</u></b>			96	23.1	626	<b><u>23.3</u></b>	<b><u>618</u></b>		
644.nab_s	96	<b><u>20.8</u></b>	<b><u>838</u></b>	20.8	838			96	<b><u>20.8</u></b>	<b><u>838</u></b>	20.8	838		
649.fotonik3d_s	96	42.4	215	<b><u>43.3</u></b>	<b><u>210</u></b>			96	42.2	216	<b><u>42.2</u></b>	<b><u>216</u></b>		
654.roms_s	96	25.2	625	<b><u>25.2</u></b>	<b><u>625</u></b>			96	25.2	625	<b><u>25.2</u></b>	<b><u>625</u></b>		

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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.

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## Operating System Notes (Continued)

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.

To always enable THP for peak runs of:

603.bwaves\_s, 607.cactuBSSN\_s, 619.lbm\_s, 627.cam4\_s, 628.pop2\_s, 638.imagick\_s, 644.nab\_s, 649.fotonik3d\_s:

'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled; echo always > /sys/kernel/mm/transparent\_hugepage/defrag'  
run as root.

To disable THP for peak runs of 621.wrf\_s:

'echo never > /sys/kernel/mm/transparent\_hugepage/enabled; echo always > /sys/kernel/mm/transparent\_hugepage/defrag'  
run as root.

To enable THP only on request for peak runs of 654.roms\_s:

'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled; echo madvise > /sys/kernel/mm/transparent\_hugepage/defrag'  
run as root.

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

GOMP\_CPU\_AFFINITY = "0-95"

LD\_LIBRARY\_PATH =

"/mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b/amd\_speed\_aocc400\_genoa\_B\_lib/li  
b:"

LIBOMP\_NUM\_HIDDEN\_HELPER\_THREADS = "0"

MALLOC\_CONF = "oversize\_threshold:0,retain:true"

OMP\_DYNAMIC = "false"

OMP\_SCHEDULE = "static"

OMP\_STACKSIZE = "128M"

OMP\_THREAD\_LIMIT = "96"

Environment variables set by runcpu during the 603.bwaves\_s peak run:

GOMP\_CPU\_AFFINITY = "0-95"

Environment variables set by runcpu during the 619.lbm\_s peak run:

GOMP\_CPU\_AFFINITY = "0-95"

Environment variables set by runcpu during the 621.wrf\_s peak run:

GOMP\_CPU\_AFFINITY = "0-95"

Environment variables set by runcpu during the 628.pop2\_s peak run:

GOMP\_CPU\_AFFINITY = "0-95"

Environment variables set by runcpu during the 649.fotonik3d\_s peak run:

GOMP\_CPU\_AFFINITY = "0-95"

PGHPPF\_ZMEM = "yes"



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## 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.

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

## Platform Notes

BIOS settings:

DRAM Refresh Delay : Performance  
DIMM Self Healing on  
Uncorrectable Memory Error : Disabled  
Logical Processor : Disabled  
Virtualization Technology : Disabled  
L3 Cache as NUMA Domain : Enabled  
  
System Profile : Custom  
C-States : Disabled  
Memory Patrol Scrub : Disabled  
PCI ASPM L1 Link  
Power Management : Disabled  
Determinism Slider : Power Determinism  
Algorithm Performance  
Boost Disable (ApbDis) : Enabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-aocc400-Blb/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d  
running on amd-sut Thu Nov 3 16:30:18 2022

SUT (System Under Test) info as seen by some common utilities.  
For more information on this section, see  
<https://www.spec.org/cpu2017/Docs/config.html#sysinfo>

From /proc/cpuinfo  
model name : AMD EPYC 9474F 48-Core Processor  
2 "physical id"s (chips)  
96 "processors"  
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

(Continued on next page)



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## Platform Notes (Continued)

```
cpu cores : 48
siblings  : 48
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
32 33 34 35 36 37 40 41 42 43 44 45 48 49 50 51 52 53 56 57 58 59 60 61
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
32 33 34 35 36 37 40 41 42 43 44 45 48 49 50 51 52 53 56 57 58 59 60 61
```

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):                96
On-line CPU(s) list:   0-95
Vendor ID:             AuthenticAMD
Model name:            AMD EPYC 9474F 48-Core Processor
CPU family:            25
Model:                 17
Thread(s) per core:    1
Core(s) per socket:    48
Socket(s):             2
Stepping:              1
Frequency boost:       enabled
CPU max MHz:           4114.0000
CPU min MHz:           400.0000
BogoMIPS:              7202.30
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
aperfmpperf 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 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 cppc arat
npt lbrv svm_lock nrip_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_lld
Virtualization:        AMD-V
L1d cache:             3 MiB (96 instances)
L1i cache:             3 MiB (96 instances)
L2 cache:              96 MiB (96 instances)
L3 cache:              512 MiB (16 instances)
NUMA node(s):         16
```

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## Platform Notes (Continued)

```

NUMA node0 CPU(s):      0-5
NUMA node1 CPU(s):      24-29
NUMA node2 CPU(s):      12-17
NUMA node3 CPU(s):      36-41
NUMA node4 CPU(s):      18-23
NUMA node5 CPU(s):      42-47
NUMA node6 CPU(s):      6-11
NUMA node7 CPU(s):      30-35
NUMA node8 CPU(s):      48-53
NUMA node9 CPU(s):      72-77
NUMA node10 CPU(s):     60-65
NUMA node11 CPU(s):     84-89
NUMA node12 CPU(s):     66-71
NUMA node13 CPU(s):     90-95
NUMA node14 CPU(s):     54-59
NUMA node15 CPU(s):     78-83
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/swapgs 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:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	32K	3M	8	Data	1	64	1	64
L1i	32K	3M	8	Instruction	1	64	1	64
L2	1M	96M	8	Unified	2	2048	1	64
L3	32M	512M	16	Unified	3	32768	1	64

/proc/cpuinfo cache data

cache size : 1024 KB

From numactl --hardware

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

available: 16 nodes (0-15)

node 0 cpus: 0 1 2 3 4 5

node 0 size: 96312 MB

node 0 free: 95997 MB

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## Platform Notes (Continued)

```

node 1 cpus: 24 25 26 27 28 29
node 1 size: 96766 MB
node 1 free: 96391 MB
node 2 cpus: 12 13 14 15 16 17
node 2 size: 96766 MB
node 2 free: 96292 MB
node 3 cpus: 36 37 38 39 40 41
node 3 size: 96766 MB
node 3 free: 96328 MB
node 4 cpus: 18 19 20 21 22 23
node 4 size: 96766 MB
node 4 free: 92233 MB
node 5 cpus: 42 43 44 45 46 47
node 5 size: 96746 MB
node 5 free: 95878 MB
node 6 cpus: 6 7 8 9 10 11
node 6 size: 96766 MB
node 6 free: 96571 MB
node 7 cpus: 30 31 32 33 34 35
node 7 size: 96730 MB
node 7 free: 96473 MB
node 8 cpus: 48 49 50 51 52 53
node 8 size: 96766 MB
node 8 free: 96604 MB
node 9 cpus: 72 73 74 75 76 77
node 9 size: 96766 MB
node 9 free: 96606 MB
node 10 cpus: 60 61 62 63 64 65
node 10 size: 96766 MB
node 10 free: 96607 MB
node 11 cpus: 84 85 86 87 88 89
node 11 size: 96766 MB
node 11 free: 96603 MB
node 12 cpus: 66 67 68 69 70 71
node 12 size: 96766 MB
node 12 free: 96628 MB
node 13 cpus: 90 91 92 93 94 95
node 13 size: 96736 MB
node 13 free: 96540 MB
node 14 cpus: 54 55 56 57 58 59
node 14 size: 96766 MB
node 14 free: 96650 MB
node 15 cpus: 78 79 80 81 82 83
node 15 size: 96766 MB
node 15 free: 96624 MB
node distances:
node 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

```

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## Platform Notes (Continued)

0:	10	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32
1:	11	10	11	11	11	11	11	11	32	32	32	32	32	32	32	32
2:	11	11	10	11	11	11	11	11	32	32	32	32	32	32	32	32
3:	11	11	11	10	11	11	11	11	32	32	32	32	32	32	32	32
4:	11	11	11	11	10	11	11	11	32	32	32	32	32	32	32	32
5:	11	11	11	11	11	10	11	11	32	32	32	32	32	32	32	32
6:	11	11	11	11	11	11	10	11	32	32	32	32	32	32	32	32
7:	11	11	11	11	11	11	11	10	32	32	32	32	32	32	32	32
8:	32	32	32	32	32	32	32	32	10	11	11	11	11	11	11	11
9:	32	32	32	32	32	32	32	32	11	10	11	11	11	11	11	11
10:	32	32	32	32	32	32	32	32	11	11	10	11	11	11	11	11
11:	32	32	32	32	32	32	32	32	11	11	11	10	11	11	11	11
12:	32	32	32	32	32	32	32	32	11	11	11	11	10	11	11	11
13:	32	32	32	32	32	32	32	32	11	11	11	11	11	10	11	11
14:	32	32	32	32	32	32	32	32	11	11	11	11	11	11	10	11
15:	32	32	32	32	32	32	32	32	11	11	11	11	11	11	11	10

From /proc/meminfo

MemTotal: 1584868756 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

/sbin/tuned-adm active

Current active profile: latency-performance

/sys/devices/system/cpu/cpu\*/cpufreq/scaling\_governor has performance

/usr/bin/lsb\_release -d

Ubuntu 22.04.1 LTS

From /etc/\*release\* /etc/\*version\*

debian\_version: bookworm/sid

os-release:

PRETTY\_NAME="Ubuntu 22.04.1 LTS"

NAME="Ubuntu"

VERSION\_ID="22.04"

VERSION="22.04.1 LTS (Jammy Jellyfish)"

VERSION\_CODENAME=jammy

ID=ubuntu

ID\_LIKE=debian

HOME\_URL="https://www.ubuntu.com/"

uname -a:

Linux amd-sut 5.15.0-46-generic #49-Ubuntu SMP Thu Aug 4 18:03:25 UTC 2022 x86\_64 x86\_64 x86\_64 GNU/Linux

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## Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):	Not affected
CVE-2018-3620 (L1 Terminal Fault):	Not affected
Microarchitectural Data Sampling:	Not affected
CVE-2017-5754 (Meltdown):	Not affected
mmio_stale_data:	Not affected
retbleed:	Not affected
CVE-2018-3639 (Speculative Store Bypass):	Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):	Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Retpolines, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):	Not affected
CVE-2019-11135 (TSX Asynchronous Abort):	Not affected

run-level 3 Nov 3 14:22

```
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b
Filesystem      Type      Size  Used Avail Use% Mounted on
tmpfs            tmpfs    125G   3.4G  122G   3% /mnt/ramdisk
```

```
From /sys/devices/virtual/dmi/id
Vendor:          Dell Inc.
Product:         PowerEdge R7625
Product Family: PowerEdge
Serial:          BRZ5015
```

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:
 1x 802C0000802C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
23x 80AD000080AD HMC94MEBRA109N 64 GB 2 rank 4800
```

```
BIOS:
  BIOS Vendor:      Dell Inc.
  BIOS Version:     1.0.2
  BIOS Date:        10/17/2022
  BIOS Revision:    1.0
```

(End of data from sysinfo program)



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## Compiler Version Notes

=====  
C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak)  
| 644.nab\_s(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++, C, Fortran | 607.cactuBSSN\_s(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

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

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

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

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

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  
=====

=====  
Fortran | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak)  
| 654.roms\_s(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

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

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  
=====

=====  
Fortran, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak)  
| 628.pop2\_s(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)

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# SPEC CPU®2017 Floating Point Speed Result

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Dell Inc.

SPECSpeed®2017\_fp\_base = 384

PowerEdge R7625 (AMD EPYC 9474F 48-Core Processor)

SPECSpeed®2017\_fp\_peak = 393

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Nov-2022

Hardware Availability: Feb-2023

Software Availability: Nov-2022

## Compiler Version Notes (Continued)

```

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
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
-----

```

## Base Compiler Invocation

C benchmarks:

clang

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Base Portability Flags

```

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

```



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## Base Optimization Flags

### C benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

### Fortran benchmarks:

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

### Benchmarks using both Fortran and C:

```
-m64 -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 -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

### Benchmarks using Fortran, C, and C++:

```
-m64 -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 -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```



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**CPU2017 License:** 6573

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**Tested by:** Dell Inc.

**Test Date:** Nov-2022

**Hardware Availability:** Feb-2023

**Software Availability:** Nov-2022

## Base Other Flags

C benchmarks:

-Wno-return-type -Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

Benchmarks using both Fortran and C:

-Wno-return-type -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:

-Wno-return-type -Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:

clang

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp  
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000

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## Peak Optimization Flags (Continued)

619.lbm\_s (continued):

-mllvm -reduce-array-computations=3 -DSPEC\_OPENMP -zopt  
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

638.imagick\_s: basepeak = yes

644.nab\_s: basepeak = yes

Fortran benchmarks:

603.bwaves\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC\_OPENMP  
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math  
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3  
-fvector-transform -fscalar-transform -fopenmp=libomp  
-lomp -lamdlibm -lamdalloc -lflang

649.fotonik3d\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC\_OPENMP  
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math  
-fopenmp -flto -Mrecursive  
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp  
-lomp -lamdlibm -lamdalloc -lflang

654.roms\_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf\_s: -m64 -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 -fopenmp  
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3 -DSPEC\_OPENMP -zopt  
-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop  
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

627.cam4\_s: basepeak = yes

628.pop2\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast

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## Peak Optimization Flags (Continued)

628.pop2\_s (continued):

```
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

607.cactuBSSN\_s: basepeak = yes

## Peak Other Flags

C benchmarks:

```
-Wno-return-type -Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```

Benchmarks using both Fortran and C:

```
-Wno-return-type -Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:

```
-Wno-return-type -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/aocc400-flags.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.0.html>

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

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

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.0.xml>

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