



# SPEC CPU®2017 Integer Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL365 Gen11

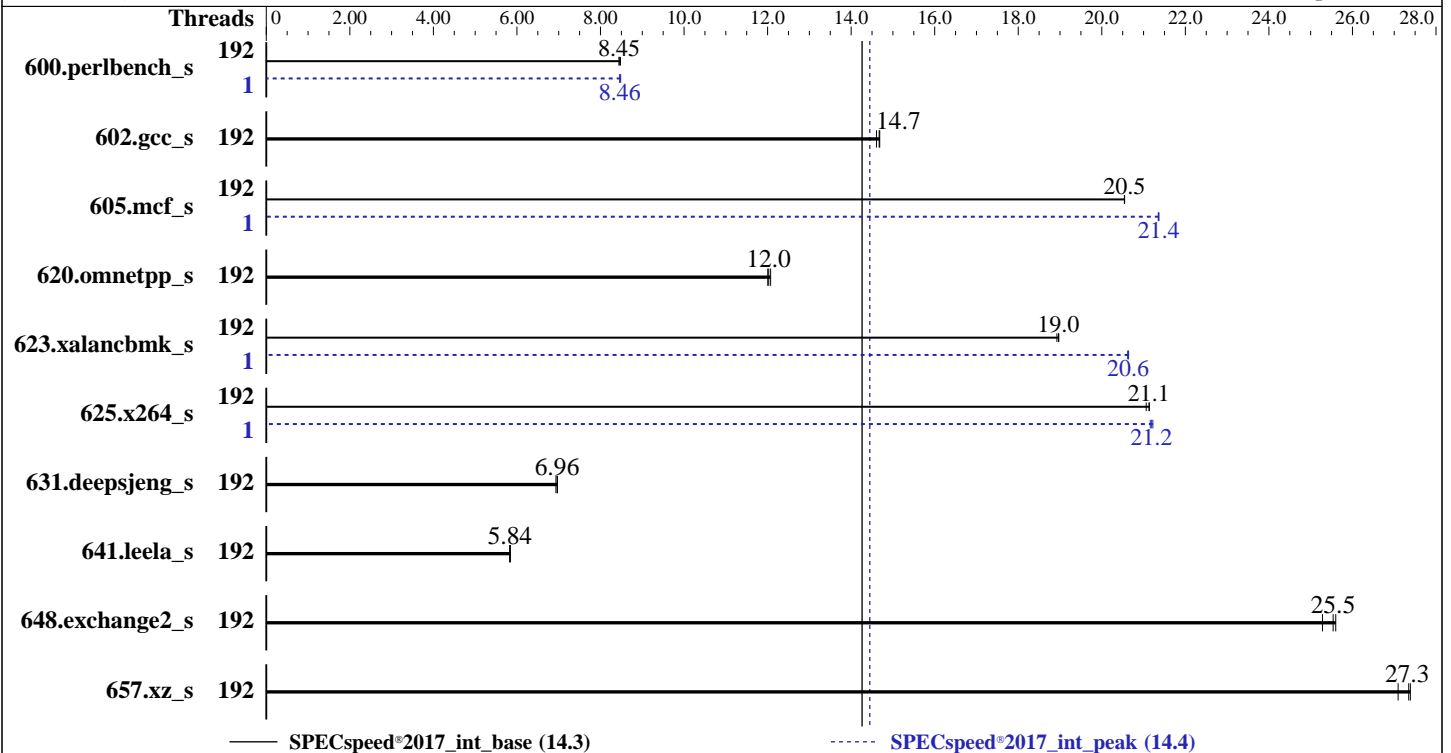
(2.55 GHz, AMD EPYC 9684X)

SPECspeed®2017\_int\_base = 14.3

SPECspeed®2017\_int\_peak = 14.4

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  
 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: Yes  
 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						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	192	<b>210</b>	<b>8.45</b>	210	8.45	209	8.48	1	<b>210</b>	<b>8.46</b>	209	8.48	210	8.46
602.gcc_s	192	271	14.7	273	14.6	<b>271</b>	<b>14.7</b>	192	271	14.7	273	14.6	<b>271</b>	<b>14.7</b>
605.mcf_s	192	230	20.5	<b>230</b>	<b>20.5</b>	230	20.5	1	221	21.4	221	21.4	<b>221</b>	<b>21.4</b>
620.omnetpp_s	192	<b>136</b>	<b>12.0</b>	135	12.1	136	12.0	192	<b>136</b>	<b>12.0</b>	135	12.1	136	12.0
623.xalancbmk_s	192	<b>74.7</b>	<b>19.0</b>	74.7	19.0	74.9	18.9	1	68.6	20.6	<b>68.7</b>	<b>20.6</b>	68.7	20.6
625.x264_s	192	83.7	21.1	<b>83.5</b>	<b>21.1</b>	83.5	21.1	1	<b>83.2</b>	<b>21.2</b>	83.4	21.2	83.1	21.2
631.deepsjeng_s	192	206	6.97	207	6.93	<b>206</b>	<b>6.96</b>	192	206	6.97	207	6.93	<b>206</b>	<b>6.96</b>
641.leela_s	192	293	5.83	292	5.84	<b>292</b>	<b>5.84</b>	192	293	5.83	292	5.84	<b>292</b>	<b>5.84</b>
648.exchange2_s	192	<b>115</b>	<b>25.5</b>	116	25.3	115	25.6	192	<b>115</b>	<b>25.5</b>	116	25.3	115	25.6
657.xz_s	192	226	27.4	<b>226</b>	<b>27.3</b>	228	27.1	192	226	27.4	<b>226</b>	<b>27.3</b>	228	27.1

SPECspeed®2017\_int\_base = **14.3**

SPECspeed®2017\_int\_peak = **14.4**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Compiler Notes

The AMD64 AOCC Compiler Suite is available at  
<http://developer.amd.com/amd-aocc/>

## Submit Notes

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
See the configuration file for details.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit  
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty\_ratio=8' run as root.  
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.  
To free node-local memory and avoid remote memory usage,  
'sysctl -w vm.zone\_reclaim\_mode=1' run as root.  
To clear filesystem caches, 'sync; sysctl -w vm.drop\_caches=3' run as root.  
To disable address space layout randomization (ASLR) to reduce run-to-run  
variability, 'sysctl -w kernel.randomize\_va\_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,  
'echo always > /sys/kernel/mm/transparent\_hugepage/enabled' and  
'echo always > /sys/kernel/mm/transparent\_hugepage/defrag' run as root.



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## Environment Variables Notes

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

```
GOMP_CPU_AFFINITY = "0-191"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc400_znver4_A_lib/lib:"
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 = "192"
```

Environment variables set by runcpu during the 600.perlbench\_s peak run:

```
GOMP_CPU_AFFINITY = "15"
```

Environment variables set by runcpu during the 605.mcf\_s peak run:

```
GOMP_CPU_AFFINITY = "15"
```

Environment variables set by runcpu during the 623.xalancbmk\_s peak run:

```
GOMP_CPU_AFFINITY = "15"
```

Environment variables set by runcpu during the 625.x264\_s peak run:

```
GOMP_CPU_AFFINITY = "15"
```

## 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 Peak Frequency Compute  
Determinism Control set to Manual  
Performance Determinism set to Power Deterministic  
AMD SMT Option set to Disabled  
Memory Patrol Scrubbing set to Disabled  
NUMA memory domains per socket set to Four memory domains per socket  
Last-Level Cache (LLC) as NUMA Node set to Enabled  
ACPI CST C2 Latency set to 18 microseconds  
Memory PStates set to Disabled  
Thermal Configuration set to Maximum Cooling  
Workload Profile set to Custom  
Power Regulator set to OS Control Mode  
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 Wed Sep 20 16:23:23 2023

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## Platform Notes (Continued)

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

### Table of contents

- 1. uname -a
- 2. w
- 3. Username
- 4. ulimit -a
- 5. sysinfo process ancestry
- 6. /proc/cpuinfo
- 7. lscpu
- 8. numactl --hardware
- 9. /proc/meminfo
- 10. who -r
- 11. Systemd service manager version: systemd 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
 16:23:23 up 6 min,  1 user,  load average: 0.07, 0.14, 0.08
USER   TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
root   pts/0    16.242.160.168  16:18   19.00s  1.06s  0.07s /bin/bash ./amd_speed_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) 3094484
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
```

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## Platform Notes (Continued)

max user processes (-u) 3094484  
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] 1 of 10-100 startups
sshd: root@pts/0
-bash
python3 ./run_intspeed.py
/bin/bash ./amd_speed_aocc400_znver4_A1.sh
runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 intspeak
runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed intspeak --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.016/templogs/preenv.intspeed.016.0.log --lognum 016.0 --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        : 96
2 physical ids (chips)
192 processors (hardware threads)
physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
physical id 1: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
physical id 1: apicids
256-263,272-279,288-295,304-311,320-327,336-343,352-359,368-375,384-391,400-407,416-423,432-439
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):                 192
On-line CPU(s) list:   0-191
Vendor ID:              AuthenticAMD
Model name:             AMD EPYC 9684X 96-Core Processor
CPU family:             25
Model:                  17
Thread(s) per core:    1
Core(s) per socket:    96
Socket(s):              2
Stepping:               2
Frequency boost:        enabled
```

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## Platform Notes (Continued)

```

CPU max MHz:          2550.0000
CPU min MHz:          1500.0000
BogoMIPS:              5091.89
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 noopl 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
                        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 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_l1d
Virtualization:       AMD-V
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
NUMA node1 CPU(s):   8-15
NUMA node2 CPU(s):   16-23
NUMA node3 CPU(s):   24-31
NUMA node4 CPU(s):   32-39
NUMA node5 CPU(s):   40-47
NUMA node6 CPU(s):   48-55
NUMA node7 CPU(s):   56-63
NUMA node8 CPU(s):   64-71
NUMA node9 CPU(s):   72-79
NUMA node10 CPU(s):  80-87
NUMA node11 CPU(s):  88-95
NUMA node12 CPU(s):  96-103
NUMA node13 CPU(s):  104-111
NUMA node14 CPU(s):  112-119
NUMA node15 CPU(s):  120-127
NUMA node16 CPU(s):  128-135
NUMA node17 CPU(s):  136-143
NUMA node18 CPU(s):  144-151
NUMA node19 CPU(s):  152-159
NUMA node20 CPU(s):  160-167
NUMA node21 CPU(s):  168-175
NUMA node22 CPU(s):  176-183
NUMA node23 CPU(s):  184-191
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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:  Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB
                           filling, PBRSE-eIBRS Not affected
Vulnerability Srbds:      Not affected

```

(Continued on next page)



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## Platform Notes (Continued)

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

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

available: 24 nodes (0-23)

node 0 cpus: 0-7

node 0 size: 31943 MB

node 0 free: 31778 MB

node 1 cpus: 8-15

node 1 size: 32253 MB

node 1 free: 32134 MB

node 2 cpus: 16-23

node 2 size: 32253 MB

node 2 free: 32148 MB

node 3 cpus: 24-31

node 3 size: 32253 MB

node 3 free: 32135 MB

node 4 cpus: 32-39

node 4 size: 32253 MB

node 4 free: 32162 MB

node 5 cpus: 40-47

node 5 size: 32253 MB

node 5 free: 32088 MB

node 6 cpus: 48-55

node 6 size: 32253 MB

node 6 free: 32075 MB

node 7 cpus: 56-63

node 7 size: 32253 MB

node 7 free: 32100 MB

node 8 cpus: 64-71

node 8 size: 32253 MB

node 8 free: 32122 MB

node 9 cpus: 72-79

node 9 size: 32253 MB

node 9 free: 32122 MB

node 10 cpus: 80-87

node 10 size: 32253 MB

node 10 free: 32159 MB

node 11 cpus: 88-95

node 11 size: 32253 MB

node 11 free: 32089 MB

node 12 cpus: 96-103

node 12 size: 32253 MB

node 12 free: 31965 MB

node 13 cpus: 104-111

node 13 size: 32253 MB

node 13 free: 32108 MB

node 14 cpus: 112-119

node 14 size: 32253 MB

node 14 free: 32137 MB

node 15 cpus: 120-127

node 15 size: 32253 MB

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## Platform Notes (Continued)

```

node 15 free: 32151 MB
node 16 cpus: 128-135
node 16 size: 32253 MB
node 16 free: 32136 MB
node 17 cpus: 136-143
node 17 size: 32253 MB
node 17 free: 32140 MB
node 18 cpus: 144-151
node 18 size: 32253 MB
node 18 free: 32070 MB
node 19 cpus: 152-159
node 19 size: 32253 MB
node 19 free: 32106 MB
node 20 cpus: 160-167
node 20 size: 32219 MB
node 20 free: 32051 MB
node 21 cpus: 168-175
node 21 size: 32253 MB
node 21 free: 32139 MB
node 22 cpus: 176-183
node 22 size: 32253 MB
node 22 free: 32137 MB
node 23 cpus: 184-191
node 23 size: 32158 MB
node 23 free: 31985 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 11 12 12 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
1:  11 10 11 12 12 12 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
2:  11 11 10 12 12 12 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
3:  12 12 12 10 11 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
4:  12 12 12 11 10 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
5:  12 12 12 11 11 10 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
6:  12 12 12 12 12 12 12 10 11 11 12 12 32 32 32 32 32 32 32 32 32 32 32 32
7:  12 12 12 12 12 12 12 11 10 11 12 12 32 32 32 32 32 32 32 32 32 32 32 32
8:  12 12 12 12 12 12 12 11 11 10 12 12 32 32 32 32 32 32 32 32 32 32 32 32
9:  12 12 12 12 12 12 12 12 12 12 10 11 11 32 32 32 32 32 32 32 32 32 32 32
10: 12 12 12 12 12 12 12 12 12 12 11 10 11 32 32 32 32 32 32 32 32 32 32 32
11: 12 12 12 12 12 12 12 12 12 11 11 10 32 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:      792219836 kB

```

```

-----
10. who -r
run-level 5 Sep 20 16:18

```

(Continued on next page)





# SPEC CPU®2017 Integer Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL365 Gen11**

(2.55 GHz, AMD EPYC 9684X)

**SPECspeed®2017\_int\_base = 14.3**

**SPECspeed®2017\_int\_peak = 14.4**

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

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

## Platform Notes (Continued)

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 nscd postfix purge-kernels rollback rsyslog smad 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 firewallld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsiid iscsiui 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-sysext systemd-time-wait-sync systemd-timesyncd tuned udisks2 upower wpa_supplicant@
indirect	pcscd 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

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## Platform Notes (Continued)

```

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 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/sda3       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

```

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## Platform Notes (Continued)

-----  
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

## Compiler Version Notes

-----  
C | 600.perlbench\_s(base, peak) 602.gcc\_s(base, peak) 605.mcf\_s(base, peak) 625.x264\_s(base, peak)  
657.xz\_s(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++ | 620.omnetpp\_s(base, peak) 623.xalancbmk\_s(base, peak) 631.deepsjeng\_s(base, peak)  
641.leela\_s(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 | 648.exchange2\_s(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



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ProLiant DL365 Gen11

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SPECspeed®2017\_int\_peak = 14.4

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

**Test Date:** Sep-2023  
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**Software Availability:** Apr-2023

## Base Portability Flags

```
600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
```

## Base Optimization Flags

### C benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -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 -lflang
-lamdalloc
```

### 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
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fvirtual-function-elimination -fvisibility=hidden -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc-ext
```

### Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc
```



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CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Sep-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023

## Base Other Flags

C benchmarks:

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

C++ benchmarks:

-Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -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
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

602.gcc\_s: basepeak = yes

(Continued on next page)



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**Software Availability:** Apr-2023

## Peak Optimization Flags (Continued)

605.mcf\_s: Same as 600.perlbench\_s

625.x264\_s: Same as 600.perlbench\_s

657.xz\_s: basepeak = yes

C++ benchmarks:

620.omnetpp\_s: basepeak = yes

623.xalancbmk\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-do-block-reorder=aggressive -Ofast  
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp  
-flto -finline-aggressive -mllvm -unroll-threshold=100  
-mllvm -reduce-array-computations=3 -DSPEC\_OPENMP -zopt  
-mllvm -do-block-reorder=aggressive  
-fvirtual-function-elimination -fvisibility=hidden  
-fopenmp=libomp -lomp -lamdlibm -lamdalloc-ext -lflang

631.deepsjeng\_s: basepeak = yes

641.leela\_s: basepeak = yes

Fortran benchmarks:

648.exchange2\_s: basepeak = yes

## Peak Other Flags

C benchmarks:

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

C++ benchmarks:

-Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-X-rev1.0.html>

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



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**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

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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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