



# SPEC CPU®2017 Integer Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL325 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_int\_base = 11.0

SPECspeed®2017\_int\_peak = 11.1

CPU2017 License: 3

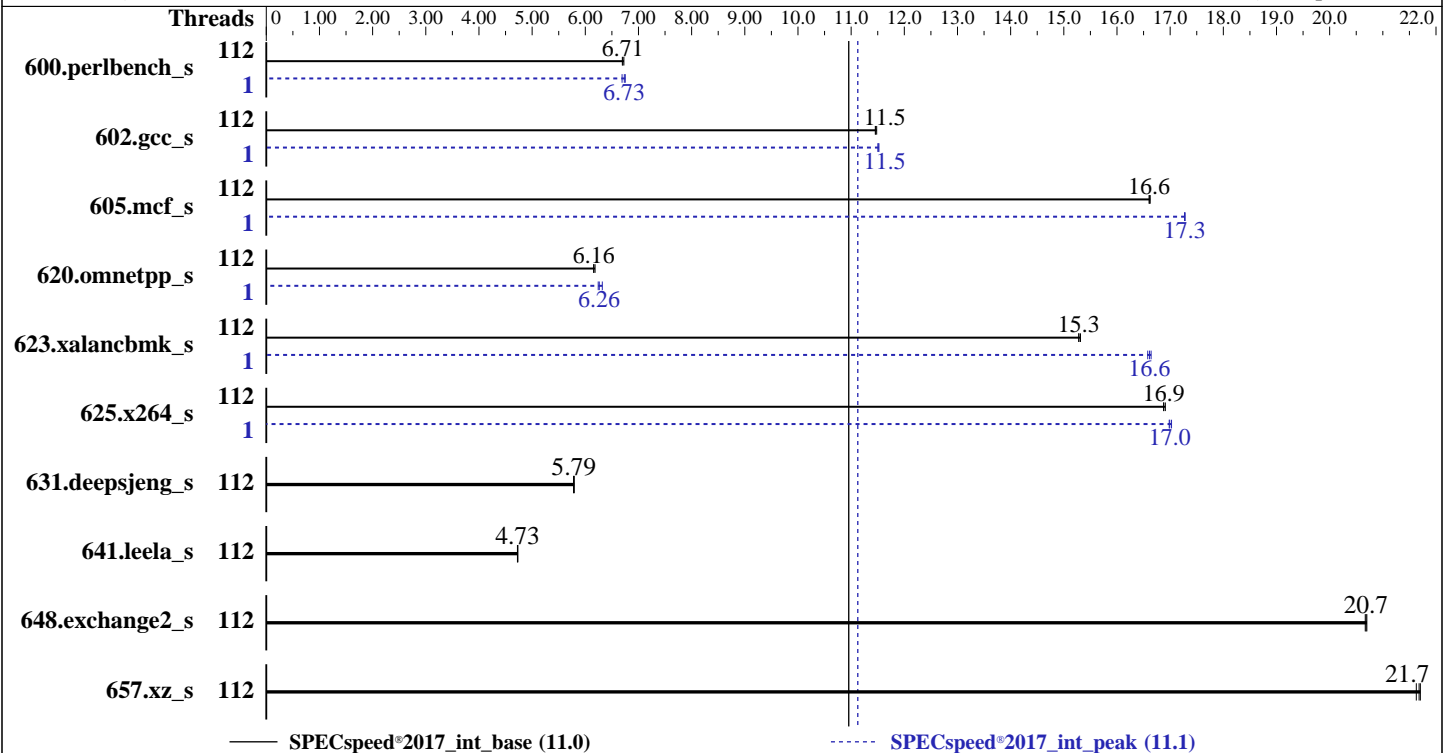
Test Sponsor: HPE

Tested by: HPE

Test Date: Sep-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023



### Hardware

CPU Name: AMD EPYC 9734  
 Max MHz: 3000  
 Nominal: 2200  
 Enabled: 112 cores, 1 chip  
 Orderable: 1 chip  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 256 MB I+D on chip per chip,  
 16 MB shared / 7 cores  
 Other: None  
 Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux 9.0 (Plow)  
 Kernel 5.14.0-70.13.1.el9\_0.x86\_64  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: Yes  
 Firmware: HPE BIOS Version v1.42 08/16/2023 released  
 Aug-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



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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	112	<b>265</b>	<b>6.71</b>	265	6.70	264	6.73	1	<b>264</b>	<b>6.73</b>	265	6.69	263	6.75
602.gcc_s	112	347	11.5	348	11.5	<b>347</b>	<b>11.5</b>	1	346	11.5	346	11.5	<b>346</b>	<b>11.5</b>
605.mcf_s	112	<b>284</b>	<b>16.6</b>	284	16.6	284	16.6	1	273	17.3	273	17.3	<b>273</b>	<b>17.3</b>
620.omnetpp_s	112	<b>265</b>	<b>6.16</b>	265	6.16	264	6.18	1	261	6.24	<b>260</b>	<b>6.26</b>	258	6.32
623.xalancbmk_s	112	92.5	15.3	<b>92.7</b>	<b>15.3</b>	92.7	15.3	1	85.1	16.6	85.5	16.6	<b>85.3</b>	<b>16.6</b>
625.x264_s	112	104	16.9	105	16.9	<b>105</b>	<b>16.9</b>	1	104	17.0	104	17.0	<b>104</b>	<b>17.0</b>
631.deepsjeng_s	112	248	5.78	247	5.79	<b>248</b>	<b>5.79</b>	112	248	5.78	247	5.79	<b>248</b>	<b>5.79</b>
641.leela_s	112	361	4.72	361	4.73	<b>361</b>	<b>4.73</b>	112	361	4.72	361	4.73	<b>361</b>	<b>4.73</b>
648.exchange2_s	112	142	20.7	142	20.7	<b>142</b>	<b>20.7</b>	112	142	20.7	142	20.7	<b>142</b>	<b>20.7</b>
657.xz_s	112	<b>285</b>	<b>21.7</b>	286	21.6	285	21.7	112	<b>285</b>	<b>21.7</b>	286	21.6	285	21.7

SPECspeed®2017\_int\_base = **11.0**

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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,  
'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 = "0-111"
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 = "112"
```

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

```
GOMP_CPU_AFFINITY = "15"
```

Environment variables set by runcpu during the 602.gcc\_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 620.omnetpp\_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
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
Memory PStates set to Disabled
ACPI CST C2 Latency set to 18 microseconds
Thermal Configuration set to Maximum Cooling
Memory Patrol Scrubbing set to Disabled
The system ROM used for this result contains microcode version 0xaa00212 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
```

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## Platform Notes (Continued)

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost.localdomain Fri Sep 22 12:42:07 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
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/khugepaged
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.e19_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 x86_64 GNU/Linux
```

```
2. w
12:42:07 up 1 min, 1 user, load average: 0.43, 0.23, 0.09
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root pts/0 12:41 15.00s 1.11s 0.03s /bin/bash ./amd_speed_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) 3094709
max locked memory (kbytes, -l) 2097152
max memory size (kbytes, -m) unlimited
open files (-n) 1024
```

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## Platform Notes (Continued)

```

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) 3094709
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 [priv]
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 intspeed
runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.011/templogs/preenv.intspeed.011.0.log --lognum 011.0 --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
microcode      : 0xaa00212
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 3584 4K pages
cpu cores      : 112
siblings       : 112
1 physical ids (chips)
112 processors (hardware threads)
physical id 0: core ids
0-6,8-14,16-22,24-30,32-38,40-46,48-54,56-62,64-70,72-78,80-86,88-94,96-102,104-110,112-118,120-126
physical id 0: apicids
0-6,8-14,16-22,24-30,32-38,40-46,48-54,56-62,64-70,72-78,80-86,88-94,96-102,104-110,112-118,120-126
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):                 112
On-line CPU(s) list:   0-111
Vendor ID:              AuthenticAMD
BIOS Vendor ID:         Advanced Micro Devices, Inc.
Model name:             AMD EPYC 9734 112-Core Processor
BIOS Model name:       AMD EPYC 9734 112-Core Processor

```

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## Platform Notes (Continued)

```

CPU family:                25
Model:                      160
Thread(s) per core:        1
Core(s) per socket:        112
Socket(s):                  1
Stepping:                   2
BogoMIPS:                   4393.41
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 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:                  3.5 MiB (112 instances)
L1i cache:                  3.5 MiB (112 instances)
L2 cache:                   112 MiB (112 instances)
L3 cache:                   256 MiB (16 instances)
NUMA node(s):               16
NUMA node0 CPU(s):          0-6
NUMA node1 CPU(s):          7-13
NUMA node2 CPU(s):          14-20
NUMA node3 CPU(s):          21-27
NUMA node4 CPU(s):          28-34
NUMA node5 CPU(s):          35-41
NUMA node6 CPU(s):          42-48
NUMA node7 CPU(s):          49-55
NUMA node8 CPU(s):          56-62
NUMA node9 CPU(s):          63-69
NUMA node10 CPU(s):         70-76
NUMA node11 CPU(s):         77-83
NUMA node12 CPU(s):         84-90
NUMA node13 CPU(s):         91-97
NUMA node14 CPU(s):         98-104
NUMA node15 CPU(s):         105-111
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:         Not affected
Vulnerability Mds:          Not affected
Vulnerability Meltdown:     Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1:    Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:    Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP 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	3.5M	8	Data	1	64	1	64
L1i	32K	3.5M	8	Instruction	1	64	1	64

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## Platform Notes (Continued)

L2	1M	112M	8 Unified	2	2048	1	64
L3	16M	256M	16 Unified	3	16384	1	64

8. numactl --hardware

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

available: 16 nodes (0-15)

```

node 0 cpus: 0-6
node 0 size: 48135 MB
node 0 free: 47756 MB
node 1 cpus: 7-13
node 1 size: 48382 MB
node 1 free: 47937 MB
node 2 cpus: 14-20
node 2 size: 48382 MB
node 2 free: 48062 MB
node 3 cpus: 21-27
node 3 size: 48382 MB
node 3 free: 48044 MB
node 4 cpus: 28-34
node 4 size: 48382 MB
node 4 free: 48188 MB
node 5 cpus: 35-41
node 5 size: 48382 MB
node 5 free: 48179 MB
node 6 cpus: 42-48
node 6 size: 48382 MB
node 6 free: 48205 MB
node 7 cpus: 49-55
node 7 size: 48382 MB
node 7 free: 48105 MB
node 8 cpus: 56-62
node 8 size: 48382 MB
node 8 free: 48255 MB
node 9 cpus: 63-69
node 9 size: 48382 MB
node 9 free: 48323 MB
node 10 cpus: 70-76
node 10 size: 48382 MB
node 10 free: 48307 MB
node 11 cpus: 77-83
node 11 size: 48382 MB
node 11 free: 48199 MB
node 12 cpus: 84-90
node 12 size: 48382 MB
node 12 free: 48275 MB
node 13 cpus: 91-97
node 13 size: 48345 MB
node 13 free: 48278 MB
node 14 cpus: 98-104
node 14 size: 48382 MB
node 14 free: 48310 MB
node 15 cpus: 105-111
node 15 size: 48329 MB
node 15 free: 48252 MB

```

node distances:

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

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```

3: 11 11 11 10 12 12 12 12 12 12 12 12 12 12 12
4: 12 12 12 12 10 11 11 11 12 12 12 12 12 12 12
5: 12 12 12 12 11 10 11 11 12 12 12 12 12 12 12
6: 12 12 12 12 11 11 10 11 12 12 12 12 12 12 12
7: 12 12 12 12 11 11 11 10 12 12 12 12 12 12 12
8: 12 12 12 12 12 12 12 12 12 10 11 11 11 12 12
9: 12 12 12 12 12 12 12 12 12 11 10 11 11 12 12
10: 12 12 12 12 12 12 12 12 12 11 11 10 11 12 12
11: 12 12 12 12 12 12 12 12 12 11 11 11 10 12 12
12: 12 12 12 12 12 12 12 12 12 12 12 12 10 11 11
13: 12 12 12 12 12 12 12 12 12 12 12 12 11 10 11
14: 12 12 12 12 12 12 12 12 12 12 12 12 11 11 10
15: 12 12 12 12 12 12 12 12 12 12 12 12 11 11 10

```

```

9. /proc/meminfo
   MemTotal:          792352308 kB

```

```

10. who -r
    run-level 3 Sep 22 12:40

```

```

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

```

```

12. Services, from systemctl list-unit-files
    STATE      UNIT FILES
    enabled    NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond
              dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
              nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
              systemd-network-generator tuned udisks2 upower
    enabled-runtime  systemd-remount-fs
    disabled      blk-availability canberra-system-bootup canberra-system-shutdown
              canberra-system-shutdown-reboot chrony-wait chronyd console-getty cpupower debug-shell
              hwloc-dump-hwdata ipsec kvm_stat man-db-restart-cache-update nftables powertop rdisc rhsm
              rhsm-facts rpmdb-rebuild serial-getty@ sshd-keygen@ systemd-boot-check-no-failures
              systemd-pstore systemd-sysext
    indirect     sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

```

```

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:
    Unable to determine current policy
    boost state support:
      Supported: yes
      Active: yes
      Boost States: 0
      Total States: 3

```

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**Tested by:** HPE

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

## Platform Notes (Continued)

Pstate-P0: 2200MHz

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

16. sysctl  
kernel.numa\_balancing 1  
kernel.randomize\_va\_space 0  
vm.compaction\_proactiveness 20  
vm.dirty\_background\_bytes 0  
vm.dirty\_background\_ratio 10  
vm.dirty\_bytes 0  
vm.dirty\_expire\_centisecs 3000  
vm.dirty\_ratio 8  
vm.dirty\_writeback\_centisecs 500  
vm.dirtytime\_expire\_seconds 43200  
vm.extfrag\_threshold 500  
vm.min\_unmapped\_ratio 1  
vm.nr\_hugepages 0  
vm.nr\_hugepages\_mempolicy 0  
vm.nr\_overcommit\_hugepages 0  
vm.swappiness 1  
vm.watermark\_boost\_factor 15000  
vm.watermark\_scale\_factor 10  
vm.zone\_reclaim\_mode 1  
-----

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 15G 357G 4% /home  
-----

21. /sys/devices/virtual/dmi/id  
-----

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# SPEC CPU®2017 Integer Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_int\_base = 11.0

SPECspeed®2017\_int\_peak = 11.1

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Sep-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023

## Platform Notes (Continued)

Vendor: HPE  
Product: ProLiant DL325 Gen11  
Product Family: ProLiant  
Serial: DL325GEN11-002

### 22. dmidecode

Additional information from dmidecode 3.3 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

#### Memory:

11x Hynix HMC94AEBRA103N 64 GB 2 rank 4800  
1x Hynix HMC94MEBRA121N 64 GB 2 rank 4800

### 23. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: HPE  
BIOS Version: 1.42  
BIOS Date: 08/16/2023  
BIOS Revision: 1.42  
Firmware Revision: 1.40

## 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



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**Test Sponsor:** HPE

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**Test Date:** Sep-2023

**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

## Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## 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
```

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## Base Optimization Flags (Continued)

C++ benchmarks (continued):

-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

## 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



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SPECspeed®2017\_int\_peak = 11.1

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

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

## 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
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

```
602.gcc_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -z muldefs -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

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

```
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
```

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## Peak Optimization Flags (Continued)

623.xalancbmk\_s (continued):

-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.2023-09-13.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.2023-09-13.xml>

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Tested with SPEC CPU®2017 v1.1.9 on 2023-09-22 03:12:06-0400.

Report generated on 2023-10-11 12:31:02 by CPU2017 PDF formatter v6716.

Originally published on 2023-10-10.