



# SPEC CPU®2017 Integer Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL345 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_int\_base = 11.0

SPECspeed®2017\_int\_peak = 11.1

CPU2017 License: 3

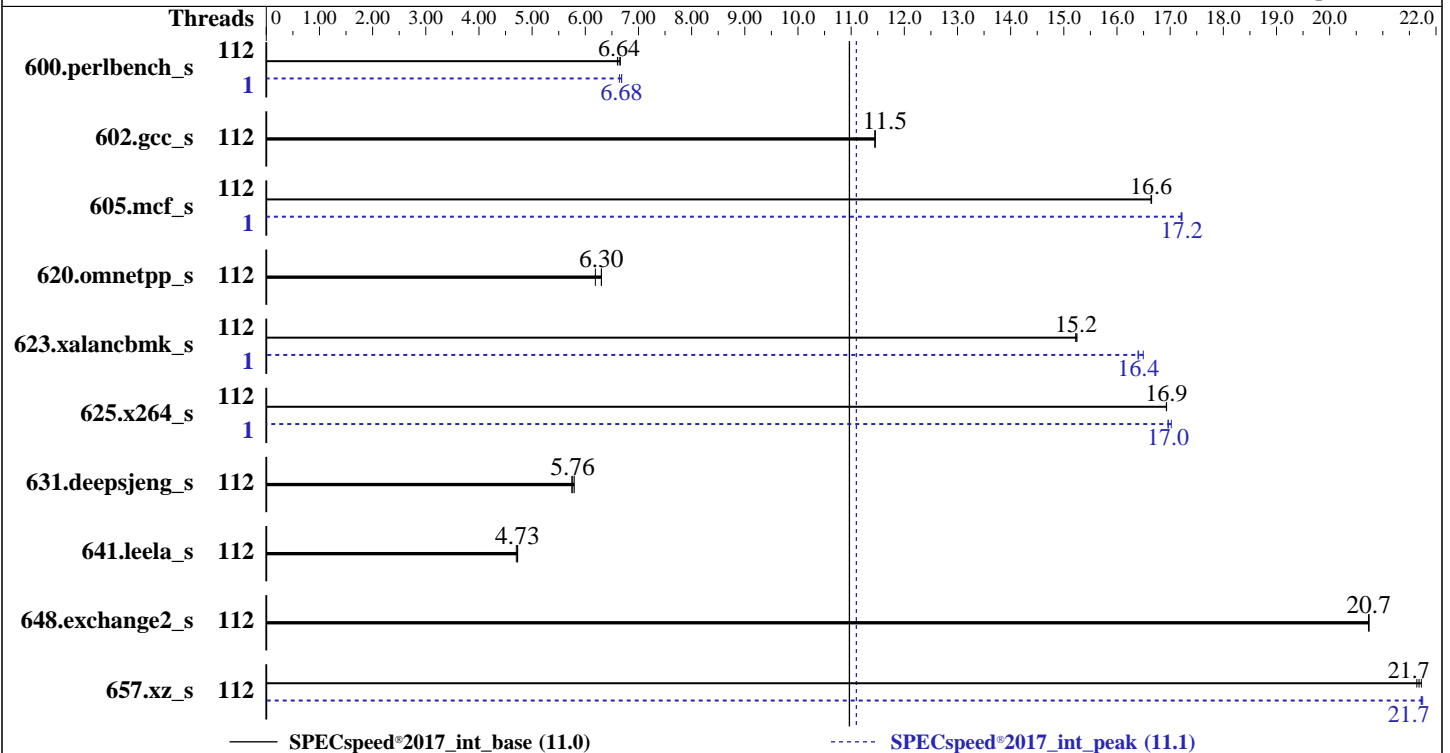
Test Sponsor: HPE

Tested by: HPE

Test Date: Jun-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 960 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 v1.30 03/06/2023 released  
 Mar-2023  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: None  
 Power Management: BIOS and OS set to prefer performance at  
 the cost of additional power usage



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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	269	6.60	267	6.66	<u>267</u>	<u>6.64</u>	1	266	6.68	267	6.64	<u>266</u>	<u>6.68</u>
602.gcc_s	112	<u>348</u>	<u>11.5</u>	348	11.4	348	11.5	112	<u>348</u>	<u>11.5</u>	348	11.4	348	11.5
605.mcf_s	112	284	16.7	284	16.6	<u>284</u>	<u>16.6</u>	1	274	17.2	274	17.2	<u>274</u>	<u>17.2</u>
620.omnetpp_s	112	259	6.30	264	6.19	<u>259</u>	<u>6.30</u>	112	259	6.30	264	6.19	<u>259</u>	<u>6.30</u>
623.xalancbmk_s	112	92.9	15.2	93.1	15.2	<u>93.0</u>	<u>15.2</u>	1	<u>86.4</u>	<u>16.4</u>	86.4	16.4	85.9	16.5
625.x264_s	112	<u>104</u>	<u>16.9</u>	104	16.9	104	16.9	1	<u>104</u>	<u>17.0</u>	104	17.0	104	17.0
631.deepsjeng_s	112	247	5.79	<u>249</u>	<u>5.76</u>	249	5.75	112	247	5.79	<u>249</u>	<u>5.76</u>	249	5.75
641.leela_s	112	361	4.73	363	4.70	<u>361</u>	<u>4.73</u>	112	361	4.73	363	4.70	<u>361</u>	<u>4.73</u>
648.exchange2_s	112	142	20.7	<u>142</u>	<u>20.7</u>	142	20.7	112	142	20.7	<u>142</u>	<u>20.7</u>	142	20.7
657.xz_s	112	285	21.7	<u>285</u>	<u>21.7</u>	286	21.6	112	<u>285</u>	<u>21.7</u>	285	21.7	284	21.8

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 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"
```

Environment variables set by runcpu during the 657.xz\_s peak run:

```
GOMP_CPU_AFFINITY = "0-111"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "8"
```

## 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
```

```
Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Jun 30 18:38:29 2023
```

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

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## Platform Notes (Continued)

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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. sysctl
16. /sys/kernel/mm/transparent\_hugepage
17. /sys/kernel/mm/transparent\_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. 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
18:38:29 up 3 min, 0 users, load average: 0.12, 0.20, 0.09
USER      TTY      LOGIN@  IDLE   JCPU   PCPU   WHAT
```

```
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) 3094708
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) 3094708
virtual memory              (kbytes, -v) unlimited
file locks                  (-x) unlimited
```

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```

-----
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@notty
bash -c cd $SPEC/ && $SPEC/intspeed.sh
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/CPU2017.001/templogs/preenv.intspeed.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/CPU2017

```

```

-----
6. /proc/cpuinfo
model name      : AMD EPYC 9734 112-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model          : 160
stepping       : 2
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 3584 4K pages
cpu cores     : 112
siblings      : 112
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
CPU family:       25
Model:            160
Thread(s) per core: 1
Core(s) per socket: 112
Socket(s):        1
Stepping:         2
BogoMIPS:         4393.48
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

```

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## Platform Notes (Continued)

```
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
avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
xsaves 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_lld
AMD-V
```

### Virtualization:

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): 56-62  
NUMA node3 CPU(s): 63-69  
NUMA node4 CPU(s): 28-34  
NUMA node5 CPU(s): 35-41  
NUMA node6 CPU(s): 84-90  
NUMA node7 CPU(s): 91-97  
NUMA node8 CPU(s): 42-48  
NUMA node9 CPU(s): 49-55  
NUMA node10 CPU(s): 98-104  
NUMA node11 CPU(s): 105-111  
NUMA node12 CPU(s): 14-20  
NUMA node13 CPU(s): 21-27  
NUMA node14 CPU(s): 70-76  
NUMA node15 CPU(s): 77-83

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/swaps 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
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: 48136 MB

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## Platform Notes (Continued)

```

node 0 free: 47903 MB
node 1 cpus: 7-13
node 1 size: 48382 MB
node 1 free: 48205 MB
node 2 cpus: 56-62
node 2 size: 48382 MB
node 2 free: 48246 MB
node 3 cpus: 63-69
node 3 size: 48382 MB
node 3 free: 48245 MB
node 4 cpus: 28-34
node 4 size: 48382 MB
node 4 free: 48095 MB
node 5 cpus: 35-41
node 5 size: 48382 MB
node 5 free: 48234 MB
node 6 cpus: 84-90
node 6 size: 48382 MB
node 6 free: 48257 MB
node 7 cpus: 91-97
node 7 size: 48382 MB
node 7 free: 48135 MB
node 8 cpus: 42-48
node 8 size: 48382 MB
node 8 free: 48225 MB
node 9 cpus: 49-55
node 9 size: 48345 MB
node 9 free: 48152 MB
node 10 cpus: 98-104
node 10 size: 48382 MB
node 10 free: 48235 MB
node 11 cpus: 105-111
node 11 size: 48382 MB
node 11 free: 48228 MB
node 12 cpus: 14-20
node 12 size: 48382 MB
node 12 free: 48075 MB
node 13 cpus: 21-27
node 13 size: 48382 MB
node 13 free: 48129 MB
node 14 cpus: 70-76
node 14 size: 48382 MB
node 14 free: 48061 MB
node 15 cpus: 77-83
node 15 size: 48329 MB
node 15 free: 48157 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
3:  11 11 11 10 12 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 12
5:  12 12 12 12 11 10 11 11 12 12 12 12 12 12 12 12
6:  12 12 12 12 11 11 10 11 12 12 12 12 12 12 12 12
7:  12 12 12 12 11 11 11 10 12 12 12 12 12 12 12 12
8:  12 12 12 12 12 12 12 12 10 11 11 11 12 12 12 12
9:  12 12 12 12 12 12 12 12 11 10 11 11 12 12 12 12
10: 12 12 12 12 12 12 12 12 11 11 10 11 12 12 12 12
11: 12 12 12 12 12 12 12 12 11 11 11 10 12 12 12 12

```

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12:	12	12	12	12	12	12	12	12	12	12	12	12	10	11	11	11
13:	12	12	12	12	12	12	12	12	12	12	12	12	11	10	11	11
14:	12	12	12	12	12	12	12	12	12	12	12	12	11	11	10	11
15:	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	10

9. /proc/meminfo  
MemTotal: 792352316 kB

10. who -r  
run-level 3 Jun 30 18:34

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 chronyd crond dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd systemd-network-generator udisks2
enabled-runtime	systemd-remount-fs
disabled	blk-availability chrony-wait console-getty cpupower debug-shell hwloc-dump-hwdata kvm_stat man-db-restart-cache-update nftables rdisc rhsm rhsm-facts rpmdb-rebuild serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysex
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=(hd0,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  
Pstate-P0: 2200MHz

15. 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

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## Platform Notes (Continued)

```

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

```

```

-----
16. /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

```

```

-----
17. /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

```

```

-----
18. 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)

```

```

-----
19. Disk information
SPEC is set to: /home/CPU2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   819G  24G  795G   3% /home

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:          HPE
Product:         ProLiant DL345 Gen11
Product Family: ProLiant
Serial:          DL345G11-004

```

```

-----
21. 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:
12x Hynix HMC94AEBRA103N 64 GB 2 rank 4800

```

(Continued on next page)



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL345 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:** Jun-2023  
**Hardware Availability:** Sep-2023  
**Software Availability:** Apr-2023

## Platform Notes (Continued)

-----  
22. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: HPE  
BIOS Version: 1.30  
BIOS Date: 03/06/2023  
BIOS Revision: 1.30  
Firmware Revision: 1.40

## 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

## Base Compiler Invocation

C benchmarks:  
clang

C++ benchmarks:  
clang++

Fortran benchmarks:  
flang



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## 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

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**Test Date:** Jun-2023

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**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

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**CPU2017 License:** 3

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**Tested by:** HPE

**Test Date:** Jun-2023

**Hardware Availability:** Sep-2023

**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: Same as 600.perlbench\_s

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-Bergamo-rev1.0.html>

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



# SPEC CPU<sup>®</sup>2017 Integer Speed Result

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**Hewlett Packard Enterprise**

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SPECspeed<sup>®</sup>2017\_int\_base = 11.0

SPECspeed<sup>®</sup>2017\_int\_peak = 11.1

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Jun-2023

**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Bergamo-rev1.0.xml>

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

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