



# SPEC CPU®2017 Integer Speed Result

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## IEIT Systems Co., Ltd. NF5180A7 (AMD EPYC 9654)

SPECspeed®2017\_int\_base = 13.9

SPECspeed®2017\_int\_peak = 14.1

CPU2017 License: 3358

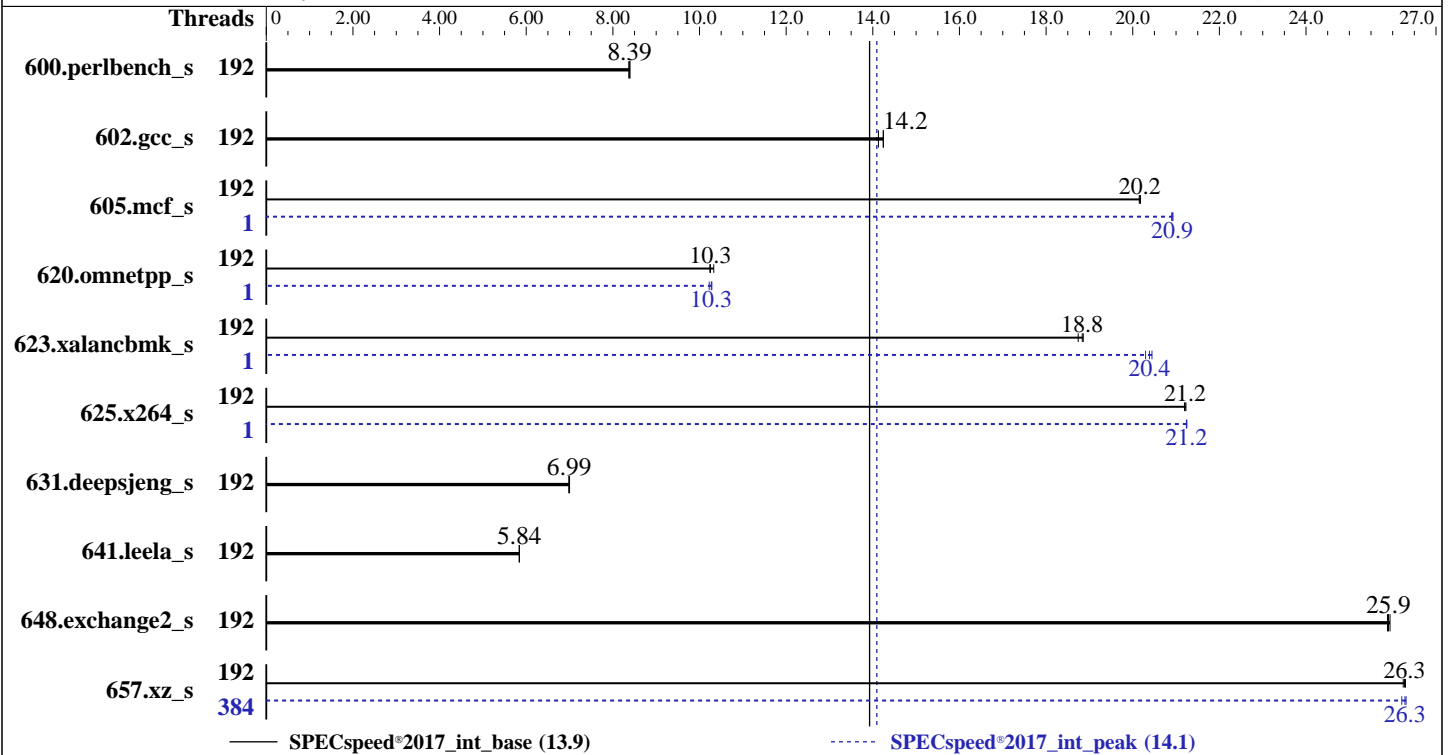
Test Sponsor: IEIT Systems Co., Ltd.

Tested by: IEIT Systems Co., Ltd.

Test Date: Nov-2023

Hardware Availability: Sep-2023

Software Availability: Nov-2022



### Hardware

CPU Name: AMD EPYC 9654  
 Max MHz: 3700  
 Nominal: 2400  
 Enabled: 192 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores  
 Other: None  
 Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 1.92 TB NVME SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux 9.0 (Plow)  
 5.14.0-70.22.1.el9\_0.x86\_64  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: Yes  
 Firmware: Version 04.02.19 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	192	211	8.39	212	8.37	<u>212</u>	<u>8.39</u>	192	211	8.39	212	8.37	<u>212</u>	<u>8.39</u>
602.gcc_s	192	280	14.2	282	14.1	<u>280</u>	<u>14.2</u>	192	280	14.2	282	14.1	<u>280</u>	<u>14.2</u>
605.mcf_s	192	234	20.2	<u>234</u>	<u>20.2</u>	234	20.2	1	226	20.9	<u>226</u>	<u>20.9</u>	226	20.9
620.omnetpp_s	192	159	10.2	<u>159</u>	<u>10.3</u>	158	10.3	1	159	10.3	160	10.2	<u>159</u>	<u>10.3</u>
623.xalancbmk_s	192	75.1	18.9	75.6	18.7	<u>75.2</u>	<u>18.8</u>	1	69.3	20.4	<u>69.5</u>	<u>20.4</u>	69.8	20.3
625.x264_s	192	83.2	21.2	<u>83.2</u>	<u>21.2</u>	83.1	21.2	1	<u>83.0</u>	<u>21.2</u>	83.1	21.2	83.0	21.2
631.deepsjeng_s	192	205	6.98	<u>205</u>	<u>6.99</u>	205	7.00	192	205	6.98	<u>205</u>	<u>6.99</u>	205	7.00
641.leela_s	192	<u>292</u>	<u>5.84</u>	292	5.84	292	5.84	192	<u>292</u>	<u>5.84</u>	292	5.84	292	5.84
648.exchange2_s	192	113	25.9	114	25.9	<u>113</u>	<u>25.9</u>	192	113	25.9	114	25.9	<u>113</u>	<u>25.9</u>
657.xz_s	192	<u>235</u>	<u>26.3</u>	235	26.3	236	26.2	384	<u>235</u>	<u>26.3</u>	236	26.2	235	26.3

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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 = "0-383"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc400_genoa_B_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 = "384"
```

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"
```

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

```
GOMP_CPU_AFFINITY = "0-383"
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:

```
SVM Mode = disable
DRAM Scrub time = disable
NUMA nodes per socket = NPS1
Determinism Slider = Power
cTDP = 400
Package Power Limit = 400
```

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Nov 21 10:44:08 2023
```

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

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## Platform Notes (Continued)

```

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.el9_0)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

```

```

-----
1. uname -a
Linux localhost 5.14.0-70.22.1.el9_0.x86_64 #1 SMP PREEMPT Tue Aug 2 10:02:12 EDT 2022 x86_64 x86_64 x86_64
GNU/Linux

```

```

-----
2. w
 10:44:08 up  1:28,  1 user,  load average: 0.26, 0.09, 0.03
USER      TTY      LOGIN@  IDLE   JCPU   PCPU   WHAT
root     ttyl          10:41   16.00s  1.50s  0.27s /bin/bash ./amd_speed_aocc400_genoa_B1.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) 6191046
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) 6191046
virtual memory              (kbytes, -v) unlimited
file locks                  (-x) unlimited

```

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## Platform Notes (Continued)

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
python3 ./run_amd_speed_aocc400_genoa_B1.py
/bin/bash ./amd_speed_aocc400_genoa_B1.sh
runcpu --config amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 intspeed
runcpu --configfile amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.015/templogs/preenv.intspeed.015.0.log --lognum 015.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

```

-----
6. /proc/cpuinfo
model name      : AMD EPYC 9654 96-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model         : 17
stepping      : 1
microcode     : 0xa101116
bugs          : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size     : 3584 4K pages
cpu cores     : 96
siblings      : 192
2 physical ids (chips)
384 processors (hardware threads)
physical id 0: core ids 0-95
physical id 1: core ids 0-95
physical id 0: apicids 0-191
physical id 1: apicids 256-447
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
virtualized systems. Use the above data carefully.

```

```

-----
7. lscpu

From lscpu from util-linux 2.37.4:
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):                384
On-line CPU(s) list:  0-383
Vendor ID:             AuthenticAMD
BIOS Vendor ID:       Advanced Micro Devices, Inc.
Model name:            AMD EPYC 9654 96-Core Processor
BIOS Model name:      AMD EPYC 9654 96-Core Processor
CPU family:            25
Model:                 17
Thread(s) per core:   2
Core(s) per socket:   96
Socket(s):             2
Stepping:              1
Frequency boost:       enabled
CPU max MHz:           3707.8120
CPU min MHz:           1500.0000
BogoMIPS:              4800.11

```

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### Platform Notes (Continued)

Flags:

fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr\_opt pdpe1gb rdtscp lm constant\_tsc rep\_good nopl nonstop\_tsc cpuid extd\_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4\_1 sse4\_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf\_lm cmp\_legacy svm extapic cr8\_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr\_core perfctr\_nb bpeext 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\_lld

Virtualization:

AMD-V  
L1d cache: 6 MiB (192 instances)  
L1i cache: 6 MiB (192 instances)  
L2 cache: 192 MiB (192 instances)  
L3 cache: 768 MiB (24 instances)  
NUMA node(s): 24  
NUMA node0 CPU(s): 0-7,192-199  
NUMA node1 CPU(s): 8-15,200-207  
NUMA node2 CPU(s): 16-23,208-215  
NUMA node3 CPU(s): 24-31,216-223  
NUMA node4 CPU(s): 32-39,224-231  
NUMA node5 CPU(s): 40-47,232-239  
NUMA node6 CPU(s): 48-55,240-247  
NUMA node7 CPU(s): 56-63,248-255  
NUMA node8 CPU(s): 64-71,256-263  
NUMA node9 CPU(s): 72-79,264-271  
NUMA node10 CPU(s): 80-87,272-279  
NUMA node11 CPU(s): 88-95,280-287  
NUMA node12 CPU(s): 96-103,288-295  
NUMA node13 CPU(s): 104-111,296-303  
NUMA node14 CPU(s): 112-119,304-311  
NUMA node15 CPU(s): 120-127,312-319  
NUMA node16 CPU(s): 128-135,320-327  
NUMA node17 CPU(s): 136-143,328-335  
NUMA node18 CPU(s): 144-151,336-343  
NUMA node19 CPU(s): 152-159,344-351  
NUMA node20 CPU(s): 160-167,352-359  
NUMA node21 CPU(s): 168-175,360-367  
NUMA node22 CPU(s): 176-183,368-375  
NUMA node23 CPU(s): 184-191,376-383  
Vulnerability Itlb multihit: Not affected  
Vulnerability L1tf: Not affected  
Vulnerability Mds: Not affected  
Vulnerability Meltdown: Not affected  
Vulnerability 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 always-on, 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	6M	8	Data	1	64	1	64

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L1i	32K	6M	8 Instruction	1	64	1	64
L2	1M	192M	8 Unified	2	2048	1	64
L3	32M	768M	16 Unified	3	32768	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: 0-7,192-199
node 0 size: 64308 MB
node 0 free: 63472 MB
node 1 cpus: 8-15,200-207
node 1 size: 64507 MB
node 1 free: 64088 MB
node 2 cpus: 16-23,208-215
node 2 size: 64507 MB
node 2 free: 64082 MB
node 3 cpus: 24-31,216-223
node 3 size: 64507 MB
node 3 free: 64039 MB
node 4 cpus: 32-39,224-231
node 4 size: 64507 MB
node 4 free: 64122 MB
node 5 cpus: 40-47,232-239
node 5 size: 64507 MB
node 5 free: 64282 MB
node 6 cpus: 48-55,240-247
node 6 size: 64507 MB
node 6 free: 64304 MB
node 7 cpus: 56-63,248-255
node 7 size: 64470 MB
node 7 free: 64254 MB
node 8 cpus: 64-71,256-263
node 8 size: 64507 MB
node 8 free: 64286 MB
node 9 cpus: 72-79,264-271
node 9 size: 64507 MB
node 9 free: 64047 MB
node 10 cpus: 80-87,272-279
node 10 size: 64507 MB
node 10 free: 64293 MB
node 11 cpus: 88-95,280-287
node 11 size: 64507 MB
node 11 free: 64302 MB
node 12 cpus: 96-103,288-295
node 12 size: 64507 MB
node 12 free: 64267 MB
node 13 cpus: 104-111,296-303
node 13 size: 64507 MB
node 13 free: 64303 MB
node 14 cpus: 112-119,304-311
node 14 size: 64507 MB
node 14 free: 64255 MB
node 15 cpus: 120-127,312-319
node 15 size: 64507 MB
node 15 free: 64205 MB
node 16 cpus: 128-135,320-327
node 16 size: 64507 MB
node 16 free: 64242 MB
node 17 cpus: 136-143,328-335

```

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## Platform Notes (Continued)

```

node 17 size: 64507 MB
node 17 free: 64229 MB
node 18 cpus: 144-151,336-343
node 18 size: 64507 MB
node 18 free: 64220 MB
node 19 cpus: 152-159,344-351
node 19 size: 64507 MB
node 19 free: 64223 MB
node 20 cpus: 160-167,352-359
node 20 size: 64507 MB
node 20 free: 64205 MB
node 21 cpus: 168-175,360-367
node 21 size: 64507 MB
node 21 free: 64170 MB
node 22 cpus: 176-183,368-375
node 22 size: 64507 MB
node 22 free: 64164 MB
node 23 cpus: 184-191,376-383
node 23 size: 64431 MB
node 23 free: 64094 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
0:  10 11 11 12 12 12 12 12 12 12 12 12 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
2:  11 11 10 12 12 12 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32
3:  12 12 12 10 11 11 12 12 12 12 12 12 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
5:  12 12 12 11 11 10 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32
6:  12 12 12 12 12 12 10 11 11 12 12 12 32 32 32 32 32 32 32 32 32 32 32
7:  12 12 12 12 12 12 11 10 11 12 12 12 32 32 32 32 32 32 32 32 32 32 32
8:  12 12 12 12 12 12 11 11 10 12 12 12 32 32 32 32 32 32 32 32 32 32 32
9:  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 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
12: 32 32 32 32 32 32 32 32 32 32 32 32 10 11 11 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
14: 32 32 32 32 32 32 32 32 32 32 32 32 11 11 10 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
16: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 11 10 11 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
18: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 10 11 11 12 12
19: 32 32 32 32 32 32 32 32 32 32 32 32 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 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 10 11 11
22: 32 32 32 32 32 32 32 32 32 32 32 32 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 11 11 10

```

```

-----
9. /proc/meminfo
   MemTotal:      1585014924 kB

```

```

-----
10. who -r
    run-level 3 Nov 21 09:15

```

```

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

```

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SPECspeed®2017\_int\_peak = 14.1

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**Test Date:** Nov-2023  
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**Software Availability:** Nov-2022

## Platform Notes (Continued)

12. Failed units, from `systemctl list-units --state=failed`  
UNIT LOAD ACTIVE SUB DESCRIPTION  
\* dnf-makecache.service loaded failed failed dnf makecache

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

14. Linux kernel boot-time arguments, from `/proc/cmdline`  
BOOT\_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.22.1.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

15. `cpupower frequency-info`  
analyzing CPU 0:  
current policy: frequency should be within 1.50 GHz and 2.40 GHz.  
The governor "performance" may decide which speed to use within this range.  
boost state support:  
Supported: yes  
Active: yes  
Boost States: 0  
Total States: 3  
Pstate-P0: 2400MHz

16. `tuned-adm active`  
Current active profile: throughput-performance

17. `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

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## Platform Notes (Continued)

```
vm.swappiness 1
vm.watermark_boost_factor 15000
vm.watermark_scale_factor 10
vm.zone_reclaim_mode 1
```

```
-----
18. /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
-----
```

```
-----
19. /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
-----
```

```
-----
20. 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)
-----
```

```
-----
21. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 1.7T 22G 1.7T 2% /home
-----
```

```
-----
22. /sys/devices/virtual/dmi/id
Vendor: IEI
Product: NF5180-A7-A0-R0-00
Product Family: Not specified
Serial: 000000000
-----
```

```
-----
23. 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:
24x Samsung M321R8GA0BB0-CQKZJ 64 GB 2 rank 4800
-----
```

```
-----
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 04.02.19
BIOS Date: 03/27/2023
-----
```



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## 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#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++ | 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#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 | 648.exchange2\_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  
-----

## 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

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## Base Portability Flags (Continued)

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
```

## Base Other Flags

C benchmarks:

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

C++ benchmarks:

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

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## Base Other Flags (Continued)

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: basepeak = yes

602.gcc\_s: basepeak = yes

605.mcf\_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

625.x264\_s: Same as 605.mcf\_s

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## Peak Optimization Flags (Continued)

657.xz\_s: Same as 605.mcf\_s

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
-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
```



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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/Inspur-Platform-Settings-amd-V3.1.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/Inspur-Platform-Settings-amd-V3.1.xml>

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