



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

## Lenovo Global Technology

SPECspeed®2017\_int\_base = 20.2

ThinkSystem SD535 V3  
(3.65 GHz, AMD EPYC 9475F)

SPECspeed®2017\_int\_peak = 20.6

CPU2017 License: 9017

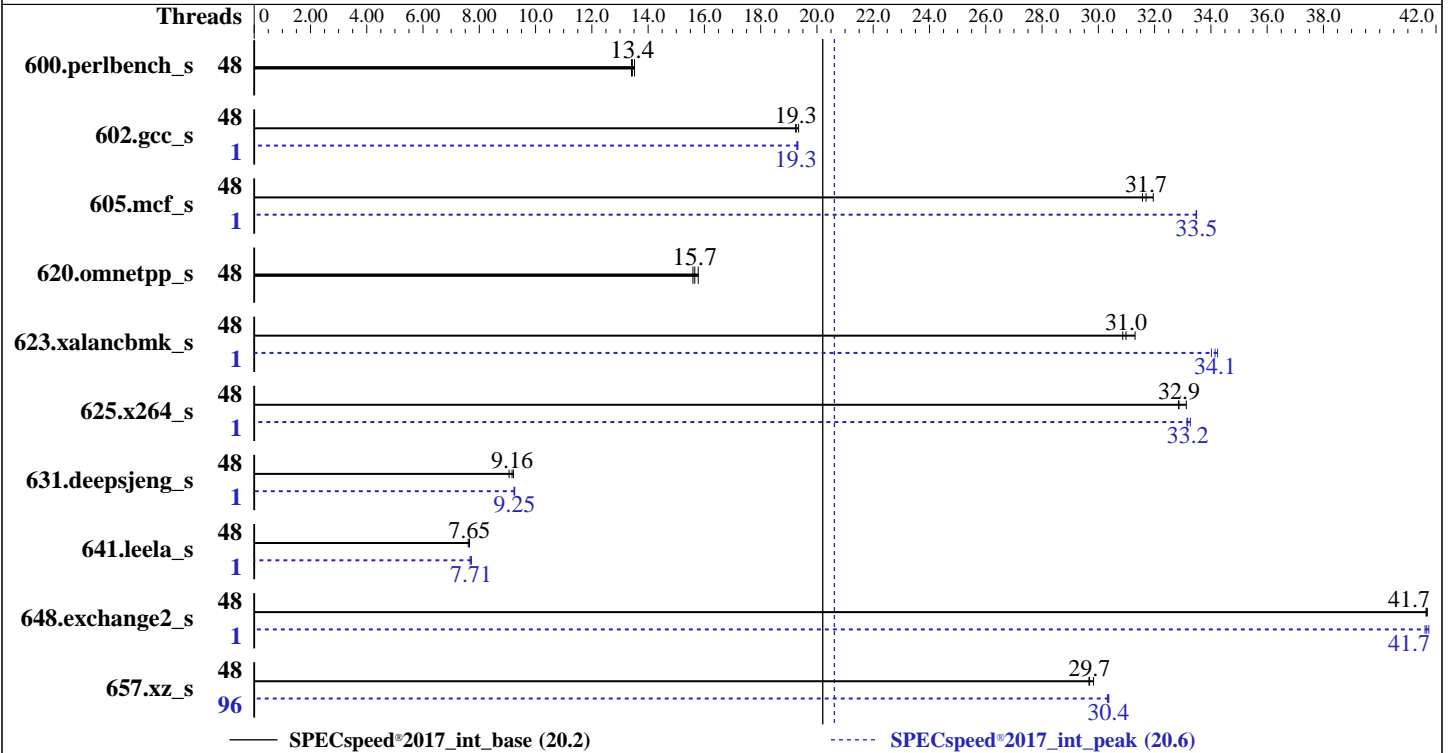
Test Date: Jan-2025

Test Sponsor: Lenovo Global Technology

Hardware Availability: Feb-2025

Tested by: Lenovo Global Technology

Software Availability: Oct-2024



### Hardware

CPU Name: AMD EPYC 9475F  
 Max MHz: 4800  
 Nominal: 3650  
 Enabled: 48 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 256 MB I+D on chip per chip,  
 32 MB shared / 6 cores  
 Other: None  
 Memory: 384 GB (12 x 32 GB 2Rx8 PC5-6400B-R, running at 6000)  
 Storage: 1 x 960 GB M.2 SATA SSD  
 Other: CPU Cooling: Air

### Software

OS: SUSE Linux Enterprise Server 15 SP6  
 Kernel 6.4.0-150600.21-default  
 Compiler: C/C++/Fortran: Version 5.0.0 of AOCC  
 Parallel: Yes  
 Firmware: Lenovo BIOS Version GPE113I 4.10 released Dec-2024  
 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	48	131	13.5	<b><u>132</u></b>	<b><u>13.4</u></b>	132	13.4	48	131	13.5	<b><u>132</u></b>	<b><u>13.4</u></b>	132	13.4
602.gcc_s	48	207	19.2	<b><u>207</u></b>	<b><u>19.3</u></b>	206	19.3	1	<b><u>206</u></b>	<b><u>19.3</u></b>	206	19.3	206	19.3
605.mcf_s	48	150	31.6	148	32.0	<b><u>149</u></b>	<b><u>31.7</u></b>	1	<b><u>141</u></b>	<b><u>33.5</u></b>	141	33.5	141	33.5
620.omnetpp_s	48	103	15.8	105	15.6	<b><u>104</u></b>	<b><u>15.7</u></b>	48	103	15.8	105	15.6	<b><u>104</u></b>	<b><u>15.7</u></b>
623.xalancbmk_s	48	45.9	30.9	45.3	31.3	<b><u>45.7</u></b>	<b><u>31.0</u></b>	1	41.4	34.2	41.7	34.0	<b><u>41.5</u></b>	<b><u>34.1</u></b>
625.x264_s	48	53.7	32.8	53.3	33.1	<b><u>53.7</u></b>	<b><u>32.9</u></b>	1	53.2	33.2	53.0	33.3	<b><u>53.2</u></b>	<b><u>33.2</u></b>
631.deepsjeng_s	48	<b><u>156</u></b>	<b><u>9.16</u></b>	158	9.06	156	9.21	1	155	9.24	155	9.26	<b><u>155</u></b>	<b><u>9.25</u></b>
641.leela_s	48	224	7.61	<b><u>223</u></b>	<b><u>7.65</u></b>	223	7.65	1	221	7.72	<b><u>221</u></b>	<b><u>7.71</u></b>	222	7.67
648.exchange2_s	48	70.6	41.6	<b><u>70.6</u></b>	<b><u>41.7</u></b>	70.5	41.7	1	70.7	41.6	70.4	41.7	<b><u>70.6</u></b>	<b><u>41.7</u></b>
657.xz_s	48	<b><u>208</u></b>	<b><u>29.7</u></b>	207	29.8	208	29.7	96	204	30.4	<b><u>204</u></b>	<b><u>30.4</u></b>	204	30.3

SPECspeed®2017\_int\_base = **20.2**

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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.

cpupower set to performance mode  
cpupower frequency-set -r -g performance  
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 = "0-95"
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2/amd_speed_aocc500_znver5_A_lib/lib:/home/cpu2017-1.1.9-am
d-aocc500_znver5_A1.2/amd_speed_aocc500_znver5_A_lib/lib32:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOCONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "96"
```

Environment variables set by runcpu during the 602.gcc\_s peak run:

```
GOMP_CPU_AFFINITY = "0"
```

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

```
GOMP_CPU_AFFINITY = "0"
```

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

```
GOMP_CPU_AFFINITY = "0"
```

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

```
GOMP_CPU_AFFINITY = "0"
```

Environment variables set by runcpu during the 631.deepsjeng\_s peak run:

```
GOMP_CPU_AFFINITY = "0"
```

Environment variables set by runcpu during the 641.leela\_s peak run:

```
GOMP_CPU_AFFINITY = "0"
```

Environment variables set by runcpu during the 648.exchange2\_s peak run:

```
GOMP_CPU_AFFINITY = "0"
```

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

```
GOMP_CPU_AFFINITY = "0-95"
```

### General Notes

Binaries were compiled on a system with 2x AMD EPYC 9D64 CPU + 500GiB Memory using Ubuntu 22.04

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:

Choose Operating Mode set to Maximum Performance and then set it to Custom Mode

NUMA Nodes per Socket set to NPS4

P-State set to Enabled

Sysinfo program /home/cpu2017-1.1.9-amd-aocc500\_znver5\_A1.2/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

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### Platform Notes (Continued)

running on localhost Fri Jan 17 21:49:05 2025

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 254 (254.10+suse.84.ge8d77af424)
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 6.4.0-150600.21-default #1 SMP PREEMPT\_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)  
x86\_64 x86\_64 x86\_64 GNU/Linux

-----

2. w  
21:49:05 up 3 min, 1 user, load average: 0.13, 0.18, 0.09  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT

-----

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)	1545963
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

(Continued on next page)



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### Platform Notes (Continued)

max user processes (-u) 1545963  
virtual memory (kbytes, -v) unlimited  
file locks (-x) unlimited

```
-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize=42
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
/bin/bash ./02.remote_local_SPECCpu_1.01.sh
/bin/bash ./Run035-compliant-amd-speedint.sh
python3 ./run_amd_speed_aocc500_znver5_A1.py
/bin/bash ./amd_speed_aocc500_znver5_A1.sh
runcpu --config amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intspeed
runcpu --configfile amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.180/templogs/preenv.intspeed.180.0.log --lognum 180.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2
-----
```

```
-----
6. /proc/cpuinfo
model name      : AMD EPYC 9475F 48-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 26
model          : 2
stepping       : 1
microcode      : 0xb00211a
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size       : 192 4K pages
cpu cores      : 48
siblings       : 96
1 physical ids (chips)
96 processors (hardware threads)
physical id 0: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
physical id 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
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 2.39.3:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          52 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 96
On-line CPU(s) list:   0-95
Vendor ID:              AuthenticAMD
BIOS Vendor ID:        Advanced Micro Devices, Inc.
Model name:             AMD EPYC 9475F 48-Core Processor
BIOS Model name:        AMD EPYC 9475F 48-Core Processor
BIOS CPU family:        107
CPU family:             26
Model:                  2
Thread(s) per core:     2
Core(s) per socket:    48
Socket(s):              1
-----
```

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### Platform Notes (Continued)

```
Stepping: 1
Frequency boost: enabled
CPU(s) scaling MHz: 98%
CPU max MHz: 3650.0000
CPU min MHz: 1500.0000
BogoMIPS: 7289.20
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 amd_lbr_v2 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 hw_pstate ssbd mba perfmon_v2
ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust 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 user_shstk avx_vnni avx512_bf16 clzero irperf
xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi
avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg avx512_vpopcnddq la57 rdpid bus_lock_detect
movdiri movdir64b overflow_recov succor smca fsrm avx512_vp2intersect
flush_lld debug_swap
Virtualization: AMD-V
L1d cache: 2.3 MiB (48 instances)
L1i cache: 1.5 MiB (48 instances)
L2 cache: 48 MiB (48 instances)
L3 cache: 256 MiB (8 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Reg file data sampling: Not affected
Vulnerability Retbleed: Not affected
Vulnerability Spec rstack overflow: 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; Enhanced / Automatic IBRS; IBPB conditional; STIBP
always-on; RSB filling; PBRSE-eIBRS Not affected; BHI Not affected
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 48K 2.3M 12 Data 1 64 1 64
L1i 32K 1.5M 8 Instruction 1 64 1 64
L2 1M 48M 16 Unified 2 1024 1 64
L3 32M 256M 16 Unified 3 32768 1 64
```

(Continued on next page)



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### Platform Notes (Continued)

8. numactl --hardware

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

```

available: 4 nodes (0-3)
node 0 cpus: 0-11,48-59
node 0 size: 96304 MB
node 0 free: 95868 MB
node 1 cpus: 12-23,60-71
node 1 size: 96761 MB
node 1 free: 96308 MB
node 2 cpus: 24-35,72-83
node 2 size: 96761 MB
node 2 free: 96104 MB
node 3 cpus: 36-47,84-95
node 3 size: 96689 MB
node 3 free: 96266 MB
node distances:
node  0  1  2  3
  0:  10  12  12  12
  1:  12  10  12  12
  2:  12  12  10  12
  3:  12  12  12  10

```

9. /proc/meminfo

MemTotal: 395793680 kB

10. who -r

run-level 3 Jan 17 21:46

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

Default Target	Status
multi-user	running

12. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ irqbalance issue-generator kbdsettings klog lvm2-monitor nscd nvme-fc-boot-connections nvmmf-autoconnect postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime	systemd-remount-fs
disabled	autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info firewallld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievd issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysextd systemd-time-wait-sync systemd-timesyncd
generated	ntp_sync
indirect	systemd-userdbd wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline

```

BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=842e182e-1d59-4d37-9172-9b67b51720c1
splash=silent
mitigations=auto
quiet

```

(Continued on next page)





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### Platform Notes (Continued)

security=apparmor

-----  
14. cpupower frequency-info

analyzing CPU 61:

current policy: frequency should be within 1.50 GHz and 3.65 GHz.

The governor "performance" may decide which speed to use within this range.

boost state support:

Supported: yes

Active: yes

-----  
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
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 SUSE Linux Enterprise Server 15 SP6

-----  
19. Disk information

SPEC is set to: /home/cpu2017-1.1.9-amd-aocc500\_znver5\_A1.2  
Filesystem Type Size Used Avail Use% Mounted on

(Continued on next page)





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**Hardware Availability:** Feb-2025  
**Software Availability:** Oct-2024

### Platform Notes (Continued)

/dev/nvme0n1p2 xfs 894G 55G 839G 7% /

-----  
20. /sys/devices/virtual/dmi/id  
Vendor: Lenovo  
Product: ThinkSystem SD535 V3  
Product Family: ThinkSystem  
Serial: 1234567890  
-----

21. 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:  
6x SK Hynix HMC88AHB471N 32 GB 2 rank 6400, configured at 6000  
1x SK Hynix HMC88AHB472N 32 GB 2 rank 6400, configured at 6000  
5x SK Hynix HMC88AHB478N 32 GB 2 rank 6400, configured at 6000  
-----

22. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: Lenovo  
BIOS Version: GPE113I-4.10  
BIOS Date: 12/12/2024  
BIOS Revision: 4.10  
Firmware Revision: 5.10  
-----

### 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 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
-----

=====  
Fortran | 648.exchange2\_s(base, peak)  
-----

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
-----

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# SPEC CPU®2017 Integer Speed Result

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## Lenovo Global Technology

ThinkSystem SD535 V3  
(3.65 GHz, AMD EPYC 9475F)

SPECspeed®2017\_int\_base = 20.2

SPECspeed®2017\_int\_peak = 20.6

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Jan-2025

**Hardware Availability:** Feb-2025

**Software Availability:** Oct-2024

## Compiler Version Notes (Continued)

---

## 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 -Wl,-mllvm -Wl,-extra-inliner -O3  
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC\_OPENMP  
-flto -fremap-arrays -fstrip-mining -fstruct-layout=7  
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3  
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp -lamdlibm  
-lflang -lamdalloc

C++ benchmarks:

-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver5  
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC\_OPENMP -flto

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## Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -mllvm -unroll-threshold=100 -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,-enable-iv-split -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -O3 -march=znver5 -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
```



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Hardware Availability: Feb-2025

Software Availability: Oct-2024

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

600.perlbench\_s: basepeak = yes

```
602.gcc_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

```
605.mcf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

625.x264\_s: Same as 602.gcc\_s

657.xz\_s: Same as 602.gcc\_s

C++ benchmarks:

620.omnetpp\_s: basepeak = yes

```
623.xalancbmk_s: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt
```

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## Peak Optimization Flags (Continued)

623.xalancbmk\_s (continued):

```
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -fopenmp=libomp -lomp
-lamdlibm -lamdalloc-ext -lflang
```

631.deepsjeng\_s: -m64 -std=c++14

```
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

641.leela\_s: Same as 631.deepsjeng\_s

Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -O3 -march=znver5 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

## 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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Turin-E.html>

<http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.html>

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

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Turin-E.xml>

<http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml>



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