



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem ST50 V3  
(3.00 GHz, Intel Xeon 6357P)

SPECrate®2017\_fp\_base = 106

SPECrate®2017\_fp\_peak = 107

CPU2017 License: 9017

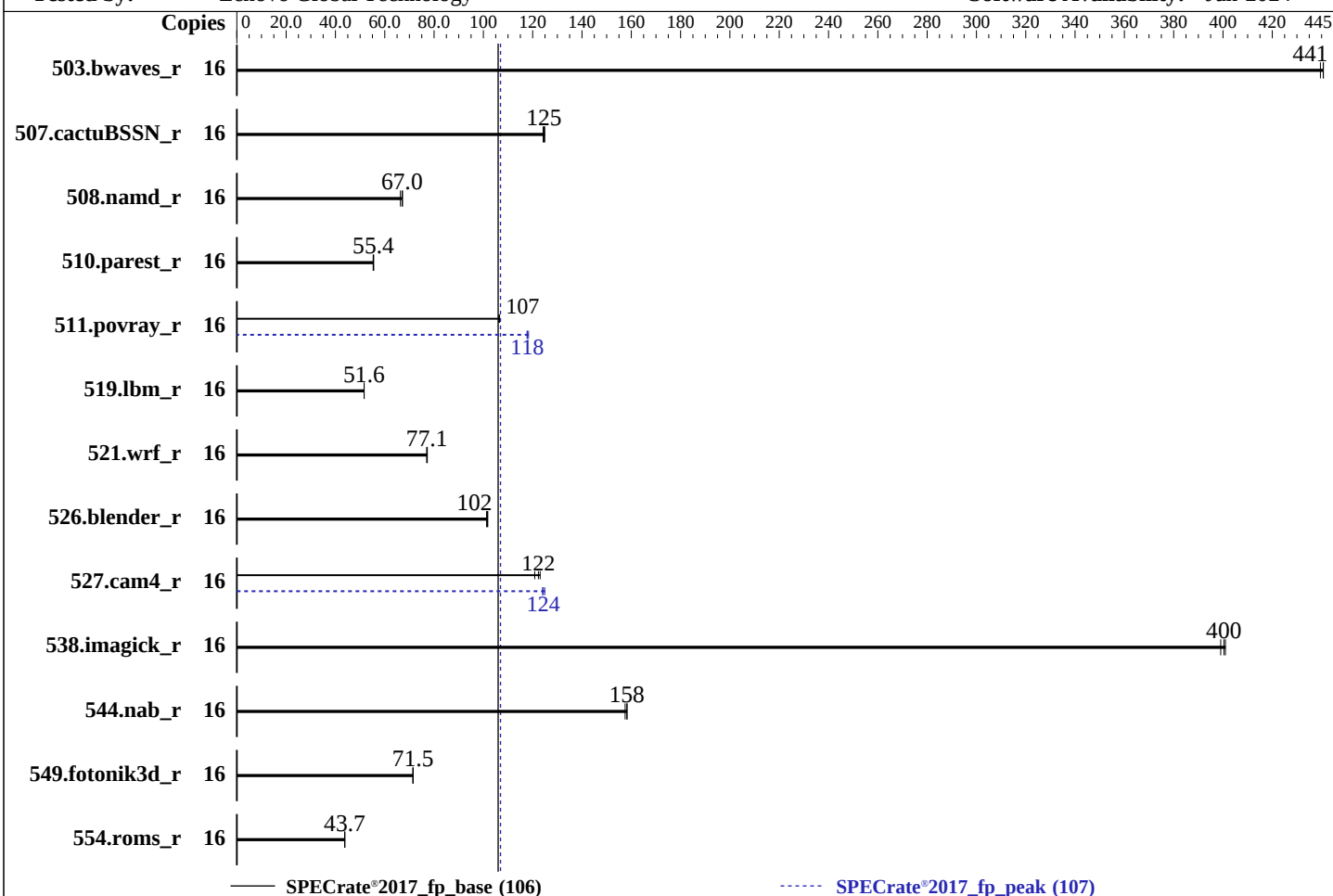
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: May-2025

Hardware Availability: Apr-2025

Software Availability: Jun-2024



## Hardware

CPU Name: Intel Xeon 6357P  
Max MHz: 5400  
Nominal: 3000  
Enabled: 8 cores, 1 chip, 2 threads/core  
Orderable: 1 chip  
Cache L1: 32 KB I + 48 KB D on chip per core  
L2: 2 MB I+D on chip per core  
L3: 24 MB I+D on chip per chip  
Other: None  
Memory: 64 GB (2 x 32 GB 2Rx8 PC5-5600B-E, running at 4400)  
Storage: 1 x 960 GB SATA SSD  
Other: CPU Cooling: Air

## Software

OS: SUSE Linux Enterprise Server 15 SP6  
Kernel 6.4.0-150600.21-default  
Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;  
Parallel: No  
Firmware: Lenovo BIOS Version CTE119B 7.10 released Feb-2025  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: 64-bit  
Other: jemalloc memory allocator V5.0.1  
Power Management: BIOS set to prefer performance at the cost of additional power usage



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## Results Table

| Benchmark       | Base   |                    |                    |                   |                    |                   |                    | Peak   |                    |                    |                   |                    |                   |                    |
|-----------------|--------|--------------------|--------------------|-------------------|--------------------|-------------------|--------------------|--------|--------------------|--------------------|-------------------|--------------------|-------------------|--------------------|
|                 | Copies | Seconds            | Ratio              | Seconds           | Ratio              | Seconds           | Ratio              | Copies | Seconds            | Ratio              | Seconds           | Ratio              | Seconds           | Ratio              |
| 503.bwaves_r    | 16     | <b><u>364</u></b>  | <b><u>441</u></b>  | 364               | 441                | 365               | 440                | 16     | <b><u>364</u></b>  | <b><u>441</u></b>  | 364               | 441                | 365               | 440                |
| 507.cactuBSSN_r | 16     | <b><u>163</u></b>  | <b><u>125</u></b>  | 162               | 125                | 163               | 124                | 16     | <b><u>163</u></b>  | <b><u>125</u></b>  | 162               | 125                | 163               | 124                |
| 508.namd_r      | 16     | 226                | 67.2               | <b><u>227</u></b> | <b><u>67.0</u></b> | 229               | 66.3               | 16     | 226                | 67.2               | <b><u>227</u></b> | <b><u>67.0</u></b> | 229               | 66.3               |
| 510.parest_r    | 16     | 754                | 55.5               | 757               | 55.3               | <b><u>755</u></b> | <b><u>55.4</u></b> | 16     | 754                | 55.5               | 757               | 55.3               | <b><u>755</u></b> | <b><u>55.4</u></b> |
| 511.povray_r    | 16     | <b><u>351</u></b>  | <b><u>107</u></b>  | 352               | 106                | 351               | 107                | 16     | 316                | 118                | <b><u>317</u></b> | <b><u>118</u></b>  | 317               | 118                |
| 519.lbm_r       | 16     | <b><u>327</u></b>  | <b><u>51.6</u></b> | 327               | 51.6               | 327               | 51.6               | 16     | <b><u>327</u></b>  | <b><u>51.6</u></b> | 327               | 51.6               | 327               | 51.6               |
| 521.wrf_r       | 16     | <b><u>465</u></b>  | <b><u>77.1</u></b> | 465               | 77.0               | 464               | 77.3               | 16     | <b><u>465</u></b>  | <b><u>77.1</u></b> | 465               | 77.0               | 464               | 77.3               |
| 526.blender_r   | 16     | 239                | 102                | 241               | 101                | <b><u>240</u></b> | <b><u>102</u></b>  | 16     | 239                | 102                | 241               | 101                | <b><u>240</u></b> | <b><u>102</u></b>  |
| 527.cam4_r      | 16     | 227                | 123                | 232               | 121                | <b><u>229</u></b> | <b><u>122</u></b>  | 16     | 226                | 124                | <b><u>225</u></b> | <b><u>124</u></b>  | 224               | 125                |
| 538.imagick_r   | 16     | <b><u>99.4</u></b> | <b><u>400</u></b>  | 99.7              | 399                | 99.2              | 401                | 16     | <b><u>99.4</u></b> | <b><u>400</u></b>  | 99.7              | 399                | 99.2              | 401                |
| 544.nab_r       | 16     | <b><u>170</u></b>  | <b><u>158</u></b>  | 171               | 158                | 170               | 158                | 16     | <b><u>170</u></b>  | <b><u>158</u></b>  | 171               | 158                | 170               | 158                |
| 549.fotonik3d_r | 16     | 873                | 71.4               | <b><u>872</u></b> | <b><u>71.5</u></b> | 872               | 71.5               | 16     | 873                | 71.4               | <b><u>872</u></b> | <b><u>71.5</u></b> | 872               | 71.5               |
| 554.roms_r      | 16     | 581                | 43.7               | 580               | 43.8               | <b><u>581</u></b> | <b><u>43.7</u></b> | 16     | 581                | 43.7               | 580               | 43.8               | <b><u>581</u></b> | <b><u>43.7</u></b> |

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

## Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH = "/home/cpu2017-1.1.9-ic2024.1/lib/intel64:/home/cpu2017-1.1.9-ic2024.1/je5.0.1-64"  
MALLOCONF = "retain:true"

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM  
memory using Red Hat Enterprise Linux 8.4  
Transparent Huge Pages enabled by default  
Prior to runcpu invocation  
Filesystem page cache synced and cleared with:  
sync; echo 3> /proc/sys/vm/drop\_caches

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)

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## General Notes (Continued)

is mitigated in the system as tested and documented.  
jemalloc, a general purpose malloc implementation  
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

BIOS configuration:  
Choose Operating Mode set to Maximum Performance

Sysinfo program /home/cpu2017-1.1.9-ic2024.1/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost Wed May 14 17:37:25 2025

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

### Table of contents

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  
17:37:25 up 3 min, 1 user, load average: 0.06, 0.02, 0.00  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
3. Username  
From environment variable \$USER: root
4. ulimit -a

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## Platform Notes (Continued)

|                      |                 |           |
|----------------------|-----------------|-----------|
| core file size       | (blocks, -c)    | unlimited |
| data seg size        | (kbytes, -d)    | unlimited |
| scheduling priority  | (-e)            | 0         |
| file size            | (blocks, -f)    | unlimited |
| pending signals      | (-i)            | 256756    |
| max locked memory    | (kbytes, -l)    | 8192      |
| 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)            | 256756    |
| 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
sh Run306-compliant-ic2024.1-lin-core-avx2-ratefp-smt-on-20240308.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=16 -c
ic2024.1-lin-core-avx2-rate-20240308.cfg --define smt-on --define cores=8 --define physicallogical
--define no-numa --tune base,peak -o all --define drop_caches fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=16 --configfile
ic2024.1-lin-core-avx2-rate-20240308.cfg --define smt-on --define cores=8 --define physicallogical
--define no-numa --tune base,peak --output_format all --define drop_caches --nopower --runmode rate --tune
base:peak --size refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.093/temlogs/preenv.fprate.093.0.log --lognum 093.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2024.1
```

### 6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) 6357P
vendor_id       : GenuineIntel
cpu family      : 6
model           : 183
stepping        : 1
microcode       : 0x12c
bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores       : 8
siblings        : 16
1 physical ids (chips)
16 processors (hardware threads)
physical id 0: core ids 0-7
physical id 0: apicids 0-15
```

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 |

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## Platform Notes (Continued)

Address sizes: 42 bits physical, 48 bits virtual  
Byte Order: Little Endian  
CPU(s): 16  
On-line CPU(s) list: 0-15  
Vendor ID: GenuineIntel  
BIOS Vendor ID: Intel(R) Corporation  
Model name: Intel(R) Xeon(R) 6357P  
BIOS Model name: Intel(R) Xeon(R) 6357P none CPU @ 4.7GHz  
BIOS CPU family: 179  
CPU family: 6  
Model: 183  
Thread(s) per core: 2  
Core(s) per socket: 8  
Socket(s): 1  
Stepping: 1  
BogoMIPS: 5990.40  
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat  
pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx  
pdpe1gb rdtscp lm constant\_tsc art arch\_perfmon pebs bts rep\_good  
nopl xtopology nonstop\_tsc cpuid aperfmperf tsc\_known\_freq pni  
pclmulqdq dtes64 monitor ds\_cpl vmx smx est tm2 ssse3 sdbg fma cx16  
xtpr pdcmm sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer aes  
xsave avx f16c rdrand lahf\_lm abm 3dnowprefetch cpuid\_fault epb ssbd  
ibrs ibpb stibp ibrs\_enhanced tpr\_shadow flexpriority ept vpid ept\_ad  
fsgsbase tsc\_adjust bmi1 avx2 smep bmi2 erms invpcid rdseed adx smap  
clflushopt clwb intel\_pt sha\_ni xsaveopt xsavec xgetbv1 xsaves  
split\_lock\_detect user\_shstk avx\_vnni dtherm ida arat pln pts hfi  
vnmii umip pku ospke waitpkg gfni vaes vpclmulqdq tme rdpid movdiri  
movdir64b fsrm md\_clear serialize pconfig arch\_lbr ibt flush\_l1d  
arch\_capabilities  
Virtualization: VT-x  
L1d cache: 384 KiB (8 instances)  
L1i cache: 256 KiB (8 instances)  
L2 cache: 16 MiB (8 instances)  
L3 cache: 24 MiB (1 instance)  
NUMA node(s): 1  
NUMA node0 CPU(s): 0-15  
Vulnerability Gather data sampling: Not affected  
Vulnerability Itlb multihit: Not affected  
Vulnerability L1tf: 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; RSB filling;  
PBRSE-eIBRS SW sequence; BHI BHI\_DIS\_S  
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      | 384K     | 12   | Data        | 1     | 64    | 1        | 64             |
| L1i  | 32K      | 256K     | 8    | Instruction | 1     | 64    | 1        | 64             |
| L2   | 2M       | 16M      | 16   | Unified     | 2     | 2048  | 1        | 64             |
| L3   | 24M      | 24M      | 12   | Unified     | 3     | 32768 | 1        | 64             |

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## Platform Notes (Continued)

8. numactl --hardware

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

available: 1 nodes (0)

node 0 cpus: 0-15

node 0 size: 64215 MB

node 0 free: 63595 MB

node distances:

node 0

0: 10

9. /proc/meminfo

MemTotal: 65756828 kB

10. who -r

run-level 3 May 14 17:34

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 nsd 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 autostart-initscripts blk-availability boot-sysctl ca-certificates chrony-wait  
chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info  
firewalld fsidd gpm grub2-once haveged 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-sysext systemd-time-wait-sync systemd-timesyncd udisks2  
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=c0e6c4c1-34fd-49fd-bd0a-0f1c1d9d4e05

splash=silent

mitigations=auto

quiet

security=apparmor

14. cpupower frequency-info

analyzing CPU 12:

Unable to determine current policy

boost state support:

Supported: yes

Active: yes

15. sysctl

kernel.numa\_balancing 0

kernel.randomize\_va\_space 2

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### Platform Notes (Continued)

|                              |       |
|------------------------------|-------|
| 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               | 20    |
| 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                | 60    |
| vm.watermark_boost_factor    | 15000 |
| vm.watermark_scale_factor    | 10    |
| vm.zone_reclaim_mode         | 0     |

-----  
16. /sys/kernel/mm/transparent\_hugepage  
defrag always defer+madvice [madvice] never  
enabled [always] madvice 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-ic2024.1  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 891G 49G 843G 6% /  
-----

-----  
20. /sys/devices/virtual/dmi/id  
Vendor: Lenovo  
Product: ThinkSystem ST50 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:

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## Platform Notes (Continued)

2x SK Hynix HMC688AGBEA081N 32 GB 2 rank 5600, configured at 4400

### 22. BIOS

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

BIOS Vendor: Lenovo  
BIOS Version: CTE119B-7.10  
BIOS Date: 02/20/2025  
BIOS Revision: 7.10  
Firmware Revision: 6.10

## Compiler Version Notes

C | 519.lbm\_r(base, peak) 538.imagick\_r(base, peak) 544.nab\_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

C++ | 508.namd\_r(base, peak) 510.parest\_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

C++, C | 511.povray\_r(base, peak) 526.blender\_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

C++, C, Fortran | 507.cactuBSSN\_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

Fortran | 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak) 554.roms\_r(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

Fortran, C | 521.wrf\_r(base, peak) 527.cam4\_r(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308

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ThinkSystem ST50 V3  
(3.00 GHz, Intel Xeon 6357P)

SPECrate®2017\_fp\_base = 106

SPECrate®2017\_fp\_peak = 107

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: May-2025

Hardware Availability: Apr-2025

Software Availability: Jun-2024

## Compiler Version Notes (Continued)

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308

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## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64

507.cactuBSSN\_r: -DSPEC\_LP64

508.namd\_r: -DSPEC\_LP64

510.parest\_r: -DSPEC\_LP64

511.povray\_r: -DSPEC\_LP64

519.lbm\_r: -DSPEC\_LP64

521.wrf\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian

526.blender\_r: -DSPEC\_LP64 -DSPEC\_LINUX -funsigned-char

527.cam4\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG

538.imagick\_r: -DSPEC\_LP64

544.nab\_r: -DSPEC\_LP64

549.fotonik3d\_r: -DSPEC\_LP64

554.roms\_r: -DSPEC\_LP64



# SPEC CPU®2017 Floating Point Rate Result

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## Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math -flto  
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both Fortran and C:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-Wno-implicit-int -nostandard-realloc-lhs -align array32byte -auto  
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -Wno-implicit-int -nostandard-realloc-lhs  
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

## Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

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## Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

519.lbm\_r: basepeak = yes

538.imagick\_r: basepeak = yes

544.nab\_r: basepeak = yes

C++ benchmarks:

508.namd\_r: basepeak = yes

510.parest\_r: basepeak = yes

Fortran benchmarks:

503.bwaves\_r: basepeak = yes

549.fotonik3d\_r: basepeak = yes

554.roms\_r: basepeak = yes

Benchmarks using both Fortran and C:

(Continued on next page)



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## Peak Optimization Flags (Continued)

521.wrf\_r: basepeak = yes

```
527.cam4_r: -w -m64 -std=c11 -Wl, -z,muldefs -xCORE-AVX2 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int
-nostandard-realloc-lhs -align array32byte -auto
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:

```
511.povray_r: -w -std=c++14 -m64 -std=c11 -Wl, -z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2 -flto
-Ofast -ffast-math -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

526.blender\_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN\_r: basepeak = yes

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-Catlow-A.html>  
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.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-Catlow-A.xml>  
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml>

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