



# SPEC CPU®2017 Integer Speed Result

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## Lenovo Global Technology

ThinkSystem SR630 V4  
(2.70 GHz, Intel Xeon 6747P)

SPECspeed®2017\_int\_base = 14.3

SPECspeed®2017\_int\_peak = Not Run

CPU2017 License: 9017

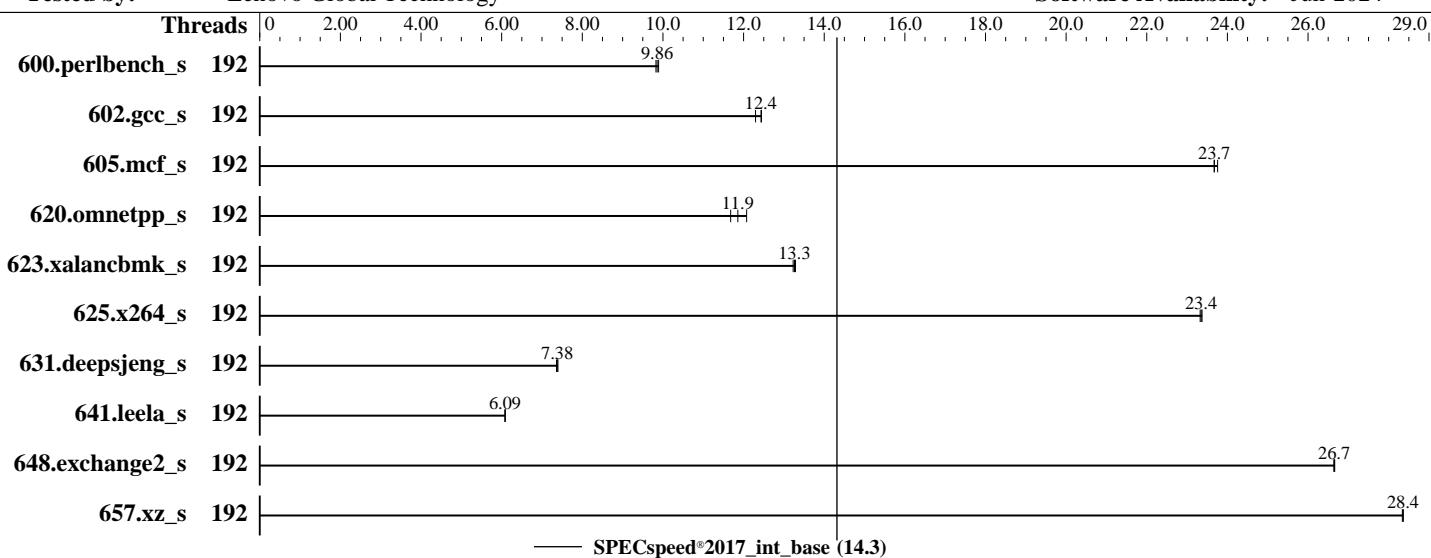
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Mar-2025

Hardware Availability: May-2025

Software Availability: Jun-2024



### Hardware

CPU Name: Intel Xeon 6747P  
Max MHz: 3900  
Nominal: 2700  
Enabled: 96 cores, 2 chips, 2 threads/core  
Orderable: 1,2 chips  
Cache L1: 64 KB I + 48 KB D on chip per core  
L2: 2 MB I+D on chip per core  
L3: 288 MB I+D on chip per chip  
Other: None  
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-88/56B-M, running at 8000)  
Storage: 1 x 960 GB NVME SSD  
Other: CPU Cooling: Air

### Software

OS: SUSE Linux Enterprise Server 15 SP6  
Compiler: Kernel 6.4.0-150600.21-default  
C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;  
Parallel: Yes  
Firmware: Lenovo BIOS Version IHE109T 1.20 released Feb-2025  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: Not Applicable  
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						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	192	179	9.89	181	9.83	<b><u>180</u></b>	<b><u>9.86</u></b>							
602.gcc_s	192	324	12.3	<b><u>320</u></b>	<b><u>12.4</u></b>	320	12.4							
605.mcf_s	192	199	23.7	<b><u>199</u></b>	<b><u>23.7</u></b>	199	23.8							
620.omnetpp_s	192	<b><u>138</u></b>	<b><u>11.9</u></b>	135	12.1	140	11.7							
623.xalancbmk_s	192	<b><u>107</u></b>	<b><u>13.3</u></b>	107	13.2	107	13.3							
625.x264_s	192	75.5	23.4	75.6	23.3	<b><u>75.5</u></b>	<b><u>23.4</u></b>							
631.deepsjeng_s	192	194	7.39	<b><u>194</u></b>	<b><u>7.38</u></b>	195	7.36							
641.leela_s	192	280	6.09	280	6.09	<b><u>280</u></b>	<b><u>6.09</u></b>							
648.exchange2_s	192	110	26.7	<b><u>110</u></b>	<b><u>26.7</u></b>	110	26.6							
657.xz_s	192	218	28.3	<b><u>218</u></b>	<b><u>28.4</u></b>	218	28.4							

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

## 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:

```
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-ic2024.1/lib/intel64:/home/cpu2017-1.1.9-ic2024.1/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM

memory using Redhat Enterprise Linux 8.0

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) 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>



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## Platform Notes

BIOS configuration:

Workload Profile set to General Computing - Peak Frequency

SNC set to Enabled

LLC Prefetch set to Enabled

Page Policy set to Adaptive

```
Sysinfo program /home/cpu2017-1.1.9-ic2024.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Thu Mar 27 16:52:42 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
16:52:42 up 3 min, 1 user, load average: 0.10, 0.11, 0.05
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) 2062717
```

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### Platform Notes (Continued)

```
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) 2062717
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 Run542-compliant-ic2024.1-lin-sapphirerapids-speedint-base-smt-on-20240308.sh
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=96 --tune base -o all --define
  intspeedaffinity --define smt-on --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=96 --tune base --output_format all --define
  intspeedaffinity --define smt-on --define drop_caches --nopower --runmode speed --tune base --size
  refspeed intspeed --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.248/templogs/preenv.intspeed.248.0.log --lognum 248.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2024.1
```

-----  
6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) 6747P
vendor_id       : GenuineIntel
cpu family     : 6
model          : 173
stepping        : 1
microcode       : 0x1000380
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores      : 48
siblings        : 96
2 physical ids (chips)
192 processors (hardware threads)
physical id 0: core ids 0-23,64-87
physical id 1: core ids 0-23,64-87
physical id 0: apicids 0-47,128-175
physical id 1: apicids 256-303,384-431
```

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):                192
```

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## Platform Notes (Continued)

On-line CPU(s) list:

0-191

Vendor ID:

GenuineIntel

BIOS Vendor ID:

Intel(R) Corporation

Model name:

Intel(R) Xeon(R) 6747P

BIOS Model name:

Intel(R) Xeon(R) 6747P UNKNOWN CPU @ 2.7GHz

BIOS CPU family:

179

CPU family:

6

Model:

173

Thread(s) per core:

2

Core(s) per socket:

48

Socket(s):

2

Stepping:

1

BogoMIPS:

5400.00

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 xtTopology nonstop\_tsc cpuid aperf mperf tsc\_known\_freq pnpi pclmulqdq dtes64 monitor ds\_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer aes xsave avx f16c rdrand lahf\_lm abm 3dnowprefetch cpuid\_fault epb cat\_13 cat\_12 cdp\_13 intel\_ppin cdp\_12 ssbd mba ibrs ibpb stibrs ibrs\_enhanced tpr\_shadow flexpriority ept vpid ept\_ad fsgsbase tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqmqrdt\_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel\_pt avx512cd sha\_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqmqllc cqmq\_occup\_llc cqmq\_mbm\_total cqmq\_mbm\_local split\_lock\_detect user\_shstck avx\_vnni avx512\_bf16 wbnoinvd dtherm ida arat pln pts hfi vnmi avx512vmbi umip pku ospke waitpkg avx512\_vbm2 gfn vaes vpclmulqdq avx512\_vnni avx512\_bitalg tme avx512\_vpopcntdq la57 rdpid bus\_lock\_detect cldemote movdiri movdir64b enqcmd fsrm md\_clear serialize tsxldtrk pconfig arch\_lbr ibt amx\_bf16 avx512\_fp16 amx\_tile amx\_int8 flush\_lld arch\_capabilities

Virtualization:

VT-x

L1d cache:

4.5 MiB (96 instances)

L1i cache:

6 MiB (96 instances)

L2 cache:

192 MiB (96 instances)

L3 cache:

576 MiB (2 instances)

NUMA node(s):

4

NUMA node0 CPU(s):

0-23,96-119

NUMA node1 CPU(s):

24-47,120-143

NUMA node2 CPU(s):

48-71,144-167

NUMA node3 CPU(s):

72-95,168-191

Vulnerability Gather data sampling:

Not affected

Vulnerability Itlb multihit:

Not affected

Vulnerability Llft:

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; PBRSB-eIBRS

Vulnerability Srbds:

Not affected; BHI BHI\_DIS\_S

Vulnerability Tsx async abort:

Not affected

From lscpu --cache:

NAME ONE-SIZE ALL-SIZE WAYS TYPE

LEVEL SETS PHY-LINE COHERENCY-SIZE

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### Platform Notes (Continued)

L1d	48K	4.5M	12 Data	1	64	1	64
L1i	64K	6M	16 Instruction	1	64	1	64
L2	2M	192M	16 Unified	2	2048	1	64
L3	288M	576M	16 Unified	3	294912	1	64

#### 8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.  
available: 4 nodes (0-3)  
node 0 cpus: 0-23,96-119  
node 0 size: 128715 MB  
node 0 free: 128165 MB  
node 1 cpus: 24-47,120-143  
node 1 size: 129011 MB  
node 1 free: 128305 MB  
node 2 cpus: 48-71,144-167  
node 2 size: 129011 MB  
node 2 free: 128446 MB  
node 3 cpus: 72-95,168-191  
node 3 size: 128968 MB  
node 3 free: 128446 MB  
node distances:  
node 0 1 2 3  
0: 10 12 21 21  
1: 12 10 21 21  
2: 21 21 10 12  
3: 21 21 12 10

#### 9. /proc/meminfo

MemTotal: 528082924 kB

#### 10. who -r

run-level 3 Mar 27 16:49

#### 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 nsqd nvmefc-boot-connections nvmf-autoconnect postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wickedd 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 firewalld fsidd gpm grub2-once haveged ipmi ipmievfd 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
generated	ntp_sync
indirect	systemd-userdbd wickedd

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

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## Platform Notes (Continued)

```
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=c5be0e33-36a7-4fb1-a8dd-78aa43a6d2d8
splash=silent
mitigations=auto
quiet
security=apparmor

-----
14. cpupower frequency-info
analyzing CPU 31:
  Unable to determine current policy
  boost state support:
    Supported: yes
    Active: yes

-----
15. sysctl
kernel.numa_balancing          1
kernel.randomize_va_space       2
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 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
```

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## Platform Notes (Continued)

### 19. Disk information

SPEC is set to: /home/cpu2017-1.1.9-ic2024.1  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/nvme0n1p3 xfs 893G 48G 845G 6% /

### 20. /sys/devices/virtual/dmi/id

Vendor: Lenovo  
Product: ThinkSystem SR630 V4  
Product Family: ThinkSystem  
Serial: 0987654321

### 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:

16x Samsung M327R4GA3EB0-CLVXB 32 GB 2 rank 8800, configured at 8000

### 22. BIOS

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

BIOS Vendor: Lenovo  
BIOS Version: IHE109T-1.20  
BIOS Date: 02/28/2025  
BIOS Revision: 1.20  
Firmware Revision: 1.20

## Compiler Version Notes

=====

C | 600.perlbench\_s(base) 602.gcc\_s(base) 605.mcf\_s(base) 625.x264\_s(base) 657.xz\_s(base)

=====

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++ | 620.omnetpp\_s(base) 623.xalancbmk\_s(base) 631.deepsjeng\_s(base) 641.leela\_s(base)

=====

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.

=====

=====

Fortran | 648.exchange2\_s(base)

=====

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



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## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

## Base Portability Flags

600.perlbench\_s: -DSPEC\_LP64 -DSPEC\_LINUX\_X64  
602.gcc\_s: -DSPEC\_LP64  
605.mcf\_s: -DSPEC\_LP64  
620.omnetpp\_s: -DSPEC\_LP64  
623.xalancbmk\_s: -DSPEC\_LP64 -DSPEC\_LINUX  
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:

-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fopenmp  
-DSPEC\_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:

-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:

-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto  
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs -align array32byte  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc



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Hardware Availability: May-2025

Tested by: Lenovo Global Technology

Software Availability: Jun-2024

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-Birchstream-C.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-Birchstream-C.xml>  
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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