



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR860 V4
(2.40 GHz, Intel Xeon 6768P)

SPECrate®2017_int_base = 2490

SPECrate®2017_int_peak = Not Run

CPU2017 License: 9017

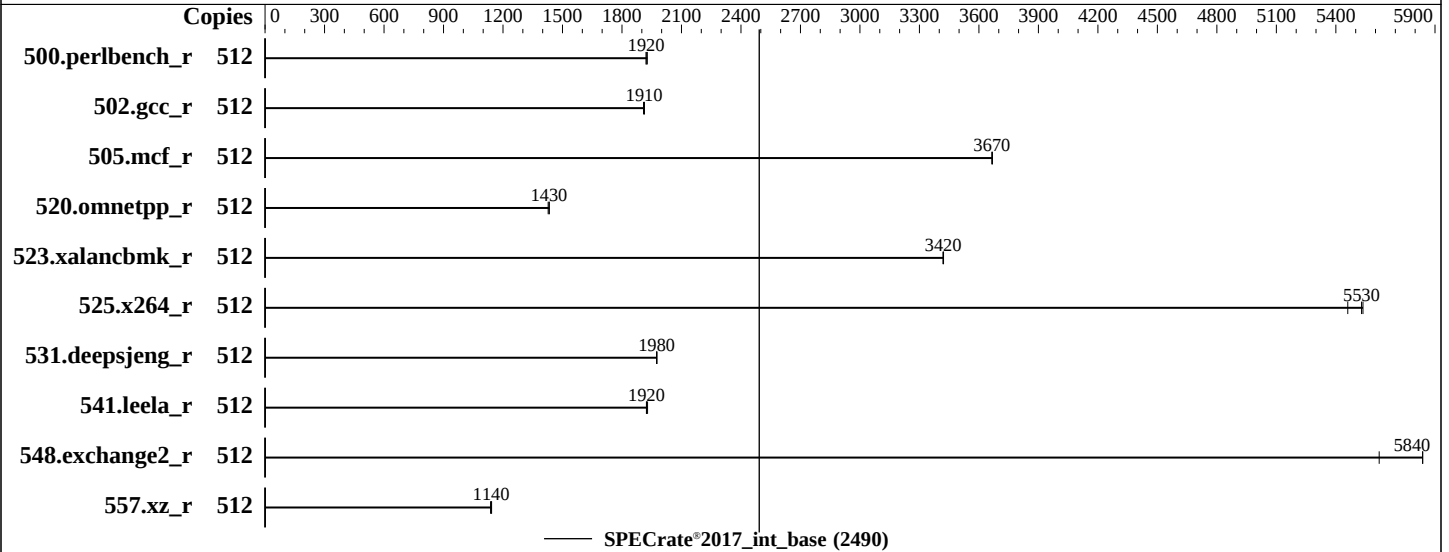
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Aug-2025

Hardware Availability: Nov-2025

Software Availability: Jun-2025



Hardware

CPU Name: Intel Xeon 6768P
Max MHz: 3900
Nominal: 2400
Enabled: 256 cores, 4 chips, 2 threads/core
Orderable: 2,4 chips
Cache L1: 64 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 336 MB I+D on chip per chip
Other: None
Memory: 2 TB (32 x 64 GB 2Rx4 PC5-6400B-R)
Storage: 1 x 1.92 TB NVMe SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP7
Kernel 6.4.0-150700.51-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 RVE103X 1.10 released Jul-2025
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
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	Seconds	Ratio
500.perlbench_r	512	423	1930	424	1920	<u>424</u>	<u>1920</u>									
502.gcc_r	512	379	1910	380	1910	<u>379</u>	<u>1910</u>									
505.mcf_r	512	<u>226</u>	<u>3670</u>	226	3670	226	3670									
520.omnetpp_r	512	<u>469</u>	<u>1430</u>	471	1430	469	1430									
523.xalancbmk_r	512	<u>158</u>	<u>3420</u>	158	3420	158	3420									
525.x264_r	512	164	5460	<u>162</u>	<u>5530</u>	162	5540									
531.deepsjeng_r	512	297	1970	297	1980	<u>297</u>	<u>1980</u>									
541.leela_r	512	441	1920	440	1930	<u>441</u>	<u>1920</u>									
548.exchange2_r	512	<u>230</u>	<u>5840</u>	239	5620	230	5840									
557.xz_r	512	484	1140	<u>485</u>	<u>1140</u>	486	1140									

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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/lib/ia32:/home/cpu2017-1.1.9-ic2024.1/je5.0.1-32"

MALLOC_CONF = "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

runcpu command invoked through numactl i.e.:

numactl --interleave=all runcpu <etc>

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.

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Software Availability: Jun-2025

General Notes (Continued)

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Platform Notes

BIOS configuration:

Workload Profile set to General Computing - Max Performance

DCU Streamer Prefetcher set to Disabled

XPT Prefetcher set to Disabled

Page Policy set to Adaptive

UPI Link Disable set to Minimum Number of Links Enabled

SNC set to Enabled

Sysinfo program /home/cpu2017-1.1.9-ic2024.1/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on localhost Fri Aug 29 13:31:55 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 (254.24+suse.148.g83b9060b6e)
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 6.4.0-150700.51-default #1 SMP PREEMPT_DYNAMIC Wed Apr 30 21:35:43 UTC 2025 (6930611)
x86_64 x86_64 x86_64 GNU/Linux

2. w
13:31:55 up 5 min, 1 user, load average: 1.28, 7.24, 4.15
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT

3. Username
From environment variable \$USER: root

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Platform Notes (Continued)

```
-----
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) 8254235
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) 8254235
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 Run502-compliant-ic2024.1-lin-sapphirerapids-rateint-base-smt-on-20240308.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=512 -c
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=256 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=512 --configfile
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=256 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.538/templots/preenv.intrate.538.0.log --lognum 538.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2024.1
-----
```

```
-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) 6768P
vendor_id      : GenuineIntel
cpu family     : 6
model          : 173
stepping       : 1
microcode      : 0x10003d0
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores      : 64
siblings       : 128
4 physical ids (chips)
512 processors (hardware threads)
physical id 0: core ids 0-31,64-95
physical id 1: core ids 0-31,64-95
physical id 2: core ids 0-31,64-95
physical id 3: core ids 0-31,64-95
physical id 0: apicids 0-63,128-191
physical id 1: apicids 256-319,384-447
physical id 2: apicids 512-575,640-703
physical id 3: apicids 768-831,896-959
-----
```

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Platform Notes (Continued)

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 2.40.4:

```
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):                      512
On-line CPU(s) list:        0-511
Vendor ID:                   GenuineIntel
Model name:                  Intel(R) Xeon(R) 6768P
CPU family:                  6
Model:                       173
Thread(s) per core:         2
Core(s) per socket:         64
Socket(s):                   4
Stepping:                    1
BogoMIPS:                    4800.00
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 xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni
                             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_l3 cat_l2 cdp_l3 intel_ppin cdp_l2
                             ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept
                             vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid cqm
                             rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
                             intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1
                             xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                             split_lock_detect user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida
                             arat pln pts vnmi avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni
                             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_l1d arch_capabilities
Virtualization:              VT-x
L1d cache:                   12 MiB (256 instances)
L1i cache:                   16 MiB (256 instances)
L2 cache:                    512 MiB (256 instances)
L3 cache:                    1.3 GiB (4 instances)
NUMA node(s):                8
NUMA node0 CPU(s):          0-31,256-287
NUMA node1 CPU(s):          32-63,288-319
NUMA node2 CPU(s):          64-95,320-351
NUMA node3 CPU(s):          96-127,352-383
NUMA node4 CPU(s):          128-159,384-415
NUMA node5 CPU(s):          160-191,416-447
NUMA node6 CPU(s):          192-223,448-479
NUMA node7 CPU(s):          224-255,480-511
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit:    Not affected
Vulnerability L1tf:            Not affected
Vulnerability Mds:             Not affected
Vulnerability Meltdown:        Not affected
```

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Platform Notes (Continued)

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 Not affected; 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	12M	12	Data	1	64	1	64
L1i	64K	16M	16	Instruction	1	64	1	64
L2	2M	512M	16	Unified	2	2048	1	64
L3	336M	1.3G	16	Unified	3	344064	1	64

8. numactl --hardware

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

available: 8 nodes (0-7)
node 0 cpus: 0-31,256-287
node 0 size: 257565 MB
node 0 free: 256564 MB
node 1 cpus: 32-63,288-319
node 1 size: 257992 MB
node 1 free: 257122 MB
node 2 cpus: 64-95,320-351
node 2 size: 258030 MB
node 2 free: 257174 MB
node 3 cpus: 96-127,352-383
node 3 size: 258030 MB
node 3 free: 257166 MB
node 4 cpus: 128-159,384-415
node 4 size: 258030 MB
node 4 free: 257257 MB
node 5 cpus: 160-191,416-447
node 5 size: 258030 MB
node 5 free: 257279 MB
node 6 cpus: 192-223,448-479
node 6 size: 258030 MB
node 6 free: 257320 MB
node 7 cpus: 224-255,480-511
node 7 size: 257873 MB
node 7 free: 257209 MB
node distances:
node 0 1 2 3 4 5 6 7
0: 10 12 21 21 31 31 21 21
1: 12 10 21 21 31 31 21 21
2: 21 21 10 12 21 21 31 31
3: 21 21 12 10 21 21 31 31
4: 31 31 21 21 10 12 21 21
5: 31 31 21 21 12 10 21 21
6: 21 21 31 31 21 21 10 12
7: 21 21 31 31 21 21 12 10

9. /proc/meminfo

MemTotal: 2113112092 kB

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Platform Notes (Continued)

10. who -r
run-level 3 Aug 29 13:28

11. Systemd service manager version: systemd 254 (254.24+suse.148.g83b9060b6e)
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 nvme-fc-boot-connections nvme-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
firewalld fsidd gpm grub2-once haveged ipmi ipmievdev 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-sysexit systemd-time-wait-sync systemd-timesyncd udisks2
indirect systemd-userdbd wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150700.51-default
root=UUID=50860560-ae42-405b-bae3-a2b14754d476
splash=silent
mitigations=auto
quiet
security=apparmor

14. cpupower frequency-info
analyzing CPU 384:
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

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Platform Notes (Continued)

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+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 SP7

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 1.8T 69G 1.7T 4% /

20. /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR860 V4
Product Family: ThinkSystem
Serial: 9876543210

21. dmidecode
Additional information from dmidecode 3.6 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:

4x	SK	Hynix	HMCG94AHBRA275N	64	GB	2	rank	6400
7x	SK	Hynix	HMCG94AHBRA277N	64	GB	2	rank	6400
3x	SK	Hynix	HMCG94AHBRA281N	64	GB	2	rank	6400
2x	SK	Hynix	HMCG94AHBRA283N	64	GB	2	rank	6400
8x	SK	Hynix	HMCG94AHBRA480N	64	GB	2	rank	6400
3x	SK	Hynix	HMCG94AHBRA481N	64	GB	2	rank	6400
3x	SK	Hynix	HMCG94AHBRA486N	64	GB	2	rank	6400
2x	SK	Hynix	HMCG94AHBRA487N	64	GB	2	rank	6400

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

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Platform Notes (Continued)

BIOS Vendor: Lenovo
BIOS Version: RVE103X-1.10
BIOS Date: 07/17/2025
BIOS Revision: 1.10
Firmware Revision: 1.40

Compiler Version Notes

=====
C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(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++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(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 | 548.exchange2_r(base)
=====

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.
=====

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64

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Base Portability Flags (Continued)

531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -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
-L/opt/intel/oneapi/compiler/2024.1/lib -lqkmalloc

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/opt/intel/oneapi/compiler/2024.1/lib -lqkmalloc

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 -auto
-L/opt/intel/oneapi/compiler/2024.1/lib -lqkmalloc

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-F.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-F.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.

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