SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

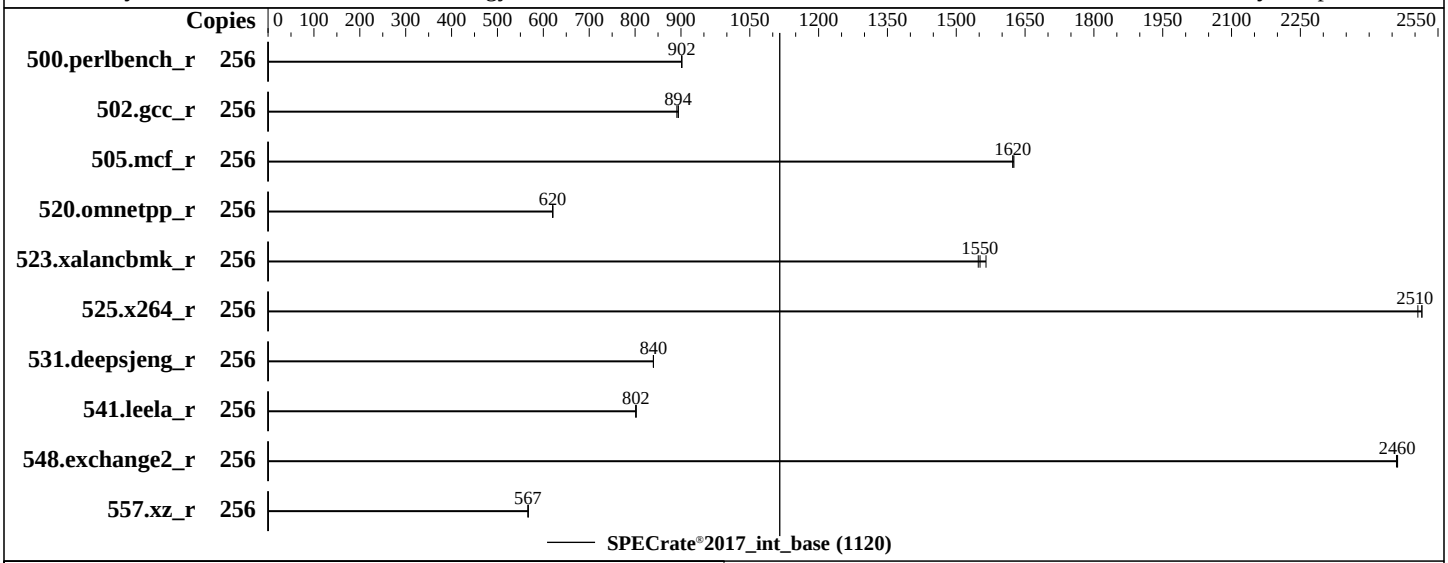
ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

SPECrate®2017_int_base = 1120

SPECrate®2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jul-2026
Hardware Availability: Aug-2024
Software Availability: Apr-2026



Hardware

CPU Name: Intel Xeon Platinum 8593Q
Max MHz: 3900
Nominal: 2200
Enabled: 128 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 320 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-5600B-R)
Storage: 1 x 960 GB NVME SSD
Other: CPU Cooling: DLC

Software

OS: SUSE Linux Enterprise Server 16.0
Kernel 6.12.0-160000.5-default
Compiler: C/C++: Version 2026.0 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2026.0 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Lenovo BIOS Version ESE139F 3.90 released May-2026
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	256	452	902	**452**	**902**	452	901							
502.gcc_r	256	407	891	**406**	**894**	405	894							
505.mcf_r	256	254	1630	**255**	**1620**	255	1620							
520.omnetpp_r	256	541	621	542	620	**541**	**620**							
523.xalancbmk_r	256	175	1550	**174**	**1550**	173	1560							
525.x264_r	256	178	2510	179	2510	**178**	**2510**							
531.deepsjeng_r	256	349	840	**349**	**840**	349	840							
541.leela_r	256	528	802	529	801	**529**	**802**							
548.exchange2_r	256	**273**	**2460**	272	2460	273	2460							
557.xz_r	256	**488**	**567**	487	567	488	567							

SPECrate®2017_int_base = 1120

SPECrate®2017_int_peak = Not Run

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-ic2026.0/lib/intel64:/home/cpu2017-1.1.9-ic2026.0/lib/ia32"
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.
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
C-States set to Legacy
UPI Link Disable set to Minimum Number of Links Enabled
SNC set to SNC2
Misc set to Option4

 Sysinfo program /home/cpu2017-1.1.9-ic2026.0/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Mon Jul 13 05:02:35 2026

 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. Systemd service manager version: systemd 257 (257.7+suse.19.ga0dfd5de4c)
 11. Services, from systemctl list-unit-files
 12. Linux kernel boot-time arguments, from /proc/cmdline
 13. cpupower frequency-info
 14. sysctl
 15. /sys/kernel/mm/transparent_hugepage
 16. /sys/kernel/mm/transparent_hugepage/khugepaged
 17. OS release
 18. Disk information
 19. /sys/devices/virtual/dmi/id
 20. dmidecode
 21. BIOS
 ------------------------------------------------------------

 ------------------------------------------------------------
 1. uname -a
   Linux localhost.localdomain 6.12.0-160000.5-default #1 SMP PREEMPT_DYNAMIC Wed Sep 10 15:26:25 UTC 2025
   (3545bbd) x86_64 x86_64 x86_64 GNU/Linux

 ------------------------------------------------------------
 2. w
    05:02:35 up  3:21,  1 user,  load average: 100.03, 210.77, 238.58
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU  WHAT
   root             10.245.48.115    01:50           0.00s  0.02s sshd-session: root [priv]

 ------------------------------------------------------------
 3. Username
   From environment variable $USER:  root

 ------------------------------------------------------------
 4. ulimit -a
   real-time non-blocking time  (microseconds, -R) unlimited
   core file size              (blocks, -c) unlimited
   data seg size               (kbytes, -d) unlimited
   scheduling priority                 (-e) 0
```

(Continued on next page)

Platform Notes (Continued)

```
   file size                   (blocks, -f) unlimited
   pending signals                     (-i) 2061252
   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) 2061252
   virtual memory              (kbytes, -v) unlimited
   file locks                          (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=47
 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
 sshd-session: root [priv]
 sshd-session: root@notty
 /bin/bash ./02.remote_local_SPECcpu_1.02.sh
 sh Run502-compliant-ic2026.0-lin-sapphirerapids-rateint-base-smt-on-20260429.sh
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 -c
   ic2026.0-lin-sapphirerapids-rate-20260429.cfg --define smt-on --define cores=128 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all intrate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 --configfile
   ic2026.0-lin-sapphirerapids-rate-20260429.cfg --define smt-on --define cores=128 --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/CPU2017.063/templogs/preenv.intrate.063.0.log --lognum 063.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2026.0

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : INTEL(R) XEON(R) PLATINUM 8593Q
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 207
    stepping        : 2
    microcode       : 0x210002d3
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi spectre_v2_user
    cpu cores       : 64
    siblings        : 128
    2 physical ids (chips)
    256 processors (hardware threads)
    physical id 0: core ids 0-63
    physical id 1: core ids 0-63
    physical id 0: apicids 0-127
    physical id 1: apicids 128-255
  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 2.41.1:
  Architecture:                            x86_64
  CPU op-mode(s):                          32-bit, 64-bit
  Address sizes:                           46 bits physical, 57 bits virtual
```

(Continued on next page)

Platform Notes (Continued)

```
Byte Order:                          Little Endian
CPU(s):                              256
On-line CPU(s) list:                 0-255
Vendor ID:                           GenuineIntel
Model name:                          INTEL(R) XEON(R) PLATINUM 8593Q
CPU family:                          6
Model:                               207
Thread(s) per core:                  2
Core(s) per socket:                  64
Socket(s):                           2
Stepping:                            2
CPU(s) scaling MHz:                  21%
CPU max MHz:                         3900.0000
CPU min MHz:                         800.0000
BogoMIPS:                            4400.00
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 hfi vnmi avx512vbmi
                                     umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
                                     avx512_vnni avx512_bitalg 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:                           6 MiB (128 instances)
L1i cache:                           4 MiB (128 instances)
L2 cache:                            256 MiB (128 instances)
L3 cache:                            640 MiB (2 instances)
NUMA node(s):                        4
NUMA node0 CPU(s):                   0-31,128-159
NUMA node1 CPU(s):                   32-63,160-191
NUMA node2 CPU(s):                   64-95,192-223
NUMA node3 CPU(s):                   96-127,224-255
Vulnerability Gather data sampling:      Not affected
Vulnerability Indirect target selection: 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;
                                         PBRSB-eIBRS SW sequence; BHI BHI_DIS_S
```

(Continued on next page)

Platform Notes (Continued)

```
  Vulnerability Srbds:                    Not affected
  Vulnerability Tsa:                      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       6M   12 Data            1     64        1             64
     L1i       32K       4M    8 Instruction     1     64        1             64
     L2         2M     256M   16 Unified         2   2048        1             64
     L3       320M     640M   20 Unified         3 262144        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: 0-31,128-159
  node 0 size: 128622 MB
  node 0 free: 126105 MB
  node 1 cpus: 32-63,160-191
  node 1 size: 129000 MB
  node 1 free: 127217 MB
  node 2 cpus: 64-95,192-223
  node 2 size: 129000 MB
  node 2 free: 126851 MB
  node 3 cpus: 96-127,224-255
  node 3 size: 128923 MB
  node 3 free: 127257 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:       527920912 kB

'who -r' did not return a run level

------------------------------------------------------------
10. Systemd service manager version: systemd 257 (257.7+suse.19.ga0dfd5de4c)
  Default Target  Status
  graphical       running

------------------------------------------------------------
11. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          NetworkManager NetworkManager-dispatcher NetworkManager-wait-online audit-rules auditd
                   chronyd dbus-broker firewalld getty@ irqbalance issue-generator kbdsettings klog
                   lvm2-monitor rollback rsyslog smartd soft-reboot-cleanup sshd systemd-pstore
                   wpa_supplicant wtmpdb-update-boot
  enabled-runtime  systemd-remount-fs
  disabled         blk-availability boot-sysctl ca-certificates ca-certificates-setup chrony-wait
                   console-getty debug-shell dnsmasq exchange-bmc-os-info gpm grub2-once ipmievd
                   issue-add-ssh-keys kernel-sysctl kexec-load lastlog2-import lunmask lvm-devices-import
                   man-db-create multipathd nftables nis-domainname rpmconfigcheck rsyncd serial-getty@
                   setup-systemd-proxy-env smartd_generate_opts snmpd snmptrapd
                   systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysext
                   systemd-time-wait-sync systemd-timesyncd systemd-udev-load-credentials udisks2
```

(Continued on next page)

Platform Notes (Continued)

```
                  wpa_supplicant@
  indirect        systemd-userdbd

------------------------------------------------------------
12. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.12.0-160000.5-default
  root=UUID=947e53e0-d208-4ab7-9188-9ca936e60a3f
  mitigations=auto
  quiet
  security=selinux
  selinux=1

------------------------------------------------------------
13. cpupower frequency-info
  analyzing CPU 170:
    current policy: frequency should be within 800 MHz and 3.90 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

------------------------------------------------------------
14. 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

------------------------------------------------------------
15. /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

------------------------------------------------------------
16. /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
```

(Continued on next page)

Platform Notes (Continued)

```
------------------------------------------------------------
17. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 16.0

------------------------------------------------------------
18. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2026.0
  Filesystem     Type   Size  Used Avail Use% Mounted on
  /dev/sda2      btrfs  445G  139G  304G  32% /home

------------------------------------------------------------
19. /sys/devices/virtual/dmi/id
    Vendor:          Lenovo
    Product:         ThinkSystem SR650 V3 MB,EGS,DDR5,SH,2U
    Product Family: ThinkSystem
    Serial:          1234567890

------------------------------------------------------------
20. 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:
    16x Samsung M321R4GA3PB0-CWMXH 32 GB 2 rank 5600


------------------------------------------------------------
21. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Lenovo
   BIOS Version:      ESE139F-3.90
   BIOS Date:         05/14/2026
   BIOS Revision:     3.90
   Firmware Revision: 8.10
```

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 2026.0.0 Build 20260331
Copyright (C) 1985-2026 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 2026.0.0 Build 20260331
Copyright (C) 1985-2026 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran | 548.exchange2_r(base)
--------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2026.0.0 Build 20260331
Copyright (C) 1985-2026 Intel Corporation. All rights reserved.
```

(Continued on next page)

Compiler Version Notes (Continued)

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
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/home/specdev/intel-compilers/compiler/latest/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
-fdelayed-template-parsing
-L/home/specdev/intel-compilers/compiler/latest/lib -lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-nostandard-realloc-lhs -align array32byte -auto
-L/home/specdev/intel-compilers/compiler/latest/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-Eaglestream-AC.html
http://www.spec.org/cpu2017/flags/Intel-ic2026-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-Eaglestream-AC.xml
http://www.spec.org/cpu2017/flags/Intel-ic2026-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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