# SPEC CPU®2017 Floating Point Speed Result

**Lenovo Global Technology**

ThinkSystem SR650 V3  
(2.00 GHz, Intel Xeon Gold 6438Y+)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Feb-2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Feb-2023</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Dec-2022</td>
</tr>
</tbody>
</table>

## SPECspeed®2017_fp_base = 308

**SPECspeed®2017_fp_peak = Not Run**

### Hardware

**CPU Name:** Intel Xeon Gold 6438Y+  
**Max MHz:** 4000  
**Nominal:** 2000  
**Enabled:** 64 cores, 2 chips  
**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:** 60 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)  
**Storage:** 1 x 960 GB SATA SSD  
**Other:** None

### Software

**OS:** SUSE Linux Enterprise Server 15 SP4 (x86_64)  
**Kernel:** 5.14.21-150400.22-default  
**Compiler:** C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;  
**Fortran:** Version 2023.0 of Intel Fortran Compiler Classic for Linux;  
**C/C++:** Version 2023.0 of Intel C/C++ Compiler Classic for Linux

**Parallel:** Yes

**Firmware:** Lenovo BIOS Version ESE109L 1.10 released Jan-2023

**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 and OS set to prefer performance at the cost of additional power usage
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>54.0</td>
<td>1090</td>
<td>54.0</td>
<td>1090</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td>47.4</td>
<td>352</td>
<td>46.9</td>
<td>356</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>64</td>
<td>20.3</td>
<td>258</td>
<td>19.5</td>
<td>269</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>64</td>
<td>61.1</td>
<td>217</td>
<td>61.3</td>
<td>216</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>64</td>
<td>54.3</td>
<td>163</td>
<td>54.6</td>
<td>162</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>64</td>
<td>137</td>
<td>86.4</td>
<td>138</td>
<td>86.0</td>
<td>136</td>
<td>87.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>64</td>
<td>23.1</td>
<td>624</td>
<td>23.0</td>
<td>626</td>
<td>23.2</td>
<td>623</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>64</td>
<td>33.1</td>
<td>527</td>
<td>33.2</td>
<td>527</td>
<td>33.1</td>
<td>527</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>64</td>
<td>52.5</td>
<td>174</td>
<td>52.7</td>
<td>173</td>
<td>52.7</td>
<td>173</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td>36.4</td>
<td>432</td>
<td>36.5</td>
<td>431</td>
<td>36.4</td>
<td>433</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 308
SPECspeed®2017_fp_peak = Not Run

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,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-ic2023.0/lib/intel64:/home/cpu2017-1.1.9-ic2023.0/j e5.0.1-64"
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.

(Continued on next page)
General Notes (Continued)

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
Operating Mode set to Custom Mode
CPU P-State Control set to Legacy
Hyper-Threading set to Disabled
DCU IP Prefetcher set to Disabled

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Sun Feb 19 19:28:50 2023

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 249 (249.11+suse.124.g2bc0b2c447)
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

---

(Continued on next page)
Platform Notes (Continued)

1. `uname -a`
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux

2. `w`
   19:28:50 up 3 min,  1 user, load average: 0.28, 0.74, 0.37
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                19:26   10.00s  1.31s  0.01s -bash

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) 2062626
   max locked memory (kbytes, -l) 64
   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) 2062626
   virtual memory   (kbytes, -v) unlimited
   file locks        (-x) unlimited

5. `sysinfo process ancestry`
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags -c
   ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=64 --tune base -o all --define drop_caches
   fpspeed
   runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=64 --tune-base --output_format all --define
   drop_caches --nopower --runmode speed --tune base --size refspeed fpspeed --nopreenv --note-preenv
   --logfile $SPEC/tmp/CPU2017.111/templogs/preenv.fpspeed.111.0.log --lognum 111.0 --from_runcpu 2

(Continued on next page)
Platform Notes (Continued)

```
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2023.0
```

6. /proc/cpuinfo

```
model name : Intel(R) Xeon(R) Gold 6438Y+
vendor_id : GenuineIntel
cpu family : 6
model : 143
stepping : 8
microcode : 0x2b000161
bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores : 32
siblings : 32
2 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-31
physical id 0: apicids
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62
physical id 1: apicids
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.
```
Lenovo Global Technology
ThinkSystem SR650 V3
(2.00 GHz, Intel Xeon Gold 6438Y+)

spec

**SPEC CPU®2017 Floating Point Speed Result**

Copyright 2017-2023 Standard Performance Evaluation Corporation

---

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

---

**SPECspeed®2017_fp_base = 308**

**SPECspeed®2017_fp_peak = Not Run**

---

**Platform Notes (Continued)**

BogoMIPS: 4000.00

Flags:

```
fpu  vme  de  pse  tsc  msr  pae  mce  cmov  pat  pse36
clflush  dts  acpi  mmx  fxsr  sse  sse2  ss  ht  tm  pbe  syscall  nx  pdpe1gb  rdtscp
lm  constant_tsc  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  xptr  pdcm  pclid  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
invpcid_single  intel_pni  cdp_12  ssbd  mba  ibrs  ibpb  ibrs_optimized
trp_shadow  vmi  f1xpriority  ept  vpid  ept_ad  fsgsbase  tsc_adjust  bmis  hle
avx2  smep  bmi2  erts  invpcid  tms  cmqm  rdrand  adx  avx512ifma
clflushopt  clwb  intel_pt  avx512cd  sha_ni  avx512bw  avx512vl
xsaveopt  xsaves  xgetbv1  xsaves  cmqm llvm  cmqm_occup_llc
```

**Virtualization:** VT-x

**L1d cache:** 3 MiB (64 instances)

**L1i cache:** 2 MiB (64 instances)

**L2 cache:** 128 MiB (64 instances)

**L3 cache:** 120 MiB (2 instances)

**NUMA node(s):**

- **NUMA node0 CPU(s):** 0-31
- **NUMA node1 CPU(s):** 32-63

**Vulnerability Itlb multihit:** Not affected

**Vulnerability Lttf:** Not affected

**Vulnerability Mds:** Not affected

**Vulnerability Meltdown:** Not affected

**Vulnerability Spectre v1:** Mitigation; Speculative Store Bypass disabled via prctl and seccomp

**Vulnerability Spectre v2:** Mitigation; Enhanced IBRS, IBPB conditional, RSB filling

**Vulnerability Srbd:**

- **Not affected**

**Vulnerability Txs async abort:**

- **Not affected**

---

8. **numactl --hardware**

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

available: 2 nodes (0-1)

---

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

Lenovo Global Technology
ThinkSystem SR650 V3
(2.00 GHz, Intel Xeon Gold 6438Y+)

SPECspeed®2017_fp_base = 308
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Feb-2023

Tested by: Lenovo Global Technology
Hardware Availability: Feb-2023
Software Availability: Dec-2022

Platform Notes (Continued)

node 0 cpus: 0–31
node 0 size: 257669 MB
node 0 free: 256626 MB
node 1 cpus: 32–63
node 1 size: 258011 MB
node 1 free: 257492 MB

node distances:
node 0 1
0: 10 21
1: 21 10

9. /proc/meminfo
MemTotal: 528056688 kB

10. who -r
run-level 3 Feb 19 19:25

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
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@ haveged irqbalance iscsi
issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs

disabled autosysautost-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
chronyd console-getty cups cups-browsed debug-shelletables exchange-bmc-os-info
firewalld gpm grub2-once haveged-switch-root ipmi ipmiervd iscsi-init iscsid iscsiui
issue-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-bikmap nmb rdisc
rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts smb snmpd snmptrapd
systemd-boot-check-no-failures systemd-network-generator systemd-sysex
indirect systemd-time-sync systemd-timesyncd udisks2
wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=cf0c8526-2665-4565-b656-0513c168d1bb
splash=silent
mitigations=auto
quiet

(Continued on next page)
Platform Notes (Continued)

security=apparmor

-------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
   current policy: frequency should be within 800 MHz and 2.00 GHz.
   The governor "ondemand" 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            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                        64
   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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V3
(2.00 GHz, Intel Xeon Gold 6438Y+)

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

SPECspeed®2017_fp_base = 308
SPECspeed®2017_fp_peak = Not Run

Test Date: Feb-2023
Hardware Availability: Feb-2023
Software Availability: Dec-2022

Platform Notes (Continued)

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 SP4

19. Disk information
    SPEC is set to: /home/cpu2017-1.1.9-ic2023.0
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      xfs   446G   53G  393G  12% /

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

21. dmidecode
    Additional information from dmidecode 3.2 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:
    9x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
    7x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800

22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Lenovo
    BIOS Version:      ESE109L-1.1.0
    BIOS Date:         01/07/2023
    BIOS Revision:     1.10
    Firmware Revision: 1.0

Compiler Version Notes

| C               | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base) |

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V3
(2.00 GHz, Intel Xeon Gold 6438Y+)

SPECspeed®2017_fp_base = 308
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Feb-2023
Tested by: Lenovo Global Technology
Hardware Availability: Feb-2023
Software Availability: Dec-2022

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
C++, C, Fortran | 607.cactuBSSN_s(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Fortran         | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Fortran, C      | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx
Lenovo Global Technology
ThinkSystem SR650 V3
(2.00 GHz, Intel Xeon Gold 6438Y+)

SPECspeed®2017_fp_base = 308
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Feb-2023
Hardware Availability: Feb-2023
Software Availability: Dec-2022

Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
ifx icx
Benchmarks using Fortran, C, and C++:
icpx icx ifx

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -std=c11 -Wl,-z,-muldefs -xsapphirerapids -Ofast -ffast-math
-fflto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,-muldefs -DSPEC_OPENMP -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,-muldefs -xsapphirerapids -Ofast -ffast-math
-fflto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

(Continued on next page)
## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
- `-m64` `-std=c++14` `-std=c11` `-W1,-z,muldefs` `-xsapphirerapids` `-Ofast`
- `-ffast-math` `-flto` `-mfpmath=sse` `-funroll-loops`
- `-qopt-mem-layout-trans=4` `-fiopenmp` `-DSPEC_OPENMP` `-Wno-implicit-int`
- `-mprefer-vector-width=512` `-nostandard-realloc-lhs` `-align array32byte`
- `-auto` `-L/usr/local/jemalloc64-5.0.1/lib` `-ljemalloc`

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-O.html

http://www.spec.org/cpu2017/flags/Intel-ic2023-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-O.xml

http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml