



SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology

SPECrate®2017_fp_base = 1630

ThinkSystem SR860 V3
(2.20 GHz, Intel Xeon Platinum 8460H)

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017

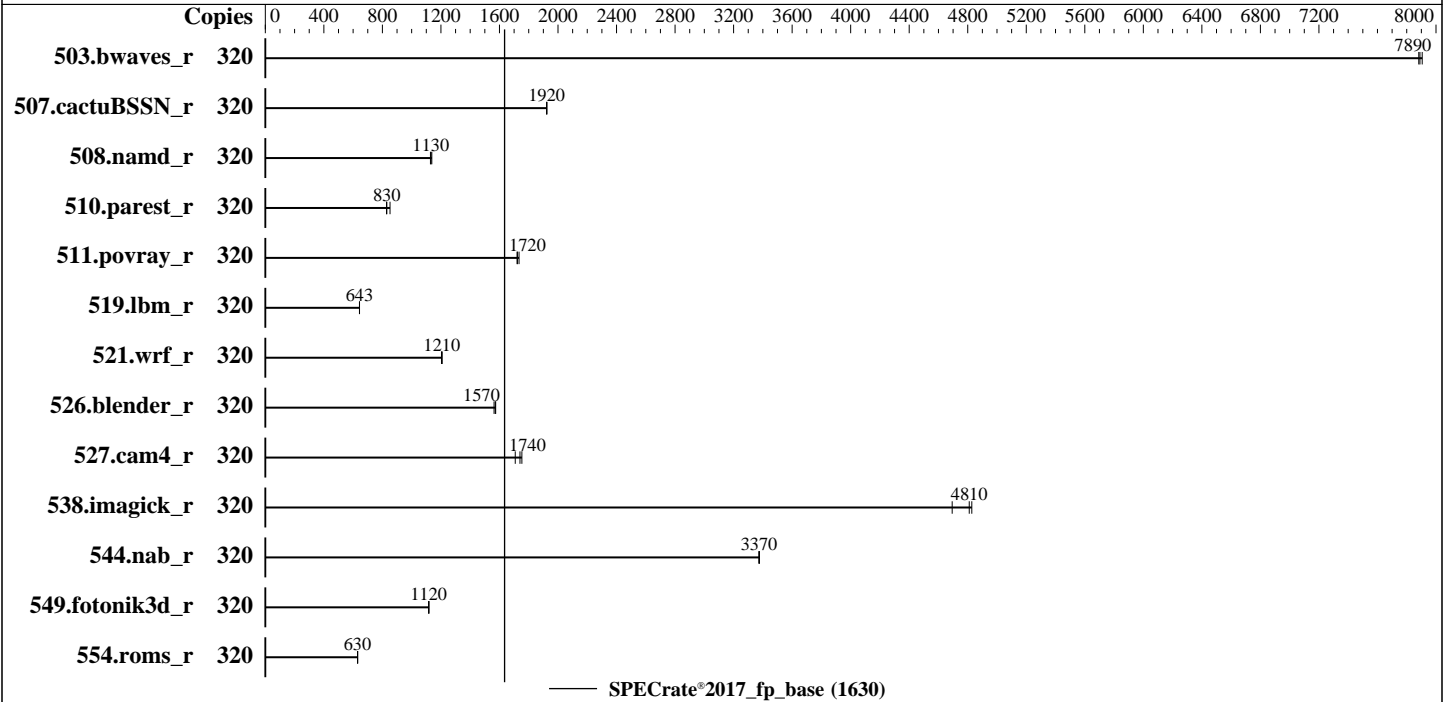
Test Date: Oct-2023

Test Sponsor: Lenovo Global Technology

Hardware Availability: Jun-2023

Tested by: Lenovo Global Technology

Software Availability: Dec-2022



Hardware

CPU Name: Intel Xeon Platinum 8460H
 Max MHz: 3800
 Nominal: 2200
 Enabled: 160 cores, 4 chips, 2 threads/core
 Orderable: 2,4 chips
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 105 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (32 x 32 GB 2Rx8 PC5-4800B-R)
 Storage: 1 x 480 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 for Linux;
 Parallel: No
 Firmware: Lenovo BIOS Version RSE105I 1.11 released Jul-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



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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 | 320 | 407 | 7880 | 406 | 7910 | 407 | 7890 | | | | | | | |
| 507.cactuBSSN_r | 320 | 211 | 1920 | 211 | 1920 | 211 | 1920 | | | | | | | |
| 508.namd_r | 320 | 269 | 1130 | 269 | 1130 | 267 | 1140 | | | | | | | |
| 510.parest_r | 320 | 1008 | 830 | 1011 | 828 | 982 | 852 | | | | | | | |
| 511.povray_r | 320 | 434 | 1720 | 434 | 1720 | 431 | 1730 | | | | | | | |
| 519.lbm_r | 320 | 524 | 643 | 524 | 643 | 524 | 644 | | | | | | | |
| 521.wrf_r | 320 | 594 | 1210 | 595 | 1200 | 594 | 1210 | | | | | | | |
| 526.blender_r | 320 | 312 | 1560 | 310 | 1570 | 310 | 1570 | | | | | | | |
| 527.cam4_r | 320 | 328 | 1710 | 319 | 1750 | 322 | 1740 | | | | | | | |
| 538.imagick_r | 320 | 170 | 4690 | 165 | 4830 | 165 | 4810 | | | | | | | |
| 544.nab_r | 320 | 160 | 3370 | 159 | 3380 | 160 | 3370 | | | | | | | |
| 549.fotonik3d_r | 320 | 1117 | 1120 | 1117 | 1120 | 1116 | 1120 | | | | | | | |
| 554.roms_r | 320 | 806 | 631 | 807 | 630 | 807 | 630 | | | | | | | |

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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-ic2023.0-2/lib/intel64:/home/cpu2017-1.1.9-ic2023.0-2/je5.0.1-64"
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.

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General Notes (Continued)

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>

Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance and then set it to Custom Mode

SNC set to SNC4

LLC Prefetch set to Disabled

DCU Streamer Prefetcher set to Disabled

C-State set to Legacy

AMP Prefetch set to Enable

Sysinfo program /home/cpu2017-1.1.9-ic2023.0-2/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Sat Oct 7 09:39:27 2023

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

Table of contents

1. uname -a
 2. w
 3. Username
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 5. sysinfo process ancestry
 6. /proc/cpuinfo
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 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
-
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
09:39:27 up 16:17, 1 user, load average: 60.56, 228.79, 286.49

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Platform Notes (Continued)

| USER | TTY | FROM | LOGIN@ | IDLE | JCPU | PCPU | WHAT |
|------|------|------|--------|--------|-------|-------|----------------------------|
| root | tty1 | - | Fri17 | 16:15m | 0.90s | 0.01s | /bin/bash ./run_SR860V3.sh |

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) 4126526
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) 4126526
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
/bin/bash ./run_SR860V3.sh
/bin/bash ./run_SR860V3.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=320 -c
  ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=160 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=320 --configfile
  ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=160 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
  rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.052/templogs/preenv.fprate.052.0.log --lognum 052.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2023.0-2

```

6. /proc/cpuinfo

```

model name      : Intel(R) Xeon(R) Platinum 8460H
vendor_id      : GenuineIntel
cpu family      : 6
model          : 143
stepping       : 8
microcode      : 0x2b0001b0
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 40
siblings       : 80
4 physical ids (chips)
320 processors (hardware threads)
physical id 0: core ids 0-39
physical id 1: core ids 0-39
physical id 2: core ids 0-39

```

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Platform Notes (Continued)

physical id 3: core ids 0-39
physical id 0: apicids 0-79
physical id 1: apicids 128-207
physical id 2: apicids 256-335
physical id 3: apicids 384-463

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 2.37.2:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:         46 bits physical, 57 bits virtual
Byte Order:            Little Endian
CPU(s):                320
On-line CPU(s) list:   0-319
Vendor ID:             GenuineIntel
Model name:            Intel(R) Xeon(R) Platinum 8460H
CPU family:            6
Model:                 143
Thread(s) per core:    2
Core(s) per socket:    40
Socket(s):             4
Stepping:              8
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
                        invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                        tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmil hle
                        avx2 smep bmi2 erms invpcid rtm 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 avx_vnni avx512_bf16 wbnoinvd dtherm ida
                        arat pln pts 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 avx512_fp16 amx_tile flush_l1d arch_capabilities
Virtualization:        VT-x
L1d cache:             7.5 MiB (160 instances)
L1i cache:             5 MiB (160 instances)
L2 cache:              320 MiB (160 instances)
L3 cache:              420 MiB (4 instances)
NUMA node(s):         16
NUMA node0 CPU(s):    0-9,160-169
NUMA node1 CPU(s):    10-19,170-179
NUMA node2 CPU(s):    20-29,180-189
NUMA node3 CPU(s):    30-39,190-199
NUMA node4 CPU(s):    40-49,200-209
NUMA node5 CPU(s):    50-59,210-219
NUMA node6 CPU(s):    60-69,220-229
NUMA node7 CPU(s):    70-79,230-239
NUMA node8 CPU(s):    80-89,240-249
NUMA node9 CPU(s):    90-99,250-259

```

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Platform Notes (Continued)

```

NUMA node10 CPU(s):      100-109,260-269
NUMA node11 CPU(s):      110-119,270-279
NUMA node12 CPU(s):      120-129,280-289
NUMA node13 CPU(s):      130-139,290-299
NUMA node14 CPU(s):      140-149,300-309
NUMA node15 CPU(s):      150-159,310-319
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:      Not affected
Vulnerability Mds:      Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
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 | 7.5M | 12 | Data | 1 | 64 | 1 | 64 |
| L1i | 32K | 5M | 8 | Instruction | 1 | 64 | 1 | 64 |
| L2 | 2M | 320M | 16 | Unified | 2 | 2048 | 1 | 64 |
| L3 | 105M | 420M | 15 | Unified | 3 | 114688 | 1 | 64 |

8. numactl --hardware

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

```

available: 16 nodes (0-15)
node 0 cpus: 0-9,160-169
node 0 size: 64169 MB
node 0 free: 62831 MB
node 1 cpus: 10-19,170-179
node 1 size: 64506 MB
node 1 free: 63754 MB
node 2 cpus: 20-29,180-189
node 2 size: 64506 MB
node 2 free: 63756 MB
node 3 cpus: 30-39,190-199
node 3 size: 64506 MB
node 3 free: 63752 MB
node 4 cpus: 40-49,200-209
node 4 size: 64506 MB
node 4 free: 63744 MB
node 5 cpus: 50-59,210-219
node 5 size: 64506 MB
node 5 free: 63760 MB
node 6 cpus: 60-69,220-229
node 6 size: 64506 MB
node 6 free: 63758 MB
node 7 cpus: 70-79,230-239
node 7 size: 64506 MB
node 7 free: 63748 MB
node 8 cpus: 80-89,240-249
node 8 size: 64506 MB
node 8 free: 63605 MB
node 9 cpus: 90-99,250-259
node 9 size: 64506 MB
node 9 free: 63709 MB
node 10 cpus: 100-109,260-269
node 10 size: 64506 MB
node 10 free: 63551 MB

```

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Platform Notes (Continued)

```

node 11 cpus: 110-119,270-279
node 11 size: 64506 MB
node 11 free: 63687 MB
node 12 cpus: 120-129,280-289
node 12 size: 64472 MB
node 12 free: 63696 MB
node 13 cpus: 130-139,290-299
node 13 size: 64506 MB
node 13 free: 63744 MB
node 14 cpus: 140-149,300-309
node 14 size: 64506 MB
node 14 free: 63748 MB
node 15 cpus: 150-159,310-319
node 15 size: 64423 MB
node 15 free: 63670 MB

```

node distances:

```

node 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
0: 10 12 12 12 21 21 21 21 21 21 21 21 21 21 21 21
1: 12 10 12 12 21 21 21 21 21 21 21 21 21 21 21 21
2: 12 12 10 12 21 21 21 21 21 21 21 21 21 21 21 21
3: 12 12 12 10 21 21 21 21 21 21 21 21 21 21 21 21
4: 21 21 21 21 10 12 12 12 21 21 21 21 21 21 21 21
5: 21 21 21 21 12 10 12 12 21 21 21 21 21 21 21 21
6: 21 21 21 21 12 12 10 12 21 21 21 21 21 21 21 21
7: 21 21 21 21 12 12 12 10 21 21 21 21 21 21 21 21
8: 21 21 21 21 21 21 21 21 10 12 12 12 21 21 21 21
9: 21 21 21 21 21 21 21 21 12 10 12 12 21 21 21 21
10: 21 21 21 21 21 21 21 21 12 12 10 12 21 21 21 21
11: 21 21 21 21 21 21 21 21 12 12 12 10 21 21 21 21
12: 21 21 21 21 21 21 21 21 21 21 21 21 10 12 12 12
13: 21 21 21 21 21 21 21 21 21 21 21 21 12 10 12 12
14: 21 21 21 21 21 21 21 21 21 21 21 21 12 12 10 12
15: 21 21 21 21 21 21 21 21 21 21 21 21 12 12 12 10

```

```

-----
9. /proc/meminfo
MemTotal: 1056415192 kB

```

```

-----
10. who -r
run-level 3 Oct 6 17:22

```

```

-----
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
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 autofsd autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info
firewalld gpm grub2-once haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load
lunmask man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd
serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
systemd-network-generator systemd-sysextd systemd-time-wait-sync systemd-timesyncd

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Platform Notes (Continued)

generated ntp_sync
indirect wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=07b494b8-a782-4eba-84f2-ef5cae789da8
splash=silent
mitigations=auto
quiet
security=apparmor

14. cpupower frequency-info
analyzing CPU 0:
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+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

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Platform Notes (Continued)

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-ic2023.0-2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 445G 45G 401G 10% /

20. /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR860 V3
Product Family: ThinkSystem
Serial: None

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:
19x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
6x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
4x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
3x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: Lenovo
BIOS Version: RSE105I-1.11
BIOS Date: 07/12/2023
BIOS Revision: 1.11
Firmware Revision: 1.11

Compiler Version Notes

=====
C | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(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.
=====

=====
C++ | 508.namd_r(base) 510.parest_r(base)
=====
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====

=====
C++, C | 511.povray_r(base) 526.blender_r(base)
=====
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201

(Continued on next page)



SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology

SPECrate®2017_fp_base = 1630

ThinkSystem SR860 V3
(2.20 GHz, Intel Xeon Platinum 8460H)

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017

Test Date: Oct-2023

Test Sponsor: Lenovo Global Technology

Hardware Availability: Jun-2023

Tested by: Lenovo Global Technology

Software Availability: Dec-2022

Compiler Version Notes (Continued)

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=====
C++, C, Fortran | 507.cactuBSSN_r(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====
Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====
Fortran, C | 521.wrf_r(base) 527.cam4_r(base)
=====

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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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



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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
```

Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -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 -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -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 -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
```

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Hardware Availability: Jun-2023

Tested by: Lenovo Global Technology

Software Availability: Dec-2022

Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):

```
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsaphirerapids -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512  
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

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-Z.html>
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64_revB.2023-10-11.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-Z.xml>
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64_revB.2023-10-11.xml

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