



SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology ThinkSystem SR860 V3 (2.40 GHz, Intel Xeon Gold 6448H)

| | |
|---------------------------------|---------|
| SPECspeed®2017_fp_base = | 336 |
| SPECspeed®2017_fp_energy_base = | 456 |
| SPECspeed®2017_fp_peak = | Not Run |
| SPECspeed®2017_fp_energy_peak = | Not Run |

CPU2017 License: 9017

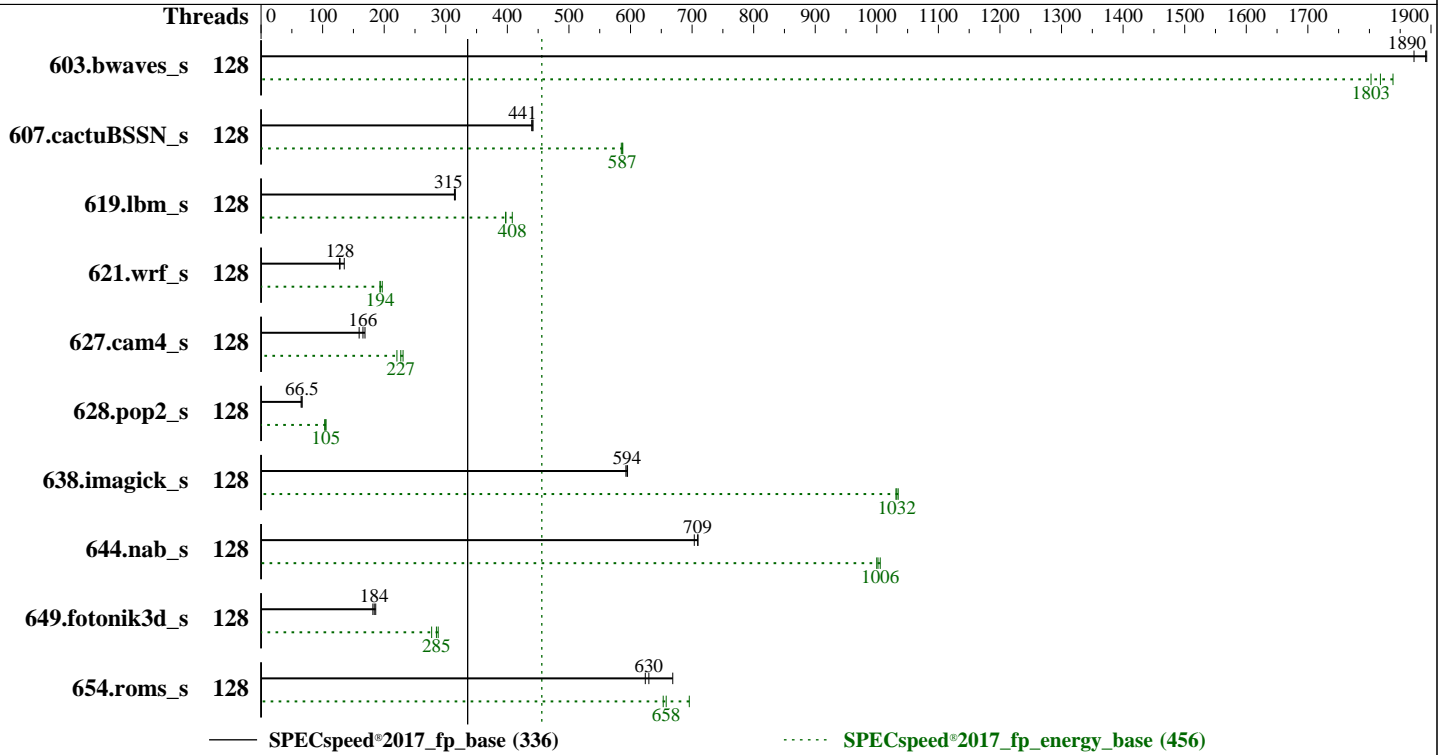
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jul-2023

Hardware Availability: Jun-2023

Software Availability: Dec-2022



Hardware

CPU Name: Intel Xeon Gold 6448H
 Max MHz: 4100
 Nominal: 2400
 Enabled: 128 cores, 4 chips
 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: 60 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 M.2 NVMe 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: Yes
 Firmware: Lenovo BIOS Version RSE105E 1.10 released May-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 balance power and performance

Power

Max. Power (W): 1196.1
 Idle Power (W): 386.36
 Min. Temperature (C): 23.94
 Elevation (m): 43
 Line Standard: 220 V / 50 Hz / 1 phase / 3 wires
 Provisioning: Line-powered



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Power Settings

Management FW: Version 1.10 of RSX303X
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 2 x 1800 W (non-redundant)
Details: ThinkSystem 1800W Titanium Power Supply 4P57A78359
Backplane: M.2 SATA/NVMe 2-Bay Enablement Kit
Other Storage: None
Storage Model #: 4XB7A82636
NICs Installed: 1 x ThinkSystem Ethernet 4-port Adaptor @ 1 Gb
NICs Enabled (FW/OS): 4 / 1
NICs Connected/Speed: 1 @ 1 Gb
Other HW Model #: 6 x Performance fans

Power Analyzer

Power Analyzer: WIN:9888
Hardware Vendor: YOKOGAWA, Inc.
Model: YokogawaWT310E
Serial Number: C3UG05014E
Input Connection: Default
Metrology Institute: CNAS
Calibration By: GRG METROLOGY & TEST (BEIJING) CO., LTD.
Calibration Label: J202210116758A-0005
Calibration Date: 19-Oct-2022
PTDaemon® Version: 1.10.0 (82175bac; 2022-08-17)
Setup Description: Connected to PSU1
Current Ranges Used: 10A
Voltage Range Used: 300V

Temperature Meter

Temperature Meter: WIN:9889
Hardware Vendor: Digi International, Inc.
Model: DigiWATCHPORT_H
Serial Number: W63074363
Input Connection: USB
PTDaemon Version: 1.10.0 (82175bac; 2022-08-17)
Setup Description: 50 mm in front of SUT main intake

Base Results Table

| Benchmark | Threads | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power |
|-----------------|---------|-------------|------------|-------------|--------------|---------------|---------------|-------------|-------------|-------------|--------------|---------------|---------------|-------------|-------------|-------------|--------------|---------------|---------------|
| 603.bwaves_s | 128 | 31.5 | 1870 | 35.4 | 1820 | 1120 | 1190 | 31.2 | 1890 | 35.0 | 1840 | 1120 | 1190 | <u>31.2</u> | <u>1890</u> | <u>35.7</u> | <u>1800</u> | <u>1140</u> | <u>1200</u> |
| 607.cactuBSSN_s | 128 | 37.8 | 441 | 31.0 | 587 | 822 | 859 | <u>37.8</u> | <u>441</u> | <u>31.1</u> | <u>587</u> | <u>823</u> | <u>860</u> | 37.9 | 439 | 31.2 | 585 | 822 | 864 |
| 619.lbm_s | 128 | 16.7 | 314 | 15.0 | 398 | 897 | 948 | 16.6 | 315 | 15.0 | 397 | 902 | 972 | <u>16.6</u> | <u>315</u> | <u>14.6</u> | <u>408</u> | <u>877</u> | <u>952</u> |
| 621.wrf_s | 128 | 104 | 127 | 74.7 | 193 | 720 | 793 | <u>103</u> | <u>128</u> | <u>74.6</u> | <u>194</u> | <u>724</u> | <u>801</u> | 97.9 | 135 | 73.4 | 197 | 750 | 836 |
| 627.cam4_s | 128 | 55.6 | 159 | 43.7 | 221 | 785 | 834 | <u>53.6</u> | <u>166</u> | <u>42.5</u> | <u>227</u> | <u>793</u> | <u>854</u> | 52.5 | 169 | 41.8 | 231 | 796 | 855 |
| 628.pop2_s | 128 | 183 | 65.0 | 126 | 103 | 692 | 785 | <u>179</u> | <u>66.5</u> | <u>124</u> | <u>105</u> | <u>694</u> | <u>775</u> | 179 | 66.5 | 124 | 105 | 695 | 755 |
| 638.imagick_s | 128 | <u>24.3</u> | <u>594</u> | <u>15.2</u> | <u>1030</u> | <u>627</u> | <u>1110</u> | 24.2 | 595 | 15.3 | 1030 | 629 | 1130 | 24.3 | 593 | 15.2 | 1030 | 624 | 1150 |
| 644.nab_s | 128 | 24.6 | 710 | 19.0 | 1000 | 771 | 828 | <u>24.6</u> | <u>709</u> | <u>18.9</u> | <u>1010</u> | <u>767</u> | <u>832</u> | 24.8 | 704 | 19.0 | 1000 | 766 | 822 |
| 649.fotonik3d_s | 128 | <u>49.6</u> | <u>184</u> | <u>35.9</u> | <u>285</u> | <u>725</u> | <u>1000</u> | 48.9 | 186 | 35.6 | 288 | 727 | 1010 | 50.2 | 182 | 37.0 | 277 | 736 | 996 |
| 654.roms_s | 128 | <u>25.0</u> | <u>630</u> | <u>26.8</u> | <u>658</u> | <u>1070</u> | <u>1120</u> | 25.2 | 624 | 27.0 | 653 | 1070 | 1130 | 23.5 | 669 | 25.3 | 695 | 1070 | 1150 |

SPECspeed®2017_fp_base = 336

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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"



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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/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>

Platform Notes

BIOS configuration:
Choose Operating Mode set to Efficiency - Favor Power and then set it to Custom Mode
Memory Speed set to Maximum Performance
UPI Link Frequency set to Maximum Performance
Hyper-Threading set to Disabled
AMP Prefetch set to Enable
Optimized Power Mode set to Enable

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Fri Jul 28 12:05:19 2023

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

Table of contents

- uname -a
- w
- Username
- ulimit -a
- sysinfo process ancestry
- /proc/cpuinfo
- lscpu
- numactl --hardware
- /proc/meminfo
- who -r
- Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)

(Continued on next page)



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Platform Notes (Continued)

- 12. Services, from `systemctl list-unit-files`
- 13. Linux kernel boot-time arguments, from `/proc/cmdline`
- 14. `cpupower frequency-info`
- 15. `tuned-adm active`
- 16. `sysctl`
- 17. `/sys/kernel/mm/transparent_hugepage`
- 18. `/sys/kernel/mm/transparent_hugepage/khugepaged`
- 19. OS release
- 20. Disk information
- 21. `/sys/devices/virtual/dmi/id`
- 22. `dmidecode`
- 23. 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
12:05:19 up 1:01, 1 user, load average: 2.70, 42.71, 49.85
USER      TTY      FROM          LOGIN@      IDLE        JCPU   PCPU   WHAT
root      ttyl    -             11:04      21.00s     1.38s   0.00s  /bin/bash ./run_SR860V3_EageStream.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) 4126861
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) 4126861
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_EageStream.sh
/bin/bash ./run_SR860V3_EageStream.sh
runcpu --power --nobuild --action validate --define default-platform-flags -c
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=128 --tune base -o all --define drop_caches
-----
```

(Continued on next page)



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Platform Notes (Continued)

```

fpspeed
runcpu --power --nobuild --action validate --define default-platform-flags --configfile
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=128 --tune base --output_format all --define
drop_caches --runmode speed --tune base --size refspeed fpspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.286/temlogs/preenv.fpspeed.286.0.log --lognum 286.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2023.0

```

```

-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) Gold 6448H
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b0001b0
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 32
siblings       : 32
4 physical ids (chips)
128 processors (hardware threads)
physical id 0: core ids 0-31
physical id 1: core ids 0-31
physical id 2: core ids 0-31
physical id 3: 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
128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
80,182,184,186,188,190
physical id 2: apicids
256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,3
08,310,312,314,316,318
physical id 3: apicids
384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418,420,422,424,426,428,430,432,434,4
36,438,440,442,444,446
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):           128
On-line CPU(s) list: 0-127
Vendor ID:        GenuineIntel
Model name:       Intel(R) Xeon(R) Gold 6448H
CPU family:       6
Model:           143
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s):        4
Stepping:         8

```

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Platform Notes (Continued)

```

CPU max MHz:      2400.0000
CPU min MHz:      800.0000
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
                  invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                  tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 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 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_lld 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:        240 MiB (4 instances)
NUMA node(s):    4
NUMA node0 CPU(s): 0-31
NUMA node1 CPU(s): 32-63
NUMA node2 CPU(s): 64-95
NUMA node3 CPU(s): 96-127
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:       Not affected
Vulnerability Mds:       Not affected
Vulnerability Meltdown:  Not affected
Vulnerability Spec store 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      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   60M      240M   15 Unified           3  65536     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
node 0 size: 257701 MB
node 0 free: 255247 MB
node 1 cpus: 32-63
node 1 size: 258039 MB
node 1 free: 257368 MB

```

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Platform Notes (Continued)

```
node 2 cpus: 64-95
node 2 size: 258005 MB
node 2 free: 257315 MB
node 3 cpus: 96-127
node 3 size: 257992 MB
node 3 free: 257333 MB
node distances:
node  0  1  2  3
  0:  10  21  31  21
  1:  21  10  21  31
  2:  31  21  10  21
  3:  21  31  21  10
```

```
9. /proc/meminfo
MemTotal:      1056501008 kB
```

```
10. who -r
run-level 3 Jul 28 11:03
```

```
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 nvme-fc-boot-connections postfix
purge-kernels rollback rsyslog smartd sshd 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
firewallld gpm grub2-once haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load
lunmask man-db-create multipathd nfs nfs-blkmap nvme-fc-autoconnect rdisc rpcbind
rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd
systemd-boot-check-no-failures systemd-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesyncd tuned
indirect wickedd
```

```
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=flca794b-c300-4deb-884c-f3fc50f5f1a3
splash=silent
mitigations=auto
quiet
security=apparmor
```

```
14. cpupower frequency-info
analyzing CPU 0:
current policy: frequency should be within 800 MHz and 2.40 GHz.
The governor "ondemand" may decide which speed to use
```

(Continued on next page)



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Platform Notes (Continued)

within this range.

boost state support:

Supported: no

Active: no

15. tuned-adm active

It seems that tuned daemon is not running, preset profile is not activated.

Preset profile: latency-performance

16. 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

```

17. /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

```

18. /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

```

19. OS release

```

From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP4

```

20. Disk information

SPEC is set to: /home/cpu2017-1.1.9-ic2023.0

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology
ThinkSystem SR860 V3
(2.40 GHz, Intel Xeon Gold 6448H)

| | |
|---------------------------------|---------|
| SPECspeed®2017_fp_base = | 336 |
| SPECspeed®2017_fp_energy_base = | 456 |
| SPECspeed®2017_fp_peak = | Not Run |
| SPECspeed®2017_fp_energy_peak = | Not Run |

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

Test Date: Jul-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022

Platform Notes (Continued)

| Filesystem | Type | Size | Used | Avail | Use% | Mounted on |
|----------------|------|------|------|-------|------|------------|
| /dev/nvme0n1p2 | xfss | 447G | 27G | 421G | 6% | / |

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

```
-----
22. 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:
  32x SK Hynix HMC88AE88A168N 32 GB 2 rank 4800
-----
```

```
-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      Lenovo
BIOS Version:    RSE105E-1.10
BIOS Date:       05/12/2023
BIOS Revision:   1.10
Firmware Revision: 1.10
-----
```

Compiler Version Notes

```
=====
C | 619.lbm_s(base) 638.imagick_s(base) 644.nab_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.
-----
```

```
=====
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
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-----
```

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CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jul-2023

Hardware Availability: Jun-2023

Software Availability: Dec-2022

Compiler Version Notes (Continued)

=====
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

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

(Continued on next page)



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CPU2017 License: 9017

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Test Date: Jul-2023

Hardware Availability: Jun-2023

Software Availability: Dec-2022

Base Optimization Flags (Continued)

C benchmarks (continued):

```
-flto -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
-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
```

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c++14 -std=c11 -Wl,-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/Intel-ic2023-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-W.html>

You can also download the XML flags sources by saving the following links:

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

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-W.xml>

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