# SPEC CPU®2017 Floating Point Rate Result

## Lenovo Global Technology

ThinkSystem SR630 V3
(2.00 GHz, Intel Xeon Gold 6438N)

### SPECrate®2017_fp_base = 642

**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

### Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_fp_base</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
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<td>786</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>128</td>
<td>371</td>
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<td>508.namd_r</td>
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<td>590</td>
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<tr>
<td>510.parest_r</td>
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<td>526.blender_r</td>
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<td>527.cam4_r</td>
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<tr>
<td>554.roms_r</td>
<td>128</td>
<td></td>
</tr>
</tbody>
</table>

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### Hardware

**CPU Name:** Intel Xeon Gold 6438N

**Max MHz:** 3600

**Nominal:** 2000

**Enabled:** 64 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:** 60 MB I+D on chip per core

**Memory:** 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)

**Storage:** 1 x 960 GB SATA SSD

---

### 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 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
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SPECraten®2017_fp_base = 642
SPECraten®2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
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<th>Seconds</th>
<th>Ratio</th>
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</tr>
<tr>
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<td>339</td>
<td>576</td>
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<td>1590</td>
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<td>1160</td>
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<tr>
<td>549.fotonik3d_r</td>
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<td>515</td>
<td>965</td>
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<td>967</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 642</th>
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</tr>
</tbody>
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CPU2017 License: 9017 
Test Sponsor: Lenovo Global Technology 
Tested by: Lenovo Global Technology 

General Notes (Continued)

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.:
umactl --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.
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:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
SNC set to SNC2
LLC Prefetch set to Disabled

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on test1 Thu Feb 9 06:02:19 2023

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

-------------------------------------------
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-------------------------------------------
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

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

<table>
<thead>
<tr>
<th>SPECrates®2017_fp_base =</th>
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<tbody>
<tr>
<td>SPECrates®2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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**Platform Notes (Continued)**

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 test1 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222) x86_64 x86_64 GNU/Linux
```

---

2. `w`

```
06:02:19 up 12:23, 1 user, load average: 37.96, 98.86, 116.06
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
root     tty1     -                Wed17   12:19m  1.15s  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) 2062489
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) 2062489
virtual memory         (kbytes, -v) unlimited
  file locks                      (-x) unlimited
```

---

5. `sysinfo process ancestry`

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
```

(Continued on next page)
Platform Notes (Continued)

-bash
-bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune base --o all fprate 
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --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/CPU2017.028/templogs/preenv.fprate.028.0.log --lognum 028.0 --from_runcpu 2 specperl $SPEC/bin/sysinfo $SPEC = /home/cpu2017-1.1.9-ic2023.0

6. /proc/cpuinfo

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>model name</td>
<td>Intel(R) Xeon(R) Gold 6438N</td>
</tr>
<tr>
<td>vendor_id</td>
<td>GenuineIntel</td>
</tr>
<tr>
<td>cpu family</td>
<td>6</td>
</tr>
<tr>
<td>model</td>
<td>143</td>
</tr>
<tr>
<td>stepping</td>
<td>8</td>
</tr>
<tr>
<td>microcode</td>
<td>0x2b000161</td>
</tr>
<tr>
<td>bugs</td>
<td>spectre_v1 spectre_v2 spec_store_bypass swapgs</td>
</tr>
<tr>
<td>cpu cores</td>
<td>32</td>
</tr>
<tr>
<td>siblings</td>
<td>64</td>
</tr>
<tr>
<td>2 physical ids (chips)</td>
<td></td>
</tr>
<tr>
<td>128 processors (hardware threads)</td>
<td></td>
</tr>
<tr>
<td>physical id 0: core ids 0-31</td>
<td></td>
</tr>
<tr>
<td>physical id 1: core ids 0-31</td>
<td></td>
</tr>
<tr>
<td>physical id 0: apicids 0-63</td>
<td></td>
</tr>
<tr>
<td>physical id 1: apicids 128-191</td>
<td></td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture:</td>
<td>x86_64</td>
</tr>
<tr>
<td>CPU op-mode(s):</td>
<td>32-bit, 64-bit</td>
</tr>
<tr>
<td>Address sizes:</td>
<td>46 bits physical, 57 bits virtual</td>
</tr>
<tr>
<td>Byte Order:</td>
<td>Little Endian</td>
</tr>
<tr>
<td>CPU(s):</td>
<td>128</td>
</tr>
<tr>
<td>On-line CPU(s) list:</td>
<td>0-127</td>
</tr>
<tr>
<td>Vendor ID:</td>
<td>GenuineIntel</td>
</tr>
<tr>
<td>Model name:</td>
<td>Intel(R) Xeon(R) Gold 6438N</td>
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<td>6</td>
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<tr>
<td>Model:</td>
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Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
Stepping: 8

BogoMIPS: 4000.00

Flags: 
fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
clflush dsour pae mce cx8 acpica htm 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
des_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_13 cat_12 cpd_13
invpnsicl_single intel_pinn cd_p_12 ssbd mba ibrs ibpb stibp ibrs_enhanced
tpr_shadow vnni intel_pinn flexpriority ept vpid ept_ad fsgsbase tsc_adjust bml1 hle
avx2 smep bmi2 erms invpcid rtm cmq rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
xsaveopt xsaves xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt

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): 4
NUMA node0 CPU(s): 0-15, 64-79
NUMA node1 CPU(s): 16-31, 80-95
NUMA node2 CPU(s): 32-47, 96-111
NUMA node3 CPU(s): 48-63, 112-127

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/swaps 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:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
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<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>3M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
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<td>Instruction</td>
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<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>128M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
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(Continued on next page)
**Platform Notes (Continued)**

<table>
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<tr>
<th>L3</th>
<th>60M</th>
<th>120M</th>
<th>15 Unified</th>
<th>3</th>
<th>65536</th>
<th>1</th>
<th>64</th>
</tr>
</thead>
</table>

8. `numactl --hardware`

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

available: 4 nodes (0-3)
node 0 cpus: 0-15,64-79
node 0 size: 128679 MB
node 0 free: 127486 MB
node 1 cpus: 16-31,80-95
node 1 size: 128981 MB
node 1 free: 128156 MB
node 2 cpus: 32-47,96-111
node 2 size: 129015 MB
node 2 free: 128246 MB
node 3 cpus: 48-63,112-127
node 3 size: 128969 MB
node 3 free: 128088 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: 528021584 kB

10. `who -r`

run-level 3 Feb 8 17:40

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)

<table>
<thead>
<tr>
<th>Default Target</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>multi-user</td>
<td>running</td>
</tr>
</tbody>
</table>

12. Services, from `systemctl list-unit-files`

<table>
<thead>
<tr>
<th>STATE</th>
<th>UNIT FILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>enabled</td>
<td>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 wickeddhcp4 wickeddhcp6 wickedd-nanny</td>
</tr>
<tr>
<td>enabled-runtime</td>
<td>systemd-remount-fs</td>
</tr>
<tr>
<td>disabled</td>
<td>autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info</td>
</tr>
</tbody>
</table>

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### Lenovo Global Technology

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

#### Platform Notes (Continued)

```plaintext
firewalld gpm grub2-once haveged-switch-root ipmi ipmievd iscsi-init iscsiul
issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nmb
rpcbind rpmconfigcheck rsyncd sequential-getty smartd_generate_opts smb snmpd
snmptrapd systemd-boot-check-no-failures systemd-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesyncd
```

```plaintext
generated ntp_sync
indirect wickedd
```

13. **Linux kernel boot-time arguments, from /proc/cmdline**
   ```plaintext
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=f976c541-a329-4c54-ba84-4be16556ee18
   splash=silent
   mitigations=auto
   quiet
   security=apparmor
   ```

14. **cpupower frequency-info**
   ```plaintext
   analyzing CPU 0:
   Unable to determine current policy
   boost state support:
   Supported: yes
   Active: yes
   ```

15. **sysctl**
   ```plaintext
   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
   ```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630 V3
(2.00 GHz, Intel Xeon Gold 6438N)

SPEC CPU®2017 Floating Point Rate Result

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SPECrate®2017_fp_base = 642
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Test Date: Feb-2023
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Platform Notes (Continued)

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
   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/sda2 xfs 894G 92G 803G 11% /

20. /sys/devices/virtual/dmi/id
   Vendor: Lenovo
   Product: ThinkSystem SR630 V3
   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:
   1x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
   5x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
   10x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800

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

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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
---
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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
---
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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(Continued on next page)
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Software Availability: Dec-2022

Compiler Version Notes (Continued)

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 | 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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------

==============================================================================
Fortran, C | 521.wrf_r(base) 527.cam4_r(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

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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630 V3
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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 -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

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

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