## Lenovo Global Technology

### ThinkSystem SR650 V3

(2.20 GHz, Intel Xeon Gold 6416H)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Mar-2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Feb-2023</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2022</td>
</tr>
</tbody>
</table>

### Test Sponsor:

Lenovo Global Technology

### Tested by:

Lenovo Global Technology

### Software Availability:

Dec-2022

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6416H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>4200</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2200</td>
</tr>
<tr>
<td>Enabled:</td>
<td>36 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1,2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>2 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>45 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Power Management:</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>SUSE Linux Enterprise Server 15 SP4 (x86_64) Kernel 5.14.21-150400.22-default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;</td>
</tr>
<tr>
<td>Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Lenovo BIOS Version ESE109L 1.10 released Jan-2023</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
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</tbody>
</table>

### Copy Results

| SPECrate®2017_int_base = | 333 |

### SPECrate®2017_int_peak = Not Run

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Mar-2023</th>
</tr>
</thead>
<tbody>
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Lenovo Global Technology

ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Gold 6416H)

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

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

SPECrate®2017_int_base = 333
SPECrate®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>72</td>
<td>486</td>
<td>236</td>
<td>485</td>
<td>236</td>
<td>486</td>
<td>236</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>72</td>
<td>352</td>
<td>290</td>
<td>356</td>
<td>287</td>
<td>353</td>
<td>289</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>72</td>
<td>217</td>
<td>536</td>
<td>214</td>
<td>543</td>
<td>214</td>
<td>543</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>72</td>
<td>402</td>
<td>235</td>
<td>402</td>
<td>235</td>
<td>403</td>
<td>235</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>72</td>
<td>117</td>
<td>650</td>
<td>116</td>
<td>653</td>
<td>117</td>
<td>647</td>
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<tr>
<td>525.x264_r</td>
<td>72</td>
<td>203</td>
<td>620</td>
<td>203</td>
<td>622</td>
<td>203</td>
<td>621</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>72</td>
<td>365</td>
<td>226</td>
<td>365</td>
<td>226</td>
<td>365</td>
<td>226</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>72</td>
<td>564</td>
<td>211</td>
<td>564</td>
<td>211</td>
<td>564</td>
<td>211</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>72</td>
<td>288</td>
<td>656</td>
<td>289</td>
<td>652</td>
<td>288</td>
<td>655</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>72</td>
<td>511</td>
<td>152</td>
<td>514</td>
<td>151</td>
<td>518</td>
<td>150</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

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/lib/ia32:/home/cpu2017-1.1.9-ic2023.0/je5.0.1-32"
MALLOC_CONF = "retain:true"
**Lenovo Global Technology**  
ThinkSystem SR650 V3  
(2.20 GHz, Intel Xeon Gold 6416H)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>333</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrater®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### 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.:  
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.

### Platform Notes

**BIOS configuration:**  
Operating Mode set to Maximum Performance and then set it to Custom Mode  
MONITOR/MWAIT set to Enabled  
SNC set to SNC2  
LLC Prefetch set to Disabled  
UPI Link Disable set to Disabled 1 Link

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
runtime on localhost Tue Mar 7 06:56:48 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. tuned-adm active  
16. sysctl  
17. /sys/kernel/mm/transparent_hugepage  
18. /sys/kernel/mm/transparent_hugepage/klugepaged  
19. OS release  
20. Disk information  
21. /sys/devices/virtual/dmi/id  
22. dmidecode  
23. BIOS

---

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### Lenovo Global Technology

#### ThinkSystem SR650 V3
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</thead>
<tbody>
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<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

#### 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`
   ```
   06:56:48 up 1 min,  1 user,  load average: 1.36, 0.72, 0.27
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                06:56    7.00s  1.08s  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      (-l) 2062613
   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) 2062613
   virtual memory       (kbytes, -v) unlimited
   file locks           (-x) unlimited
   ```

5. `sysinfo process ancestry`
   ```
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   ```

6. `/proc/cpuinfo`
   ```
   model name      : Intel(R) Xeon(R) Gold 6416H
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 8
   microcode       : 0x2b000161
   ```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Gold 6416H)

SPEC CPU®2017 Integer Rate Result

SPECrates®2017_int_base = 333
SPECrates®2017_int_peak = Not Run

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

Platform Notes (Continued)

cpu cores : 18
siblings : 36
2 physical ids (chips)
72 processors (hardware threads)
physical id 0: core ids 0-17
physical id 1: core ids 0-17
physical id 0: apicids 0-35
physical id 1: apicids 128-163

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): 72
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Gold 6416H
CPU family: 6
Model: 143
Core(s) per socket: 18
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 pse syscall nx pdpe1gb rdtscp
lm constant_tsc arch_perfmon pbe 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_l3 cat_l2 cdp cdp_13

invpncid_single intel_pppin cdp_12 ssbd mba ibrs ibpb ibrs_extended
ptr_shadow vmni flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmon hle
avx2 smep bmi2 emms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
avx512sfma cflushtpr clwb intel_pt avx512cd sha ni avx512bw avx512vl
xsaveopt xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mmm_total
cqm_mmm_local split_lock_detect avx_vnni avx512_bf16 vmbase dtherm ida
arat pfn pts avx512vnni umip pku ospke waitpkg avx512_vbmi gfni vaes
vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vppcmtdq l357 rdipd
tmr_lock_detect cldenote movdiri movdir64b enqcmd mfc md_clear serialize
tsxintel pconf arch_bbr avx512_fp16 amx_tile flush_l1d arch_capabilities

Virtualization:
VT-x
L1d cache: 1.7 MiB (36 instances)
L1i cache: 1.1 MiB (36 instances)
L2 cache: 72 MiB (36 instances)
L3 cache: 90 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-8,36-44
NUMA node1 CPU(s): 9-17,45-53
NUMA node2 CPU(s): 18-26,54-62
NUMA node3 CPU(s): 27-35,63-71

Vulnerability Itlb multihit: Not affected
Vulnerability Lltf: Not affected
Vulnerability Mds: Not affected

(Continued on next page)
Platform Notes (Continued)

Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapsgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbd: 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>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>1.7M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>1.1M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>72M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>45M</td>
<td>90M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>49152</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</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: 0-8,36-44
node 0 size: 128682 MB
node 0 free: 127854 MB
node 1 cpus: 9-17,45-53
node 1 size: 129019 MB
node 1 free: 128635 MB
node 2 cpus: 18-26,54-62
node 2 size: 129019 MB
node 2 free: 128526 MB
node 3 cpus: 27-35,63-71
node 3 size: 128956 MB
node 3 free: 128517 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: 528053428 kB

10. who -r
run-level 3 Mar 7 06:55

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
Default Target: running
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 lvms-monitor nscd postfix purge-kernels rollback rsyslog
smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
systemd-remount-fs
enabled-runtime autofs autoyast-scripts 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 ipmienvd issue-add-ssh-keys kexec-load

(Continued on next page)
**Platform Notes (Continued)**

- lunmask man-db-create multipathd nfs nfs-blinkmap rdisc rpcbind rpmconfigcheck rsyncd sapconf serial-getty@ smartd_generate_opts snmpd snmptrapd sysstat systemd-boot-check-no-failures systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd tuned
  indirect  uidd wickedd

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOO	_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=461ffdbd-8da0-4e20-adb7-d9d3143b6a85
   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. tuned-adm active
   It seems that tuned daemon is not running, preset profile is not activated.
   Preset profile: virtual-guest

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         150000
   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/hugepaged
   alloc_sleep_millisecs  60000

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR650 V3**
(2.20 GHz, Intel Xeon Gold 6416H)

---

**SPECrates**

<table>
<thead>
<tr>
<th>SPECrates</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrates\textsuperscript{2017\textsubscript{int_base}}</td>
<td>333</td>
</tr>
<tr>
<td>SPECrates\textsuperscript{2017\textsubscript{int_peak}}</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

---

### CPU2017 License:

9017

---

### Test Sponsor:

Lenovo Global Technology

---

### Tested by:

Lenovo Global Technology

---

### Test Date:

Mar-2023

---

### Hardware Availability:

Feb-2023

---

### Software Availability:

Dec-2022

---

### Platform Notes (Continued)

#### defrag

1

#### max\_ptes\_none

511

#### max\_ptes\_shared

256

#### max\_ptes\_swap

64

#### pages\_to\_scan

4096

#### scan\_sleep\_milliseconds

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

Filesystem Type Size Used Avail Use% Mounted on

/dev/sda3 xfs 889G 112G 777G 13% /

---

#### 21. /sys/devices/virtual/dmi/id

Vendor: Lenovo

Product: ThinkSystem SR650 V3 MB, EGS, DDR5, SH, 2U

Product Family: ThinkSystem

Serial: 1234567890

---

#### 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:

16x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800

---

#### 23. 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

```
<table>
<thead>
<tr>
<th>C</th>
<th>500.perlbench_r(base)</th>
<th>502.gcc_r(base)</th>
<th>505.mcf_r(base)</th>
<th>525.x264_r(base)</th>
<th>557.xz_r(base)</th>
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(Continued on next page)
## Lenovo Global Technology

ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Gold 6166H)

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

### Compiler Version Notes (Continued)

Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------------------------------------------------------
Intel(R) Fortran 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

### Base Portability Flags

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### Base Optimization Flags

**C benchmarks:**
- `-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math`
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-lgkmlalloc`

**C++ benchmarks:**
- `-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math`
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`

(Continued on next page)
# SPEC CPU®2017 Integer Rate Result

**Lenovo Global Technology**

ThinkSystem SR650 V3  
(2.20 GHz, Intel Xeon Gold 6416H)

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

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<td>Dec-2022</td>
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## Base Optimization Flags (Continued)

### C++ benchmarks (continued):

- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

### Fortran benchmarks:

- `-w`  
- `-m64`  
- `-Wl,-z,muldefs`  
- `-xsapphirerapids`  
- `-O3`  
- `-ffast-math`  
- `-flto`  
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`  
- `-auto`  
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

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/Intel-ic2023-official-linux64.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/Intel-ic2023-official-linux64.xml)

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.9 on 2023-03-06 17:56:47-0500.  
Originally published on 2023-03-28.