### Lenovo Global Technology

ThinkSystem SR860 V3
(3.70 GHz, Intel Xeon Gold 6434H)

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

#### SPECrate®2017_int_base = 397

| SPECrate®2017_int_peak = Not Run |

#### Hardware

- **CPU Name:** Intel Xeon Gold 6434H
- **Max MHz:** 4100
- **Nominal:** 3700
- **Enabled:** 32 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:** 22.5 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 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:** None
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

#### Performance Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Specrate®2017_int_base</th>
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<td>502.gcc_r</td>
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Lenovo Global Technology

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https://www.spec.org/
**SPEC CPU®2017 Integer Rate Result**

Lenovo Global Technology  
ThinkSystem SR860 V3  
(3.70 GHz, Intel Xeon Gold 6434H)

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Aug-2023  
**Hardware Availability:** Jun-2023  
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### Results Table

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**SPECrate®2017_int_base = 397**  
**SPECrate®2017_int_peak = Not Run**

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

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### 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"
```

---

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SPECrate®2017_int_base = 397
SPECrate®2017_int_peak = Not Run

CPU2017 License: 9017
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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.
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:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C1 Enhanced Mode set to Enabled
DCU Streamer Prefetcher set to Disabled
SNC set to SNC2
UPI Link Disable set to Disabled 1 Link
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 localhost Mon Aug 21 16:45:05 2023

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

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17. /sys/kernel/mm/transient_hugepage/khugepaged
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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`
   16:45:05 up 48 min, 1 user, load average: 3.59, 35.75, 49.61
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                15:57    8.00s  0.89s  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) 4126993
   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) 4126993
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

5. `sysinfo process ancestry`
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=64 --c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=32 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=64 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=32 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
   rate --tune base --size refrain intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.085/tempslogs/preenv.intrate.085.0.log --lognum 085.0 --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 6434H
   vendor_id           : GenuineIntel
   cpu family          : 6
   model               : 143
   stepping            : 8
   microcode           : 0x2b0001b0
   bugs                : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores           : 8

(Continued on next page)
Platform Notes (Continued)

siblings        : 16 
4 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-7
physical id 1: core ids 0-7
physical id 2: core ids 0-7
physical id 3: core ids 0-7
physical id 1: apicids 128-143
physical id 2: apicids 256-271
physical id 3: apicids 384-399

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):                          64
On-line CPU(s) list:             0-63
Vendor ID:                       GenuineIntel
Model name:                      Intel(R) Xeon(R) Gold 6434H
CPU family:                      6
Model:                           143
Thread(s) per core:              2
Core(s) per socket:              8
Socket(s):                       4
Stepping:                        8
BogoMIPS:                        7400.00

Flags:                           fpu vme de pse tsc msr pae mca cmov pat pse36
clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl apic pid efer
nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64
msr tm lse sole fmmul fnpl nstic mapping mrxsave fsxsave pdxr stibp
mah 3nte unstoppable fpcca mmakk pge mcm mmxplus rtm pav保罗
xsave xstate pxrmb crto cmov stp hws nstarg stencils fsgsbase tsc_adjust
bts dver sniff_clint mtrr msrm turms tm2 loadmtr msrsole seqinfn
bts mcm tscmt tscplot mcm_preference x2apic

Virtualization:                  VT-x
L1d cache:                       1.5 MiB (32 instances)
L1i cache:                       1.5 MiB (32 instances)
L2 cache:                        64 MiB (32 instances)
L3 cache:                        90 MiB (4 instances)
NUMA node(s):                    8
NUMA node0 CPU(s):               0-3,32-35
NUMA node1 CPU(s):               4-7,36-39
NUMA node2 CPU(s):               8,11,40-43
NUMA node3 CPU(s):               12-15,44-47
SPEC CPU®2017 Integer Rate Result

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SPECrates®2017_int_base = 397
SPECrates®2017_int_peak = Not Run

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

Platform Notes (Continued)

NUMA node4 CPU(s): 16-19,48-51
NUMA node5 CPU(s): 20-23,52-55
NUMA node6 CPU(s): 24-27,56-59
NUMA node7 CPU(s): 28-31,60-63
Vulnerability Itlb multihit: Not affected
Vulnerability Lttf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre 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 Tax async abort: Not affected

From lscpu --cache:

```text
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d  48K  1.5M  12 Data 1  64  1  64
L1i  32K  1M  8 Instruction 1  64  1  64
L2   2M  64M 16 Unified 2 2048 1  64
L3   22.5M 90M 15 Unified 3 24576 1  64
```

8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 8 nodes (0-7)
node 0 cpus: 0-3,32-35
node 0 size: 128683 MB
node 0 free: 127683 MB
node 1 cpus: 4-7,36-39
node 1 size: 129021 MB
node 1 free: 128481 MB
node 2 cpus: 8-11,40-43
node 2 size: 129021 MB
node 2 free: 128557 MB
node 3 cpus: 12-15,44-47
node 3 size: 129021 MB
node 3 free: 128579 MB
node 4 cpus: 16-19,48-51
node 4 size: 128987 MB
node 4 free: 128565 MB
node 5 cpus: 20-23,52-55
node 5 size: 129021 MB
node 5 free: 128597 MB
node 6 cpus: 24-27,56-59
node 6 size: 129021 MB
node 6 free: 128597 MB
node 7 cpus: 28-31,60-63
node 7 size: 128992 MB
node 7 free: 128571 MB

node distances:
```text
node 0 1 2 3 4 5 6 7
0: 10 12 21 21 31 31 21 21
1: 12 10 21 21 31 31 21 21
2: 21 21 10 12 21 21 31 31
3: 21 21 12 10 21 21 31 31
4: 31 31 21 21 10 12 21 21
5: 31 31 21 21 12 10 21 21
6: 21 21 31 31 21 21 10 12
7: 21 21 31 31 21 21 12 10
```

(Continued on next page)
Platform Notes (Continued)

---
9. /proc/meminfo
   MemTotal: 1056534888 kB
---
10. who -r
   run-level 3 Aug 21 15:56
---
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@ havedegd irqbalance
            issue-generator kbsettings 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  autofs autostart-initscripts blk-availability boot-sysct1 ca-certificates chrony-wait
            chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
            firewalld gpm grub2-once havedegd-switch-root ipmi ipmielvd issue-add-ssh-keys kexec-load
            lumask man-db-create multipathd nfs nfs-bkmap rdac rchbind rpmconfigcheck rsyncd
            serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
            systemd-network-generator systemd-syssext systemd-time-wait-sync systemd-timesyncd
   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-ef5caee789da8
   splash=silent
   mitigations=auto
   quiet
   security=apparmor
---
14. cpupower frequency-info
   analyzing CPU 0:
   Unable to determine current policy
---
15. sysctl
   kernel.numa_balancing 1
   kernel.randomize_va_space 2
   vm.compaction_proactive
   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.extrfrag_threshold 500
   vm.min_unmapped_ratio 1
   vm.nr_hugepages 0
---
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### Platform Notes (Continued)

```
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+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/sda3 xfs 445G 12G 433G 3% /

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-CQKDIG 32 GB 2 rank 4800
    4x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
    3x Samsung M321R4GA3BB0-CQKVVG 32 GB 2 rank 4800
```

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Platform Notes (Continued)

| BIOS Date: | 05/12/2023 |
| BIOS Revision: | 1.10 |
| Firmware Revision: | 1.10 |

Compiler Version Notes

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<th>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201</td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++</th>
<th>520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Fortran</th>
<th>548.exchange2_r(base)</th>
</tr>
</thead>
<tbody>
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<td>Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>

Base Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifx

Base Portability Flags

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -DSPEC_LP64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64

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

Lenovo Global Technology
ThinkSystem SR860 V3
(3.70 GHz, Intel Xeon Gold 6434H)

SPECrade®2017_int_base = 397
SPECrade®2017_int_peak = Not Run

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

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

Base Portability Flags (Continued)

541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

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
-lqkmalloc

C++ benchmarks:
-w -std=c++14 -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
-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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-X.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-X.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 2023-08-21 04:45:04-0400.
Report generated on 2024-01-29 18:08:30 by CPU2017 PDF formatter v6716.
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