# Lenovo Global Technology

**ThinkSystem SR630 V3 (2.90 GHz, Intel Xeon Platinum 8444H)**

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s 64</td>
<td>9.53</td>
<td>Not Run</td>
</tr>
<tr>
<td>602.gcc_s 64</td>
<td>12.1</td>
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<tr>
<td>605.mcf_s 64</td>
<td>22.8</td>
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<tr>
<td>620.omnetpp_s 64</td>
<td>11.2</td>
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<tr>
<td>623.xalancbmk_s 64</td>
<td>29.2</td>
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<tr>
<td>625.x264_s 64</td>
<td>7.28</td>
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<tr>
<td>631.deepsjeng_s 64</td>
<td>5.97</td>
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<tr>
<td>641.leela_s 64</td>
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<tr>
<td>648.exchange2_s 64</td>
<td>26.5</td>
<td></td>
</tr>
<tr>
<td>657.xz_s 64</td>
<td>25.6</td>
<td></td>
</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon Platinum 8444H
- **Max MHz:** 4000
- **Nominal:** 2900
- **Enabled:** 32 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:** 45 MB I+D on chip per chip
- **Other:** None
- **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 Classic for Linux;
  C/C++: Version 2023.0 of Intel C/C++ Compiler Classic for Linux
- **Parallel:** Yes
- **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
# Lenovo Global Technology

## ThinkSystem SR630 V3

(2.90 GHz, Intel Xeon Platinum 8444H)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
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<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<tr>
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<tr>
<td>641.leela_s</td>
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<tr>
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</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 15.0**

**SPECspeed®2017_int_peak = Not Run**

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.

### 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:

- KMP_AFFINITY = "granularity=fine,scatter"
- 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

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR630 V3
(2.90 GHz, Intel Xeon Platinum 8444H)

SPEC CPU®2017 Integer Speed Result

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Lenovo Global Technology

SPECspeed®2017_int_base = 15.0

SPECspeed®2017_int_peak = Not Run

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

General Notes (Continued)

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.


Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-state set to Legacy

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Feb 15 20:01:35 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. numaclt --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/klhugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

Table of contents (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
   20:01:35 up 2 min,  1 user,  load average: 0.41, 0.51, 0.23

(Continued on next page)
Lenovo Global Technology  
ThinkSystem SR630 V3  
(2.90 GHz, Intel Xeon Platinum 8444H)

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

SPECspeed\textsuperscript{\textregistered}2017_int_base = 15.0  
SPECspeed\textsuperscript{\textregistered}2017_int_peak = Not Run

Platform Notes (Continued)

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) 2062626  
max locked memory (kbytes, -l) unlimited  
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) 2062626  
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 -c  
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=32 --tune base -o all --define  
intspeedaffinity --define smt-on --define drop_caches intspeed  
runcpu --nobuild --action validate --define default-platform-flags --configfile  
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=32 --tune base --output_format all --define  
intspeedaffinity --define smt-on --define drop_caches --nopower --runnode speed --tune base --size  
refspeed intspeed --nopreenv --note-preenv --logfile  
SPEC/tmp/CPU2017.068/templogs/preenv.intspeed.068.0.log --lognum 068.0 --from_runcpu 2  
specperl $SPEC/bin/sysinfo  
$SPEC = /home/cpu2017-1.1.9-ic2023.0

6. /proc/cpuinfo
  
model name : Intel(R) Xeon(R) Platinum 8444H  
vendor_id : GenuineIntel  
cpu family : 6  
model : 143  
stepping : 8  
microcode : 0x2b000161  
bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs  
cpu cores : 16  
siblings : 32  
2 physical ids (chips)  
64 processors (hardware threads)  
physical id 0: core ids 0-15  
physical id 1: core ids 0-15  
physical id 0: apicids 0-31  
physical id 1: apicids 128-159

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**SPEC CPU®2017 Integer Speed Result**

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**SPECspeed®2017_int_base = 15.0**

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**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Test Date:** Feb-2023

**Hardware Availability:** Feb-2023

**Tested by:** Lenovo Global Technology

**Software Availability:** Dec-2022

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### Platform Notes (Continued)

8. numactl --hardware

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

available: 2 nodes (0-1)
node 0 cpus: 0-15,32-47
node 0 size: 257703 MB
node 0 free: 256892 MB
node 1 cpus: 16-31,48-63
node 1 size: 257976 MB
node 1 free: 257269 MB
node distances:
    node 0: 10 21
    node 1: 21 10

---

9. /proc/meminfo

MemTotal: 528056652 kB

---

10. who -r

run-level 3 Feb 15 19:59

---

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 nsd postfix purge-kernels rollback rsyslog
          smartd sshd wicked wicked@ auto4 wicked@dhcpp wicked@dhcpp6 wicked@nanny

enabled-runtime systemctl-remount-fs
f100t00 autofs autodynam-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
          chrontd console-getty cups cups-browsed debug-shell ebtables exchange-lmc-os-info
          firewall gpm grub2-once haveged-ignore switch-root ipmi ipmi@evd issue-add-ssh-keys keyec-load
          lnumask man-db-create multipathd nfs nfs-blinkmap rdisc rpckeck rmpconfigcheck rsyncd
          serial-getty@ smartd_generate_opts snmpd snmpd@trapd systemd-boot-check-no-failures
          systemd-network-generator systemd-sysxext systemd-time-wait-sync systemd-timesyncd
indirect   wicked

---

13. Linux kernel boot-time arguments, from /proc/cmdline

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=efe3d3bb-d17b-48bc-af3c-7ee429916327
splash=silent
mitigations=auto
quiet
security=apparmor

---

14. cpupower frequency-info

anayzing CPU 0:
    Unable to determine current policy

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

```
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+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/klhugepaged`
   - 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`
    `/dev/sda2`
    xfs 894G 64G 830G 8% /

20. `/sys/devices/virtual/dmi/id`
    Vendor: Lenovo
    Product: ThinkSystem SR630 V3 MB, EGS, DDR5, NY, 1U
    Product Family: ThinkSystem
    Serial: 1234567890
```

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

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:
- 2x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
- 14x Samsung M321R4GA3BB0-CQKVGG 32 GB 2 rank 4800

22. BIOS

(This section combines info from /sys/devices and dmidecode.)

<table>
<thead>
<tr>
<th>BIOS Vendor</th>
<th>Lenovo</th>
</tr>
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<tbody>
<tr>
<td>BIOS Version</td>
<td>ESE109L-1.10</td>
</tr>
<tr>
<td>BIOS Date</td>
<td>01/07/2023</td>
</tr>
<tr>
<td>BIOS Revision</td>
<td>1.10</td>
</tr>
<tr>
<td>Firmware Revision</td>
<td>1.0</td>
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### Compiler Version Notes

<table>
<thead>
<tr>
<th>C benchmarks</th>
<th>600.perlbench_s(base) 602.qcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(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 Copyright (C) 1985-2022 Intel Corporation. All rights reserved.</td>
<td></td>
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<table>
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<tr>
<th>C++ benchmarks</th>
<th>620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)</th>
</tr>
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<tr>
<td>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.</td>
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<table>
<thead>
<tr>
<th>Fortran benchmarks</th>
<th>648.exchange2_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
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### Base Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifx
SPEC CPU®2017 Integer Speed Result

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SPECSpeed®2017_int_base = 15.0
SPECSpeed®2017_int_peak = Not Run

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

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
    -m64  -std=c11  -Wl,-z,muldefs  -xsapphirerapids  -O3  -ffast-math  -flto
    -mfpmath=sse  -funroll-loops  -qopt-mem-layout-trans=4  -fiopenmp
    -DSPEC_OPENMP  -L/usr/local/jemalloc64-5.0.1/lib  -ljemalloc

C++ benchmarks:
    -m64  -std=c++14  -Wl,-z,muldefs  -xsapphirerapids  -O3  -ffast-math
    -flto  -mfpmath=sse  -funroll-loops  -qopt-mem-layout-trans=4
    -L/usr/local/jemalloc64-5.0.1/lib  -ljemalloc

Fortran benchmarks:
    -m64  -Wl,-z,muldefs  -xsapphirerapids  -O3  -ffast-math  -flto
    -mfpmath=sse  -funroll-loops  -qopt-mem-layout-trans=4
    -nostandard-realloc-lhs  -align array32byte
    -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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-O.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-O.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

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