### Lenovo Global Technology

**ThinkSystem SD650 V3**  
(3.10 GHz, Intel Xeon Gold 6458Q)

**SPECSpeed®2017_int_base** = 15.4

**SPECSpeed®2017_int_peak** = Not Run

---

#### Hardware

<table>
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<tr>
<th>Component</th>
<th>Specification Details</th>
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<tbody>
<tr>
<td><strong>CPU Name</strong></td>
<td>Intel Xeon Gold 6458Q</td>
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<tr>
<td><strong>Max MHz</strong></td>
<td>4000</td>
</tr>
<tr>
<td><strong>Nominal</strong></td>
<td>3100</td>
</tr>
<tr>
<td><strong>Enabled</strong></td>
<td>64 cores, 2 chips</td>
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<tr>
<td><strong>Orderable</strong></td>
<td>1.2 chips</td>
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<tr>
<td><strong>Cache L1</strong></td>
<td>32 KB I + 48 KB D on chip per core</td>
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<tr>
<td><strong>Cache L2</strong></td>
<td>2 MB I+D on chip per core</td>
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<td><strong>Cache L3</strong></td>
<td>60 MB I+D on chip per chip</td>
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<tr>
<td><strong>Memory</strong></td>
<td>512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)</td>
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<tr>
<td><strong>Storage</strong></td>
<td>1 x 960 GB SATA SSD</td>
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<tr>
<td><strong>Other</strong></td>
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#### Software

<table>
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<tr>
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<tbody>
<tr>
<td><strong>OS</strong></td>
<td>SUSE Linux Enterprise Server 15 SP4 (x86_64)</td>
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<td><strong>Kernel</strong></td>
<td>5.14.21-150400.22-default</td>
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<td>C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;</td>
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<td><strong>Fortran</strong></td>
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<td><strong>Parallel</strong></td>
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<td><strong>Firmware</strong></td>
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<td><strong>File System</strong></td>
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<td><strong>System State</strong></td>
<td>Run level 3 (multi-user)</td>
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<tr>
<td><strong>Base Pointers</strong></td>
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<tr>
<td><strong>Peak Pointers</strong></td>
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<tr>
<td><strong>Power Management</strong></td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage</td>
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## Lenovo Global Technology

ThinkSystem SD650 V3
(3.10 GHz, Intel Xeon Gold 6458Q)

<table>
<thead>
<tr>
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<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
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<tr>
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<td>184</td>
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<td>602.gcc_s</td>
<td>64</td>
<td>313</td>
<td>12.7</td>
<td>310</td>
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<tr>
<td>605.mcf_s</td>
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<tr>
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<td>64</td>
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<tr>
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<td>22.8</td>
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<tr>
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**TOTALS**

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<thead>
<tr>
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<th>Base</th>
<th>Peak</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
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<tr>
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<td>657.xz_s</td>
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</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 15.4**

**SPECspeed®2017_int_peak = Not Run**

---

### 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/cpu2017-1.1.8-ic2022.1/lib/intel64:/home/cpu2017-1.1.8-ic2022.1/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)
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 Custom Mode
CPU P-state Control set to Cooperative with Legacy
Hyper-Threading set to Disabled

Sysinfo program /home/cpu2017-1.1.8-ic2022.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e6acafccd
running on localhost Wed Jan 18 14:56:56 2023

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Gold 6458Q
   64 "physical id"s (chips)
   64 "processors"
   cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
      cpu cores : 32
      siblings : 32
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
      25 26 27 28 29 30 31
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
      25 26 27 28 29 30 31

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 6458Q
   CPU family: 6
   Model: 143
   Thread(s) per core: 1
   Core(s) per socket: 32
   Socket(s): 2
   Stepping: 8
   CPU max MHz: 4000.0000
   CPU min MHz: 800.0000
   BogoMIPS: 6200.00
   Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V3
(3.10 GHz, Intel Xeon Gold 6458Q)

SPEC®CPU®2017 Integer Speed Result
Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

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

Test Date: Jan-2023
Hardware Availability: Feb-2023
Software Availability: Jun-2022

SPECspeed®2017_int_base = 15.4
SPECspeed®2017_int_peak = Not Run

Platform Notes (Continued)

pge mca cmov pat pse36 clflush dtst acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx
pdpclwb 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 xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt
tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault
ebcat13 cat12 cdp13 invpcid_single intel_pni cdp12 asid mba ibrs ibpb stibp
ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bm1
hle avx2 smep bmi2 emms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512v1 xsaveopt
xsave xsetbk1 xsavee cmqm llc cmqm_occupa llc cmqm_mbb_total cmqm_mbb_local
split_lock Detect avx_vnni avx512_bf16 wbinvd dtherm ida arat pni pts hwp
hwp_act_window hwp_epc hwp_pkreq avx512_vnni umip pku ospke waitpkg avx512_vmmi2
gfn1 vaes vpclmulqdq avx512_vnni avx512_bitalge tme avx512_vpopcntdq la57 rdpid
bus_lock Detect cideon movdiri movdir64b enqcmd fscr md_clear serialize tdxldtrk
pconfignl arch_lbr avx512_fp16 amx_tile flush_lid arch_capabilities
Virtualization: VT-x
L1d cache: 3MB (64 instances)
L1i cache: 2MB (64 instances)
L2 cache: 128MB (64 instances)
L3 cache: 120MB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-31
NUMA node1 CPU(s): 32-63
Vulnerability Itlb multihit: Not affected
Vulnerability L1tfr: 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 sanitation
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB
filling
Vulnerability Srbd: Not affected
Vulnerability Txs async abort: Not affected

From lsmp --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d 48K 3M 12 Data 1 64 1 64
L1i 32K 2M 8 Instruction 1 64 1 64
L2 2M 120M 16 Unified 2 2048 1 64
L3 60M 120M 15 Unified 3 65536 1 64

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
28 29 30 31
node 0 size: 257704 MB
node 0 free: 256736 MB
node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
57 58 59 60 61 62 63
node 1 size: 257704 MB
node 1 free: 257081 MB
node distances:
node 0: 1
0: 10 21

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V3
(3.10 GHz, Intel Xeon Gold 6458Q)

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

SPECSpeed®2017_int_base = 15.4
SPECSpeed®2017_int_peak = Not Run

Platform Notes (Continued)

1: 21 10
From /proc/meminfo
MemTotal: 528056956 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance
From /etc/*release*/etc/*version*
NAME="SLES"
VERSION="15-SP4"
VERSION_ID="15.4"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:o:suse:sles:15:sp4"
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
Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store
Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swaps
barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB:
conditional, RSB filling
CVE-2018-3638 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected
run-level 3 Jan 18 14:56
SPEC is set to: /home/cpu2017-1.1.8-ic2022.1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 890G 67G 824G 8% /
From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SD650 V3
Product Family: ThinkSystem
Serial: 9999999999

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:
4x Hynix HMCG88AEBRA115N 32 GB 2 rank 4800

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V3
(3.10 GHz, Intel Xeon Gold 6458Q)

**SPECSpeed®2017_int_base = 15.4**
**SPECSpeed®2017_int_peak = Not Run**

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<tr>
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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

12x Hynix HMC88AEBRA173N 32 GB 2 rank 4800

BIOS:
- BIOS Vendor: Lenovo
- BIOS Version: USE109M-1.12
- BIOS Date: 12/29/2022
- BIOS Revision: 1.12
- Firmware Revision: 0.90

(End of data from sysinfo program)

**Compiler Version Notes**

<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbenc_h_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316</td>
</tr>
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<td>Copyright (C) 1985-2022 Intel Corporation. All rights reserved.</td>
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<table>
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<th>620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)</th>
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<th>648.exchange2_s(base)</th>
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</tr>
<tr>
<td></td>
<td>Copyright (C) 1985-2022 Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

**Base Compiler Invocation**

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifx

**Base Portability Flags**

600.perlbenc_h_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64

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

**Lenovo Global Technology**

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| SPECspeed®2017_int_base = 15.4 |
| SPECspeed®2017_int_peak = Not Run |

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

**Base Portability Flags (Continued)**

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 -xCORE-AVX512 -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 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -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-N.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


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

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