SPEC CPU®2017 Integer Speed Result

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Lenovo Global Technology

$SPECspeed®2017\_int\_base = 12.1$

ThinkSystem SD630 V2
(3.10 GHz, Intel Xeon Gold 6346)

$SPECspeed®2017_int_peak = $ Not Run

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

Test Date: May-2021
Hardware Availability: Jul-2021
Software Availability: Feb-2021

Threads scale: 0 1.00 3.00 5.00 7.00 9.00 11.0 13.0 15.0 17.0 19.0 21.0 24.0

Benchmark	Threads	Result
600.perlbench_s	64	7.35
602.gcc_s	64	11.0
605.mcf_s	64	19.8
620.omnetpp_s	64	12.0
623.xalancbmk_s	64	14.0
625.x264_s	64	17.6
631.deepsjeng_s	64	5.99
641.leela_s	64	4.90
648.exchange2_s	64	20.8
657.xz_s	64	23.9

—— SPECspeed®2017_int_base (12.1)

Hardware

CPU Name: Intel Xeon Gold 6346
 Max MHz: 3600
 Nominal: 3100
Enabled: 32 cores, 2 chips, 2 threads/core
Orderable: 2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1.25 MB I+D on chip per core
 L3: 36 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux 8.3
 (Ootpa)
 Kernel 4.18.0-240.el8.x86_64
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
 Compiler Build 20201113 for Linux;
 Fortran: Version 2021.1 of Intel Fortran Compiler
 Classic Build 20201112 for Linux;
 C/C++: Version 2021.1 of Intel C/C++ Compiler
 Classic Build 20201112 for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version U8E109PT1 1.01
 released Apr-2021
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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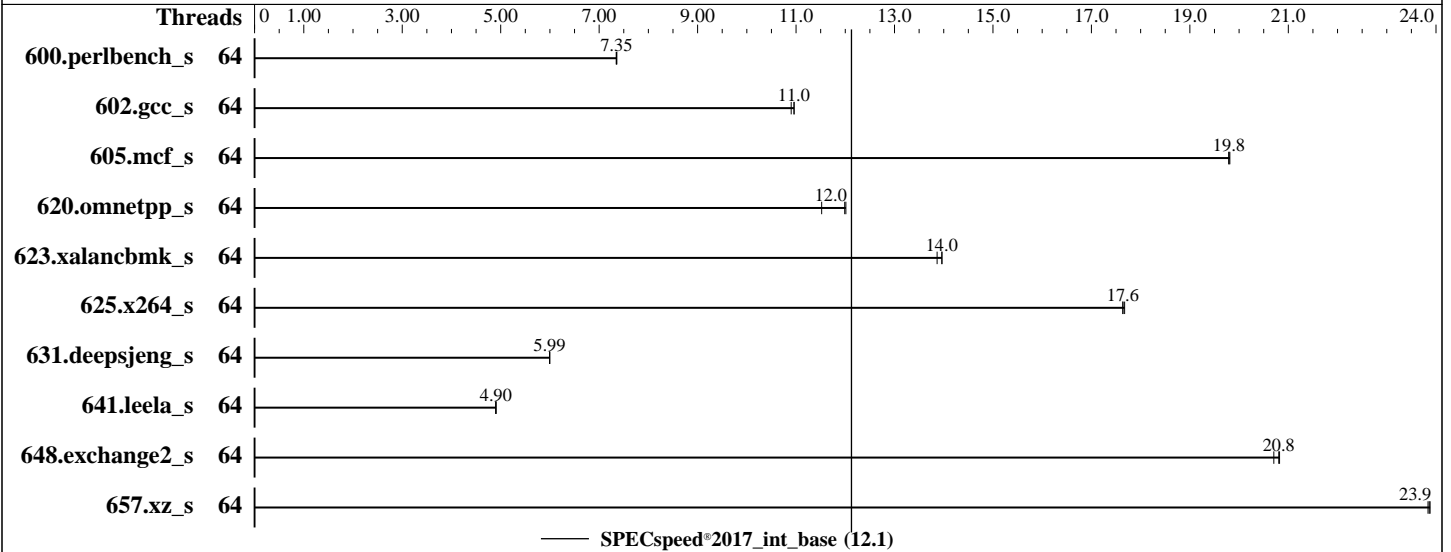SPECspeed®2017_int_peak = Not Run

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	64	241	7.36	242	7.35	**241**	**7.35**							
602.gcc_s	64	365	10.9	**363**	**11.0**	363	11.0							
605.mcf_s	64	239	19.8	**238**	**19.8**	238	19.8							
620.omnetpp_s	64	**136**	**12.0**	142	11.5	136	12.0							
623.xalancbmk_s	64	101	14.0	102	13.9	**101**	**14.0**							
625.x264_s	64	100	17.6	**100**	**17.6**	99.8	17.7							
631.deepsjeng_s	64	**239**	**5.99**	239	5.99	239	6.00							
641.leela_s	64	348	4.90	**348**	**4.90**	348	4.90							
648.exchange2_s	64	142	20.7	141	20.8	**141**	**20.8**							
657.xz_s	64	259	23.8	259	23.9	**259**	**23.9**							
SPECspeed®2017_int_base =	**12.1**													
SPECspeed®2017_int_peak =	**Not Run**													

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

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/cpu2017-1.1.5-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.5-ic202
     1.1-revB/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
 Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
 memory using Redhat Enterprise Linux 8.0
 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
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.
```

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Standard Performance Evaluation Corporation (info@spec.org)
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General Notes (Continued)

```
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Autonomous
CPU P-state Control set to Autonomous

 Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
 Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
 running on localhost.localdomain Mon May 10 05:14:30 2021

 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 6346 CPU @ 3.10GHz
       2  "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 : 16
       siblings  : 32
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

 From lscpu:
       Architecture:        x86_64
       CPU op-mode(s):      32-bit, 64-bit
       Byte Order:          Little Endian
       CPU(s):              64
       On-line CPU(s) list: 0-63
       Thread(s) per core:  2
       Core(s) per socket:  16
       Socket(s):           2
       NUMA node(s):        2
       Vendor ID:           GenuineIntel
       CPU family:          6
       Model:               106
       Model name:          Intel(R) Xeon(R) Gold 6346 CPU @ 3.10GHz
       Stepping:            6
       CPU MHz:             800.000
```

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Platform Notes (Continued)

```
        BogoMIPS:              6200.00
        Virtualization:        VT-x
        L1d cache:             48K
        L1i cache:             32K
        L2 cache:              1280K
        L3 cache:              36864K
        NUMA node0 CPU(s):     0-15,32-47
        NUMA node1 CPU(s):     16-31,48-63
        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 pbe syscall nx pdpe1gb rdtscp
    lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
    aperfmperf pni pclmulqdq dtes64 monitor ds_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 invpcid_single
    intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept
    vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a
    avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni
    avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
    cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat pln pts hwp_epp avx512vbmi
    umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
    avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

 /proc/cpuinfo cache data
    cache size : 36864 KB

 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 32 33 34 35 36 37 38 39 40 41 42 43
   44 45 46 47
   node 0 size: 246165 MB
   node 0 free: 256463 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56
   57 58 59 60 61 62 63
   node 1 size: 247650 MB
   node 1 free: 257252 MB
   node distances:
   node   0    1
     0:  10   20
     1:  20   10

 From /proc/meminfo
    MemTotal:        528007256 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /sbin/tuned-adm active
```

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Platform Notes (Continued)

```
     Current active profile: throughput-performance

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="8.3 (Ootpa)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="8.3"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

 uname -a:
    Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
    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):                      Not affected
 CVE-2018-3639 (Speculative Store Bypass):      Mitigation: Speculative Store
                                                Bypass disabled via prctl and
                                                seccomp
 CVE-2017-5753 (Spectre variant 1):             Mitigation: usercopy/swapgs
                                                barriers and __user pointer
                                                sanitization
 CVE-2017-5715 (Spectre variant 2):             Mitigation: Enhanced IBRS, IBPB:
                                                conditional, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):       Not affected

 run-level 3 May 10 05:11

 SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   372G   39G  333G  11% /home

 From /sys/devices/virtual/dmi/id
     Vendor:        Lenovo
     Product:       ThinkSystem SD630 V2
     Product Family: ThinkSystem
```

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Platform Notes (Continued)

```
       Serial:          1234567890

 Additional information from dmidecode 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 M393A4K40DB3-CWE 32 GB 2 rank 3200

 BIOS:
    BIOS Vendor:      Lenovo
    BIOS Version:     U8E109PT1-1.01
    BIOS Date:        04/28/2021
    BIOS Revision:    1.1
    Firmware Revision: 1.40

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C        | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)
         | 625.x264_s(base) 657.xz_s(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++      | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
         | 641.leela_s(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 648.exchange2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
  Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

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Base Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifort`

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:
```
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX2
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:
```
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-lqkmalloc
```

Fortran benchmarks:
```
-m64 -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
```

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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-ICElake-D.html
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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-ICElake-D.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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

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