



SPEC CPU®2017 Integer Speed Result

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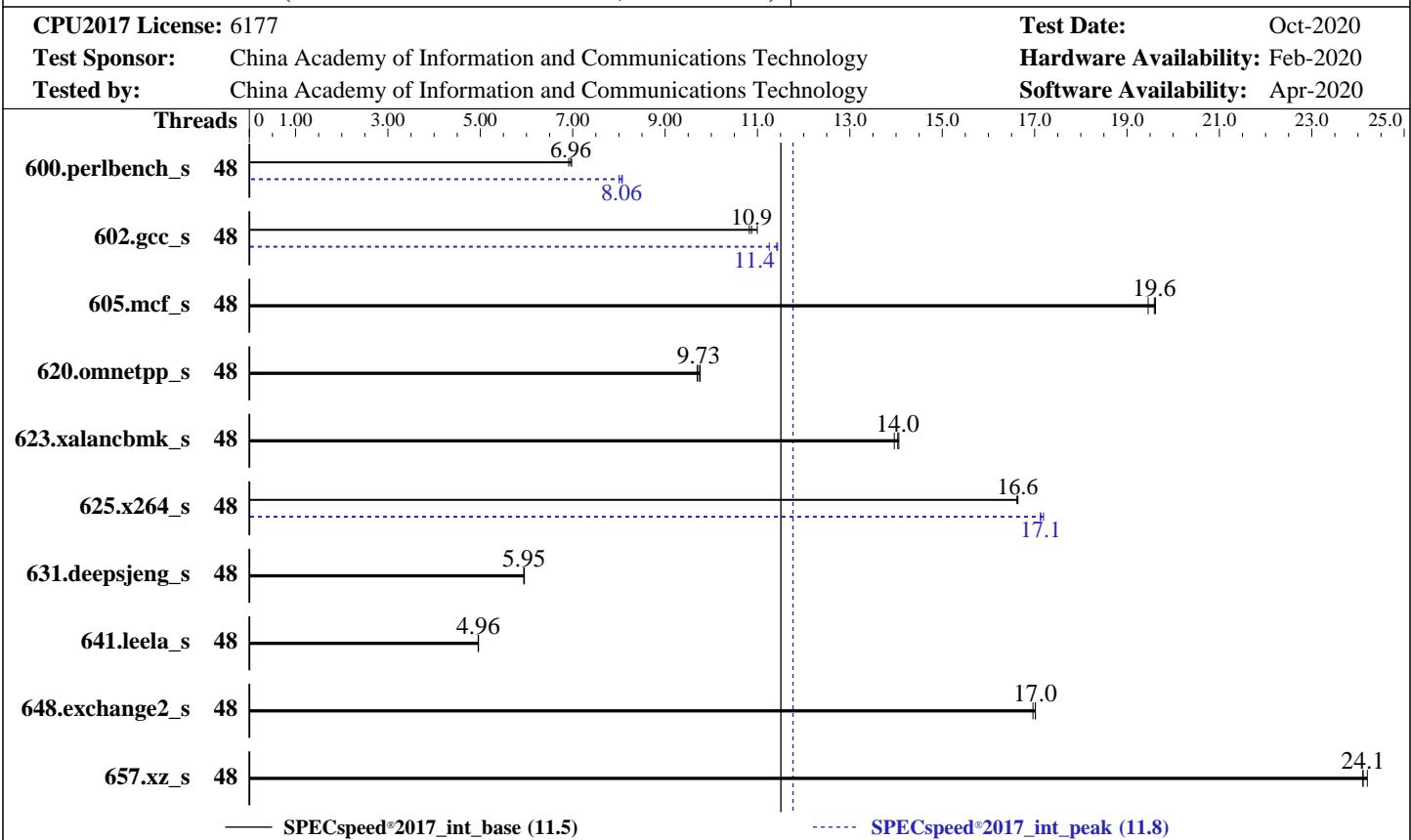
Huawei

(Test Sponsor: China Academy of Information and Communications Technology)

Huawei 1288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)

SPECSspeed®2017_int_base = 11.5

SPECSspeed®2017_int_peak = 11.8



Hardware		Software	
CPU Name:	Intel Xeon Gold 5220R	OS:	SUSE Linux Enterprise Server 12 SP4 (x86_64)
Max MHz:	4000	Compiler:	Kernel 4.12.14-94.41-default
Nominal:	2200	Parallel:	C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;
Enabled:	48 cores, 2 chips	Firmware:	Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux
Orderable:	1,2 chips	File System:	Yes
Cache L1:	32 KB I + 32 KB D on chip per core	System State:	Version 6.83 released Jun-2019
L2:	1 MB I+D on chip per core	Base Pointers:	xfs
L3:	35.75 MB I+D on chip per chip	Peak Pointers:	Run level 3 (multi-user)
Other:	None	Other:	64-bit
Memory:	768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)	Power Management:	64-bit
Storage:	1 x 900 GB SAS SSD		jemalloc memory allocator V5.0.1
Other:	None		BIOS set to prefer performance at the cost of additional power usage.



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CPU2017 License: 6177

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Tested by: China Academy of Information and Communications Technology

Test Date: Oct-2020

Hardware Availability: Feb-2020

Software Availability: Apr-2020

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	48	254	6.98	257	6.91	255	6.96	48	222	8.00	220	8.06	220	8.08
602.gcc_s	48	366	10.9	368	10.8	362	11.0	48	349	11.4	348	11.4	354	11.3
605.mcf_s	48	241	19.6	241	19.6	243	19.5	48	241	19.6	241	19.6	243	19.5
620.omnetpp_s	48	168	9.73	168	9.69	167	9.76	48	168	9.73	168	9.69	167	9.76
623.xalancbmk_s	48	101	14.0	101	14.1	101	14.0	48	101	14.0	101	14.1	101	14.0
625.x264_s	48	106	16.6	106	16.6	106	16.6	48	103	17.2	103	17.1	103	17.1
631.deepsjeng_s	48	241	5.95	241	5.94	241	5.95	48	241	5.95	241	5.94	241	5.95
641.leela_s	48	344	4.95	344	4.96	344	4.96	48	344	4.95	344	4.96	344	4.96
648.exchange2_s	48	173	17.0	173	17.0	173	17.0	48	173	17.0	173	17.0	173	17.0
657.xz_s	48	255	24.2	256	24.1	256	24.1	48	255	24.2	256	24.1	256	24.1
SPECspeed®2017_int_base = 11.5														
SPECspeed®2017_int_peak = 11.8														

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

Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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,compact,1,0"
LD_LIBRARY_PATH =
    "/opt/intel/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64
    4:/usr/local/jemalloc-5.0.1"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

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)

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General Notes (Continued)

is mitigated in the system as tested and documented.

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
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:

Power Policy Set to Load Balance

Hyper-Threading Set to Disabled

XPT Prefetch Set to Enabled

Sysinfo program /spec2017/bin/sysinfo

```
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on linux-j3dr Mon Oct 26 14:36:39 2020
```

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 5220R CPU @ 2.20GHz
  2 "physical id"s (chips)
  48 "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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
```

From lscpu:

```
Architecture:           x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
CPU(s):                48
On-line CPU(s) list:   0-47
Thread(s) per core:    1
Core(s) per socket:    24
Socket(s):              2
NUMA node(s):          2
Vendor ID:              GenuineIntel
```

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Platform Notes (Continued)

CPU family:	6
Model :	85
Model name:	Intel(R) Xeon(R) Gold 5220R CPU @ 2.20GHz
Stepping:	7
CPU MHz:	2200.000
CPU max MHz:	4000.0000
CPU min MHz:	1000.0000
BogoMIPS:	4400.00
Virtualization:	VT-x
L1d cache:	32K
L1i cache:	32K
L2 cache:	1024K
L3 cache:	36608K
NUMA node0 CPU(s):	0-23
NUMA node1 CPU(s):	24-47
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 aperf fm perf 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 rdrandlahf_lm abm 3dnowprefetch cpuid_fault epb cat_13 cdp_13 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

```
/proc/cpuinfo cache data
cache size : 36608 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 16 17 18 19 20 21 22 23
node 0 size: 385580 MB
node 0 free: 380965 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387036 MB
node 1 free: 385548 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10
```

```
From /proc/meminfo
MemTotal:      791159924 kB
HugePages_Total:      0
```

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Platform Notes (Continued)

Hugepagesize: 2048 kB

```
From /etc/*release* /etc/*version*
SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 4
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
os-release:
    NAME="SLES"
    VERSION="12-SP4"
    VERSION_ID="12.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
Linux linux-j3dr 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):	Not affected
Microarchitectural Data Sampling:	No status reported
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Oct 26 11:05

```
SPEC is set to: /spec2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3        xfs   734G  48G  686G   7%  /
```

```
From /sys/devices/virtual/dmi/id
BIOS:      INSYDE Corp. 6.83 06/29/2019
Vendor:    Huawei
Product:   1288H V5
Product Family: Purley
Serial:   210200351910KC000123
```

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)



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Platform Notes (Continued)

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:

24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

=====

C | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
| 625.x264_s(base, peak) 657.xz_s(base, peak)

=====

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====

C | 600.perlbench_s(peak)

=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====

C | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
| 625.x264_s(base, peak) 657.xz_s(base, peak)

=====

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====

C | 600.perlbench_s(peak)

=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====

C++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)

=====

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Compiler Version Notes (Continued)

| 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====
Fortran | 648.exchange2_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

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



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Base Optimization Flags

C benchmarks:

```
-m64 -qnextgen -std=c11  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs  
-xCORE-AVX512 -O3 -ffast-math -fno-math-errno -mfpmath=sse -funroll-loops  
-fuse-lld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP  
-L/usr/local/jemalloc64-5.0.1/ -ljemalloc
```

C++ benchmarks:

```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -fno-math-errno -mfpmath=sse  
-funroll-loops -fuse-lld=gold -qopt-mem-layout-trans=4  
-L/opt/intel/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin  
-lqkmalloc
```

Fortran benchmarks:

```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512  
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs -align array32byte  
-mbranches-within-32B-boundaries
```

Peak Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Peak Portability Flags

```
600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64(*) -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
```

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Peak Portability Flags (Continued)

648.exchange2_s: -DSPEC_LP64

657.xz_s: -DSPEC_LP64

(*) Indicates a portability flag that was found in a non-portability variable.

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/ -ljemalloc
```

```
602.gcc_s: -m64 -qnextgen -std=c11 -fuse-lld=gold
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/ -ljemalloc
```

605.mcf_s: basepeak = yes

```
625.x264_s: -m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-lld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/jemalloc64-5.0.1/ -ljemalloc
```

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

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Peak Optimization Flags (Continued)

648.exchange2_s: basepeak = yes

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/Intel-ic19.lul-official-linux64_revB.html
<http://www.spec.org/cpu2017/flags/CAICT-Platform-Settings-V1.3.html>

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic19.lul-official-linux64_revB.xml
<http://www.spec.org/cpu2017/flags/CAICT-Platform-Settings-V1.3.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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