# SPEC CPU®2017 Integer Speed Result

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

$SPECspeed®2017\_int\_base =$ 11.7

## Huawei CH121 V5 (Intel Xeon Gold 6246R)

$SPECspeed®2017\_int\_peak =$ Not Run

**CPU2017 License:** 6177  
**Test Sponsor:** China Academy of Information and Communications Technology  
**Tested by:** China Academy of Information and Communications Technology  

**Test Date:** Jan-2021  
**Hardware Availability:** Jul-2020  
**Software Availability:** Apr-2020

| Benchmark | Threads | Result |
|---|---|---|
| 600.perlbench_s | 32 | 7.12 |
| 602.gcc_s | 32 | 10.9 |
| 605.mcf_s | 32 | 19.8 |
| 620.omnetpp_s | 32 | 9.92 |
| 623.xalancbmk_s | 32 | 14.4 |
| 625.x264_s | 32 | 16.8 |
| 631.deepsjeng_s | 32 | 6.10 |
| 641.leela_s | 32 | 5.08 |
| 648.exchange2_s | 32 | 17.4 |
| 657.xz_s | 32 | 24.5 |

SPECspeed®2017_int_base (11.7)

## Hardware

CPU Name: Intel Xeon Gold 6246R  
 Max MHz: 4100  
 Nominal: 3400  
Enabled: 32 cores, 2 chips  
Orderable: 1,2 chips  
Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 35.75 MB I+D on chip per chip  
 Other: None  
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
Storage: 1 x 960 GB SSD  
Other: None

## Software

OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)  
 Kernel 4.12.14-94.41-default  
Compiler: C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux  
Parallel: Yes  
Firmware: Version 6.83 released Jun-2019  
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 set to prefer performance at the cost of additional power usage.

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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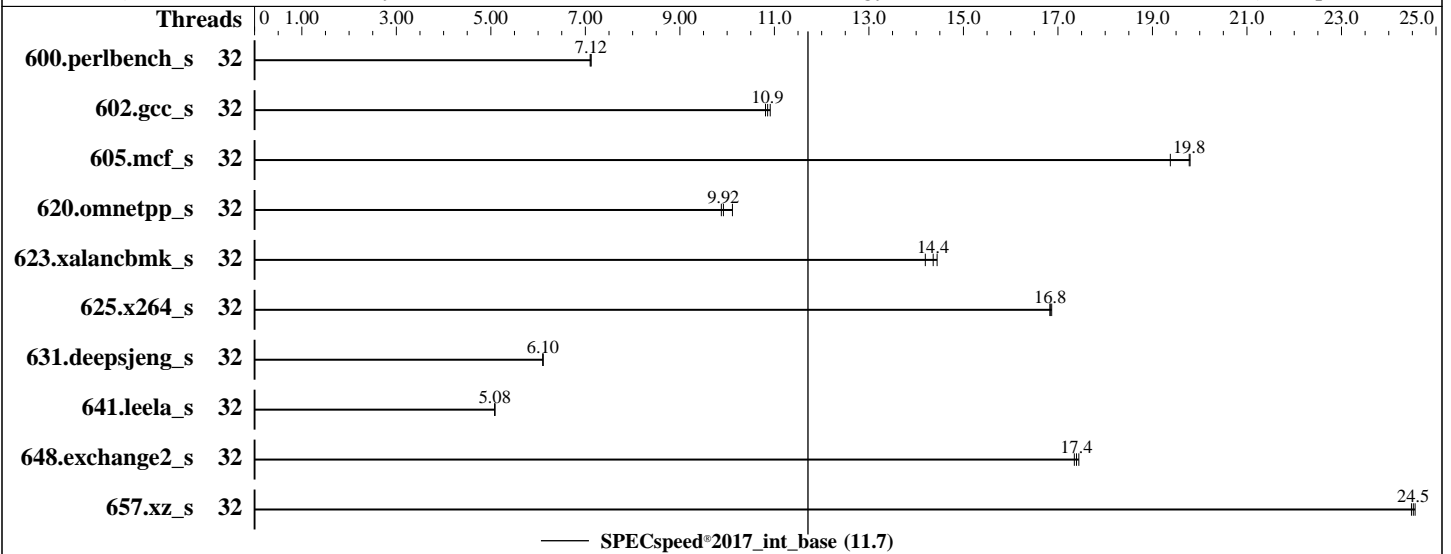SPECspeed®2017_int_peak = Not Run

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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 | 32 | 250 | 7.10 | 249 | 7.12 | **249** | **7.12** | | | | | | | |
| 602.gcc_s | 32 | 365 | 10.9 | 368 | 10.8 | **367** | **10.9** | | | | | | | |
| 605.mcf_s | 32 | 238 | 19.8 | **239** | **19.8** | 244 | 19.4 | | | | | | | |
| 620.omnetpp_s | 32 | 165 | 9.88 | 161 | 10.1 | **164** | **9.92** | | | | | | | |
| 623.xalancbmk_s | 32 | **98.7** | **14.4** | 98.1 | 14.4 | 99.8 | 14.2 | | | | | | | |
| 625.x264_s | 32 | 105 | 16.8 | 105 | 16.9 | **105** | **16.8** | | | | | | | |
| 631.deepsjeng_s | 32 | 235 | 6.10 | **235** | **6.10** | 235 | 6.10 | | | | | | | |
| 641.leela_s | 32 | 336 | 5.08 | 336 | 5.08 | **336** | **5.08** | | | | | | | |
| 648.exchange2_s | 32 | 169 | 17.4 | **169** | **17.4** | 169 | 17.3 | | | | | | | |
| 657.xz_s | 32 | 252 | 24.6 | **252** | **24.5** | 253 | 24.5 | | | | | | | |

|  |  |
|---|---|
| **SPECspeed®2017_int_base =** | **11.7** |
| **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

```
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/intel6
     4:/usr/local/jemalloc64-5.0.1"
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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| | | | |
|---|---|---|---|
| **CPU2017 License:** 6177 | | **Test Date:** | Jan-2021 |
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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 Jan 18 16:52:46 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 6246R CPU @ 3.40GHz
      2  "physical id"s (chips)
      32 "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  : 16
      physical 0: cores 0 2 3 5 6 9 10 12 13 16 18 20 21 24 27 29
      physical 1: cores 0 2 3 5 6 9 10 12 13 16 18 20 21 24 27 29

From lscpu:
   Architecture:          x86_64
   CPU op-mode(s):        32-bit, 64-bit
   Byte Order:            Little Endian
   CPU(s):                32
   On-line CPU(s) list:   0-31
   Thread(s) per core:    1
   Core(s) per socket:    16
   Socket(s):             2
   NUMA node(s):          2
   Vendor ID:             GenuineIntel
```

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**Test Date:** Jan-2021

**Hardware Availability:** Jul-2020

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## Platform Notes (Continued)

```
        CPU family:           6
        Model:                85
        Model name:           Intel(R) Xeon(R) Gold 6246R CPU @ 3.40GHz
        Stepping:             7
        CPU MHz:              3400.000
        CPU max MHz:          4100.0000
        CPU min MHz:          1200.0000
        BogoMIPS:             6800.00
        Virtualization:       VT-x
        L1d cache:            32K
        L1i cache:            32K
        L2 cache:             1024K
        L3 cache:             36608K
        NUMA node0 CPU(s):    0-15
        NUMA node1 CPU(s):    16-31
        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 cdp_l3
    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
   node 0 size: 385580 MB
   node 0 free: 385125 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
   node 1 size: 387036 MB
   node 1 free: 386478 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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| | | | |
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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 Jan 18 16:11

 SPEC is set to: /spec2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda3       xfs   734G   48G  687G   7% /

 From /sys/devices/virtual/dmi/id
     BIOS:    INSYDE Corp. 6.83 06/29/2019
     Vendor:  Huawei
     Product: CH121 V5
     Product Family: Purley
     Serial:  Serial Number

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

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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

  (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) 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++      | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
         | 641.leela_s(base)
------------------------------------------------------------------------------
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)
------------------------------------------------------------------------------
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

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# Base Compiler Invocation (Continued)

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:
```
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=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 -flto -mfpmath=sse
-funroll-loops -fuse-ld=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
```

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

http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-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-ic19.1u1-official-linux64_revB.xml
http://www.spec.org/cpu2017/flags/CAICT-Platform-Settings-V1.3.xml

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

Tested with SPEC CPU®2017 v1.1.0 on 2021-01-18 03:52:46-0500.
Report generated on 2021-03-16 15:23:47 by CPU2017 PDF formatter v6255.
Originally published on 2021-03-16.