SPEC CPU®2017 Integer Speed Result

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

Huawei CH121 V5 (Intel Xeon Gold 6246R)

<table>
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<tr>
<th>SPECspeed®2017_int_base = 11.7</th>
<th>SPECspeed®2017_int_peak = Not Run</th>
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</table>

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

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<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base (11.7)</th>
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<tbody>
<tr>
<td>600.perlbench_s 32</td>
<td>602.gcc_s 32</td>
</tr>
<tr>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>2.12</td>
<td>10.9</td>
</tr>
</tbody>
</table>

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
Cache L2: 1 MB I+D on chip per core
Cache 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
Power Management: BIOS set to prefer performance at the cost of additional power usage.

Test Date: Jan-2021
Hardware Availability: Jul-2020
Software Availability: Apr-2020
### SPEC CPU®2017 Integer Speed Result

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>600:perlbench_s</td>
<td>32</td>
<td>250</td>
<td>7.10</td>
<td>249</td>
<td>7.12</td>
<td>249</td>
<td>7.12</td>
</tr>
<tr>
<td>602:gcc_s</td>
<td>32</td>
<td>365</td>
<td>10.9</td>
<td>368</td>
<td>10.8</td>
<td>367</td>
<td>10.9</td>
</tr>
<tr>
<td>605:mcf_s</td>
<td>32</td>
<td>238</td>
<td>19.8</td>
<td>239</td>
<td>19.8</td>
<td>244</td>
<td>19.4</td>
</tr>
<tr>
<td>620:omnetpp_s</td>
<td>32</td>
<td>165</td>
<td>9.88</td>
<td>161</td>
<td>10.1</td>
<td>164</td>
<td>9.92</td>
</tr>
<tr>
<td>623:xalancbmk_s</td>
<td>32</td>
<td><strong>98.7</strong></td>
<td><strong>14.4</strong></td>
<td>98.1</td>
<td>14.4</td>
<td>99.8</td>
<td>14.2</td>
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<tr>
<td>625:x264_s</td>
<td>32</td>
<td>105</td>
<td>16.8</td>
<td>105</td>
<td>16.9</td>
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<td>16.8</td>
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<tr>
<td>631:deepsjeng_s</td>
<td>32</td>
<td>235</td>
<td>6.10</td>
<td>235</td>
<td>6.10</td>
<td>235</td>
<td>6.10</td>
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<tr>
<td>641:leela_s</td>
<td>32</td>
<td>336</td>
<td>5.08</td>
<td>336</td>
<td>5.08</td>
<td>336</td>
<td>5.08</td>
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<tr>
<td>648:exchange2_s</td>
<td>32</td>
<td>169</td>
<td>17.4</td>
<td>169</td>
<td>17.4</td>
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<td>17.3</td>
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<tr>
<td>657:xz_s</td>
<td>32</td>
<td>252</td>
<td>24.6</td>
<td>252</td>
<td>24.5</td>
<td>253</td>
<td>24.5</td>
</tr>
</tbody>
</table>

**Results Table**

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:/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) is mitigated in the system as tested and documented.

(Continued on next page)
Huawei CH121 V5 (Intel Xeon Gold 6246R)  

<table>
<thead>
<tr>
<th>SPECspeed©2017_int_base</th>
<th>SPECspeed©2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.7</td>
<td>Not Run</td>
</tr>
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CPU2017 License: 6177  
Test Sponsor: China Academy of Information and Communications Technology  
Hardware Availability: Jul-2020  
Test Date: Jan-2021  
Tested by: China Academy of Information and Communications Technology  
Software Availability: Apr-2020

**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  

**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 295195f888a3d7ed1e6e46a485a0011  
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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Huawei
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Huawei CH121 V5 (Intel Xeon Gold 6246R)

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SPECspeed®2017_int_base = 11.7
SPECspeed®2017_int_peak = Not Run

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: 4100.000
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrcm pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abml rm abml 3dnowprefetch cpuid_fault epb cat1 cd0 cdp
invpcid_single ssbd mba ibrs ibpbi stibp trp_shado 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
xsaves opt xgetbv1 xsave vmmi_ocupp llc cqm_mbm_total cqm_mbm_local
dtherm ida arat pnu pku ovpke avx512_vnni flush l1d arch_capabilities

/platforminfo 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

(Continued on next page)
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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:
  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

(Continued on next page)
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Tested by: China Academy of Information and Communications Technology

Test Date: January 2021  
Hardware Availability: July 2020  
Software Availability: April 2020

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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)

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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.

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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 -m64 -qnextgen -std=c11
-Wl, -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 -m64 -qnextgen -Wl, -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/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

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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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