## Huawei

### Huawei 5288 V5 (Intel Xeon Gold 5118)

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>Huawei</th>
</tr>
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<tbody>
<tr>
<td>Tested by:</td>
<td>Huawei</td>
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<tr>
<td>Hardware Availability:</td>
<td>Jan-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Jan-2018</td>
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</tbody>
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### SPEC CPU2017 Integer Speed Result

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jul-2018</th>
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<tbody>
<tr>
<td>Hardware:</td>
<td>Huawei 5288 V5 (Intel Xeon Gold 5118)</td>
</tr>
<tr>
<td>Software:</td>
<td>Red Hat Enterprise Linux Server release 7.4 (Maipo)</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 0.81 Released Jul-2018</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc: jemalloc memory allocator library V5.0.1;</td>
</tr>
</tbody>
</table>

### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>24</td>
<td>6.30</td>
<td>7.30</td>
</tr>
<tr>
<td>gcc</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mcf</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>omnetpp</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xalancbmk</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x264</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>deepsjeng</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>leela</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exchange2</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz</td>
<td>24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CPU

- **CPU Name:** Intel Xeon Gold 5118
- **Max MHz.:** 3200
- **Nominal:** 2300
- **Enabled:** 24 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:** 16.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 1200 GB SAS, 10000 RPM
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 0.81 Released Jul-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1;
## Results Table

<table>
<thead>
<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>24</td>
<td>335</td>
<td>5.30</td>
<td>332</td>
<td>5.34</td>
<td>339</td>
<td>5.23</td>
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<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>501</td>
<td>7.95</td>
<td>499</td>
<td>7.99</td>
<td>500</td>
<td>7.96</td>
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<tr>
<td>605.mcf_s</td>
<td>24</td>
<td>503</td>
<td>9.38</td>
<td>485</td>
<td>9.72</td>
<td>479</td>
<td>9.85</td>
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<tr>
<td>620.omnetpp_s</td>
<td>24</td>
<td>347</td>
<td>4.70</td>
<td>344</td>
<td>4.74</td>
<td>346</td>
<td>4.71</td>
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<td>623.xalanchmk_s</td>
<td>24</td>
<td>172</td>
<td>8.22</td>
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<td>8.27</td>
<td>171</td>
<td>8.28</td>
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<tr>
<td>625.x264_s</td>
<td>24</td>
<td>179</td>
<td>9.86</td>
<td>178</td>
<td>9.89</td>
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<td>9.89</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>24</td>
<td>317</td>
<td>4.52</td>
<td>315</td>
<td>4.54</td>
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<td>4.55</td>
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<tr>
<td>641.leela_s</td>
<td>24</td>
<td>458</td>
<td>3.72</td>
<td>457</td>
<td>3.73</td>
<td>458</td>
<td>3.73</td>
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<tr>
<td>648.exchange2_s</td>
<td>24</td>
<td>253</td>
<td>11.6</td>
<td>253</td>
<td>11.6</td>
<td>253</td>
<td>11.6</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24</td>
<td>335</td>
<td>18.5</td>
<td>332</td>
<td>18.6</td>
<td>332</td>
<td>18.6</td>
</tr>
</tbody>
</table>

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"

### General Notes

Environment variables set by runcpu before the start of the run:
- KMP_AFFINITY = "granularity=fine,scatter"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
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: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
- jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;

Yes: 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.
Huawei

Huawei 5288 V5 (Intel Xeon Gold 5118)

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>3175</th>
<th>Test Date</th>
<th>Jul-2018</th>
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</table>

**SPECspeed2017_int_base** = 7.52

**SPECspeed2017_int_peak** = 7.77

---

**Platform Notes**

BIOS configuration:
- Power Policy Set to Load Balance
- Hyper-Threading Set to Disable
- XPT Prefetch Set to Enabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc091c0f
running on localhost.localdomain Mon Jul 30 18:53:52 2018

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 5118 CPU @ 2.30GHz
  2 "physical id"s (chips)
  24 "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:        12
siblings:         12
physical 0:       cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1:       cores 0 1 2 3 4 5 8 9 10 11 12 13
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                24
On-line CPU(s) list:   0-23
Thread(s) per core:    1
Core(s) per socket:    12
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 5118 CPU @ 2.30GHz
Stepping:              4
CPU MHz:               2301.000
CPU max MHz:           2301.0000
CPU min MHz:           1000.0000
BogoMIPS:              4600.00
Virtualization:       VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              16896K
```

(Continued on next page)
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SPECspeed2017_int_base = 7.52
SPECspeed2017_int_peak = 7.77

Platform Notes (Continued)

NUMA node0 CPU(s):     0-11
NUMA node1 CPU(s):     12-23
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 pdumpgb rdtscp
                        lm constant_tsc art arch_perfmon pebs bts rep_good nopl nonstop_tsc
                        aperfmperf eagerfpu pni pclmulqdq dtes64 mce cx16 xtpr
                        pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx
                        f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt
                        spec_ctrl ibbp_support tpr_shadow vnmi flexpriority ept vpid fsqsgbase tsc_adjust
                        bmi1 hle avx2 smep bmi2 ets invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx
                        smap cflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc
                        cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts

/cache info cache data
    cache size: 16896 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
    node 0 size: 391349 MB
    node 0 free: 382285 MB
    node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
    node 1 size: 393216 MB
    node 1 free: 384206 MB
    node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
    MemTotal: 790512260 KB
    HugePages_Total: 0
    Hugepagesize: 2048 KB

From /etc/*release*/ /etc/*version*/
    os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.4 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VARIANT="Server"
    VARIANT_ID="server"
    VERSION_ID="7.4"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
    redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
    system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
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Platform Notes (Continued)

system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
    Linux localhost.localdomain 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST 2017 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 30 18:47

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 781G 95G 687G 13% /

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.

BIOS INSYDE Corp. 0.81 07/02/2018
Memory:
    24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)
==============================================================================
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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Compiler Version Notes (Continued)

CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak)
641.leela_s(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 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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CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

**Base Optimization Flags**

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

**Base Other Flags**

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

**Peak Compiler Invocation**

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

**Peak Portability Flags**

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64

(Continued on next page)
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Peak Portability Flags (Continued)

-DSPEC_LP64
-DSPEC_LINUX

Peak Optimization Flags

C benchmarks:

-DSPEC_SUPPRESS_OPENMP
-qopenmp
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

-DSPEC_OPENMP

(Continued on next page)
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Peak Optimization Flags (Continued)

623.xalancbmk_s (continued):
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: basepeak = yes

Fortran benchmarks:
-W1, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks (except as noted below):
-m64

623.xalancbmk_s: -m32

Fortran benchmarks:
-m64

The flags files that were used to format this result can be browsed at:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.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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