## SPEC® CPU2017 Integer Rate Result

**Huawei**

**Huawei CH121 V5 (Intel Xeon Silver 4109T)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>71.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>75.8</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  
**Test Date:** Sep-2018  
**Hardware Availability:** Jul-2017  
**Software Availability:** Jan-2018

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Silver 4109T</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>3000</td>
</tr>
<tr>
<td>Nominal</td>
<td>2000</td>
</tr>
<tr>
<td>Enabled</td>
<td>16 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Cache L3</td>
<td>11 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 1200 GB SAS, 10000 RPM</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</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++</td>
</tr>
<tr>
<td>Compiler for Linux</td>
<td>Fortran: Version 18.0.0.128 of Intel Fortran</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</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>

---

**SPECrate2017_int_base = 71.3**  
**SPECrate2017_int_peak = 75.8**
Huawei
Huawei CH121 V5 (Intel Xeon Silver 4109T)

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>32</td>
<td>953</td>
<td>53.5</td>
<td>958</td>
<td>53.2</td>
<td>950</td>
<td>53.6</td>
<td>32</td>
<td>766</td>
<td>66.5</td>
<td>768</td>
<td>66.3</td>
<td>771</td>
<td>66.0</td>
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<tr>
<td>502.gcc_r</td>
<td>32</td>
<td>700</td>
<td>64.7</td>
<td>700</td>
<td>64.7</td>
<td>701</td>
<td>64.6</td>
<td>32</td>
<td>609</td>
<td>74.4</td>
<td>608</td>
<td>74.5</td>
<td>609</td>
<td>74.4</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>32</td>
<td>583</td>
<td>87.7</td>
<td>574</td>
<td>90.1</td>
<td>582</td>
<td>88.9</td>
<td>32</td>
<td>575</td>
<td>89.9</td>
<td>571</td>
<td>90.5</td>
<td>585</td>
<td>88.5</td>
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<tr>
<td>520.omnetpp_r</td>
<td>32</td>
<td>858</td>
<td>49.0</td>
<td>857</td>
<td>49.0</td>
<td>869</td>
<td>48.3</td>
<td>32</td>
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<td>849</td>
<td>49.5</td>
<td>856</td>
<td>49.0</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>32</td>
<td>451</td>
<td>74.9</td>
<td>452</td>
<td>74.7</td>
<td>453</td>
<td>74.6</td>
<td>32</td>
<td>378</td>
<td>89.4</td>
<td>379</td>
<td>89.2</td>
<td>378</td>
<td>89.3</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>32</td>
<td>429</td>
<td>130</td>
<td>425</td>
<td>132</td>
<td>427</td>
<td>131</td>
<td>32</td>
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<td>136</td>
<td>411</td>
<td>136</td>
<td>410</td>
<td>137</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>32</td>
<td>601</td>
<td>61.0</td>
<td>601</td>
<td>61.0</td>
<td>601</td>
<td>61.1</td>
<td>32</td>
<td>601</td>
<td>61.0</td>
<td>601</td>
<td>61.0</td>
<td>601</td>
<td>61.1</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>32</td>
<td>973</td>
<td>54.5</td>
<td>972</td>
<td>54.5</td>
<td>973</td>
<td>54.5</td>
<td>32</td>
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<td>55.5</td>
<td>945</td>
<td>56.1</td>
<td>953</td>
<td>55.6</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>32</td>
<td>652</td>
<td>129</td>
<td>652</td>
<td>129</td>
<td>652</td>
<td>129</td>
<td>32</td>
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<td>129</td>
<td>652</td>
<td>129</td>
<td>652</td>
<td>129</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
<td>642</td>
<td>53.8</td>
<td>644</td>
<td>53.7</td>
<td>642</td>
<td>53.8</td>
<td>32</td>
<td>642</td>
<td>53.8</td>
<td>644</td>
<td>53.7</td>
<td>642</td>
<td>53.8</td>
</tr>
</tbody>
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SPECraterate2017_int_base = 71.3
SPECraterate2017_int_peak = 75.8

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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:

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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;
jemalloc: sources available from jemalloc.net or

(Continued on next page)
Huawei CH121 V5 (Intel Xeon Silver 4109T)  

**SPEC CPU2017 Integer Rate Result**  

<table>
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<tr>
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<th>Value</th>
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**Test Sponsor:** Huawei  
**Test Date:** Sep-2018  
**Hardware Availability:** Jul-2017  
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**Software Availability:** Jan-2018

**General Notes (Continued)**

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.

**Platform Notes**

BIOS configuration:
Power Policy Set to Performance  
XPT Prefetch Set to Enabled  
Sysinfo program /spec2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on localhost.localdomain Mon Sep 3 15:29:28 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) Silver 4109T CPU @ 2.00GHz  
- 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 : 8  
- siblings : 16  
- physical 0: cores 0 1 2 3 4 5 6 7  
- physical 1: cores 0 1 2 3 4 5 6 7

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: 2  
- Core(s) per socket: 8  
- Socket(s): 2  
- NUMA node(s): 2  
- Vendor ID: GenuineIntel  
- CPU family: 6  
- Model: 85  
- Model name: Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz  
- Stepping: 4
Platform Notes (Continued)

CPU MHz:               2000.000
BogoMIPS:              4000.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              11264K
NUMA node0 CPU(s):     0-7,16-23
NUMA node1 CPU(s):     8-15,24-31
Flags:                 fpu vme de pse mce cx8 apic sep mtrr pge mca cmov
                       pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpes gb
                       rdtscp lm constant_tsc art arch_perfmon pebs rep_good nop1 xtology nonstop_tsc
                       aperfmperf eagerfpu pni pclmulqdq dtogui vmx smx est tm2 ssse3 fma cx16 xtpr
                       pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx
                       fl64c rdrand lahf_lm abm 3nowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt
                       spec_ctrl ibpb_support tpr_shadow vnumi flexpriority ext vpid fsgsbase tsc_adjust
                       bni hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx
                       smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc
                       cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

/proc/cpuinfo cache data
   cache size : 11264 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 16 17 18 19 20 21 22 23
   node 0 size: 391349 MB
   node 0 free: 371425 MB
   node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
   node 1 size: 393216 MB
   node 1 free: 375160 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"

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Huawei

Huawei CH121 V5 (Intel Xeon Silver 4109T)

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### Platform Notes (Continued)

```
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)  
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 Sep 2 16:50  
```

**SPEC is set to:** /spec2017

```
Filesystem  Type  Size  Used  Avail  Use%  Mounted on  
/dev/sda2    xfs   781G  132G  650G   17%  /  
```

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  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)  
525.x264_r(base, peak) 557.xz_r(base, peak)  
==============================================================================
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
==============================================================================
```

```
==============================================================================
CC  500.perlbench_r(peak) 502.gcc_r(peak)  
==============================================================================
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
```
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**Base Compiler Invocation**

- **C benchmarks:** icc
- **C++ benchmarks:** icpc
- **Fortran benchmarks:** ifort

**Base Portability Flags**

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -DSPEC_LP64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64

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### Base Portability Flags (Continued)

- 541.leela_r: -DSPEC_LP64  
- 548.exchange2_r: -DSPEC_LP64  
- 557.xz_r: -DSPEC_LP64

### Base Optimization Flags

#### 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

#### 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
Huawei

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Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

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| SPECrate2017_int_base | 71.3 |
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Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
- L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: basepeak = yes

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:
548.exchange2_r: basepeak = yes

Peak Other Flags

C benchmarks (except as noted below):
-m64 -std=c11
502.gcc_r: -m32 -std=c11

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