## SPEC® CPU2017 Integer Rate Result

**Huawei**

Huawei CH121 V5 (Intel Xeon Platinum 8168)

### CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>CPU2017 License: 3175</th>
<th>Test Sponsor: Huawei</th>
<th>Tested by: Huawei</th>
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<tbody>
<tr>
<td>Jan-2018</td>
<td>3175</td>
<td>Huawei</td>
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<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Platinum 8168</td>
<td>OS: Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.el7.x86_64</td>
</tr>
<tr>
<td>Max MHz.: 3700</td>
<td>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</td>
</tr>
<tr>
<td>Nominal: 2700</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>Enabled: 48 cores, 2 chips, 2 threads/core</td>
<td>Firmware: Version 0.31 Released Sep-2017</td>
</tr>
<tr>
<td>Orderable: 1,2 chips</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>L3: 33 MB I+D on chip per chip</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc: jemalloc memory allocator library V5.0.1</td>
</tr>
<tr>
<td>Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)</td>
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<tr>
<td>Storage: 1 x 1200 GB SAS, 10000 RPM</td>
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<td>Other: None</td>
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### SPECrate2017_int_base = 253
SPECrate2017_int_peak = 274

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<td>208</td>
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<tr>
<td>gcc_r</td>
<td>96</td>
<td>193</td>
</tr>
<tr>
<td>mcf_r</td>
<td>96</td>
<td>257</td>
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<td>omnetpp_r</td>
<td>96</td>
<td>160</td>
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<td>xalancbmk_r</td>
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<td>228</td>
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<tr>
<td>x264_r</td>
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<td>exchange2_r</td>
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<tr>
<td>xz_r</td>
<td>96</td>
<td>156</td>
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</tbody>
</table>

---

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[info@spec.org](mailto:info@spec.org)

[https://www.spec.org/](https://www.spec.org/)

---

**Hardware**

CPU Name: Intel Xeon Platinum 8168
Max MHz.: 3700
Nominal: 2700
Enabled: 48 cores, 2 chips, 2 threads/core
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: 33 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 1200 GB SAS, 10000 RPM
Other: None

**Software**

OS: Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.el7.x86_64
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: No
Firmware: Version 0.31 Released Sep-2017
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

---

**SPEC® CPU2017 Integer Rate Result**

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Huawei

Huawei CH121 V5 (Intel Xeon Platinum 8168)

SPECrate2017_int_base = 253
SPECrate2017_int_peak = 274
## SPEC CPU2017 Integer Rate Result

**Huawei**

### Huawei CH121 V5 (Intel Xeon Platinum 8168)

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<tr>
<td>Test Date:</td>
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<td>Hardware Availability:</td>
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<td>Software Availability:</td>
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### SPECrate2017_int_base = 253

### SPECrate2017_int_peak = 274

### Results Table

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<td>520.omnetpp_r</td>
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<td>531.deepsjeng_r</td>
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<td>238</td>
<td>461</td>
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<td>541.leela_r</td>
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<td>703</td>
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<td>548.exchange2_r</td>
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<td>557.xz_r</td>
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<td>146</td>
<td>665</td>
<td>156</td>
<td>623</td>
<td>166</td>
</tr>
</tbody>
</table>

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

### 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;

(Continued on next page)
Huawei CH121 V5 (Intel Xeon Platinum 8168)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
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<tbody>
<tr>
<td>253</td>
<td>274</td>
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</table>

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

General Notes (Continued)


No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS configuration:
Power Policy Set to Performance
SNC Set to Enabled
IMC Interleaving Set to 1 way Interleave
XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Wed Jan 17 06:00:50 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) Platinum 8168 CPU @ 2.70GHz
  2 "physical id"s (chips)
  96 "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

(Continued on next page)
## SPEC CPU2017 Integer Rate Result

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<td><strong>Software Availability:</strong> Sep-2017</td>
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<tr>
<td><strong>Tested by:</strong> Huawei</td>
<td><strong>Tested by:</strong> Huawei</td>
<td></td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

siblings : 48  
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29  
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29  

From `lscpu`:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 96
- On-line CPU(s) list: 0-95
- Thread(s) per core: 2
- Core(s) per socket: 24
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8168 CPU @ 2.70GHz
- Stepping: 4
- CPU MHz: 2700.000
- BogoMIPS: 5405.10
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 33792K
- NUMA node0 CPU(s): 0-6,12-14,18-20,48-50,54-56,60-62,66-67
- NUMA node1 CPU(s): 3-5,9-11,15-17,21-23,51-53,57-59,63-65,69-71
- NUMA node2 CPU(s): 24-26,30-32,36-38,42-44,72-74,78-80,84-86,90-92
- NUMA node3 CPU(s): 27-29,33-35,39-41,45-47,75-77,81-83,87-89,93-95

/proc/cpuinfo cache data  
- cache size: 33792 KB

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.
- available: 4 nodes (0-3)
- node 0 cpus: 0 1 2 6 7 8 12 13 14 18 19 20 48 49 50 54 55 56 60 61 62 66 67 68
- node 0 size: 96405 MB
- node 0 free: 93262 MB
- node 1 cpus: 3 4 5 9 10 11 15 16 17 21 22 23 51 52 53 57 58 59 63 64 65 69 70 71
- node 1 size: 98304 MB
- node 1 free: 95327 MB
- node 2 cpus: 24 25 26 30 31 32 36 37 38 42 43 44 72 73 74 78 79 80 84 85 86 90 91 92
- node 2 size: 98304 MB
- node 2 free: 94652 MB
- node 3 cpus: 27 28 29 33 34 35 39 40 41 45 46 47 75 76 77 81 82 83 87 88 89 93 94 95

(Continued on next page)
Huawei

Huawei CH121 V5 (Intel Xeon Platinum 8168)

SPECrate2017_int_base = 253
SPECrate2017_int_peak = 274

Platform Notes (Continued)

node 3 size: 98304 MB
node 3 free: 95428 MB
node distances:
node 0 1 2 3
0: 10 11 21 21
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10

From /proc/meminfo
   MemTotal:       394144696 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.3 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.3"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

uname -a:
   Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 16 10:49

SPEC is set to: /spec2017
   Filesystem  Type  Size   Used  Avail  Use%  Mounted on
      /dev/sda2   xfs   781G  229G  553G  30% /

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. 0.31 09/29/2017
   Memory:
      24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from syinsfro program)
Huawei CH121 V5 (Intel Xeon Platinum 8168)

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### Compiler Version Notes

<table>
<thead>
<tr>
<th>Compiler</th>
<th>Version</th>
<th>Date</th>
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<tbody>
<tr>
<td>icc (ICC)</td>
<td>18.0.0</td>
<td>20170811</td>
</tr>
<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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### Base Compiler Invocation

**C benchmarks:**
- icc

**C++ benchmarks:**
- icpc

(Continued on next page)
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Huawei CH121 V5 (Intel Xeon Platinum 8168)

<table>
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**Software Availability:** Sep-2017

### Base Compiler Invocation (Continued)

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

### Base Optimization Flags

- C benchmarks:  
  -Wl,-z,muldefs -xCORE-AVX512 -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-AVX512 -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-AVX512 -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
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**Software Availability:** Sep-2017

### Base Other Flags (Continued)

- Fortran benchmarks: 
  - `-m64`

### Peak Compiler Invocation

- **C benchmarks:** 
  - `icc`

- **C++ benchmarks:** 
  - `icpc`

- Fortran benchmarks: 
  - `ifort`

### 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`

### Peak Optimization Flags

- **C benchmarks:**
  - `500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`
  - `-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3`
  - `-fno-strict-overflow -L/usr/local/je5.0.1-64/lib`
  - `-ljemalloc`
  - `502.gcc_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32`
  - `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`
  - `-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3`
  - `-L/usr/local/je5.0.1-32/lib -ljemalloc`

(Continued on next page)
# SPEC CPU2017 Integer Rate Result

## Huawei

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<tr>
<th>Huawei CH121 V5 (Intel Xeon Platinum 8168)</th>
<th>SPECrate2017_int_base = 253</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak = 274</td>
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</table>

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

## Peak Optimization Flags (Continued)

505.mcf_r: basepeak = yes

525.x264_r: -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -fno-alias  
-1/L/usr/local/je5.0.1-64/lib -ljemalloc

557.xz_r: basepeak = yes

### C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: -W1/-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-1/L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: -W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-1/L/usr/local/je5.0.1-64/lib -ljemalloc

541.leela_r: Same as 531.deepsjeng_r

### Fortran benchmarks:

- W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-1/L/usr/local/je5.0.1-64/lib -ljemalloc

## 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
Huawei

Huawei CH121 V5 (Intel Xeon Platinum 8168)

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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-ic18.0-official-linux64.html
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.7.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-V1.7.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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