# SPEC® CPU2017 Integer Rate Result

## Huawei

**Huawei 5288 V5 (Intel Xeon Gold 6146)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>157</td>
<td>167</td>
</tr>
</tbody>
</table>

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

### Hardware

- **CPU Name:** Intel Xeon Gold 6146  
- **Max MHz.:** 4200  
- **Nominal:** 3200  
- **Enabled:** 24 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:** 24.75 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 7.4 (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:** No  
- **Firmware:** Version 0.62 Released Mar-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;

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Graphs showing SPEC benchmark results for Huawei 5288 V5 (Intel Xeon Gold 6146) with SPECrate2017_int_base = 157 and SPECrate2017_int_peak = 167.
Huawei

Huawei 5288 V5 (Intel Xeon Gold 6146)

SPECrate2017_int_base = 157

SPECrate2017_int_peak = 167

CPU2017 License: 3175
Test Date: Jun-2018
Test Sponsor: Huawei
Hardware Availability: Jul-2017
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Results Table

<table>
<thead>
<tr>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Ratio</th>
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<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>48</td>
<td>657</td>
<td>116</td>
<td>634</td>
<td>121</td>
<td>642</td>
<td>119</td>
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<td>148</td>
<td>522</td>
<td>146</td>
<td>521</td>
<td>147</td>
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<td>502.gcc_r</td>
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<td>498</td>
<td>136</td>
<td>507</td>
<td>134</td>
<td>508</td>
<td>134</td>
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<td>505.mcf_r</td>
<td>48</td>
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</tr>
<tr>
<td>520.omnetpp_r</td>
<td>48</td>
<td>662</td>
<td>95.1</td>
<td>665</td>
<td>94.7</td>
<td>670</td>
<td>93.9</td>
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<td>523.xalancbmk_r</td>
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<tr>
<td>525.x264_r</td>
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<td>133</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
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<td>404</td>
<td>136</td>
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<td>541.leela_r</td>
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<td>133</td>
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<tr>
<td>548.exchange2_r</td>
<td>48</td>
<td>409</td>
<td>107</td>
<td>408</td>
<td>107</td>
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<td>107</td>
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</tr>
<tr>
<td>557.xz_r</td>
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<td>485</td>
<td>107</td>
<td>486</td>
<td>107</td>
<td>485</td>
<td>107</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;
jemalloc: sources available from jemalloc.net or

(Continued on next page)
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Huawei 5288 V5 (Intel Xeon Gold 6146)

SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 157
SPECrate2017_int_peak = 167

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei
Hardware Availability: Jul-2017
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
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 Fri Jun 22 05:17:01 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 6146 CPU @ 3.20GHz
 2 "physical id"s (chips)
 48 "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 : 24
physical 0: cores 0 1 2 3 4 9 10 16 18 19 25 26
physical 1: cores 0 1 2 3 8 9 10 11 18 19 24 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

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Huawei

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| SPECrate2017_int_base | 157 |
| SPECrate2017_int_peak | 167 |

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

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Platform Notes (Continued)

- **Model name:** Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
- **Stepping:** 4
- **CPU MHz:** 3200.000
- **BogoMIPS:** 6400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0-2, 5, 7, 10, 24-26, 29, 31, 34
- **NUMA node1 CPU(s):** 3, 4, 6, 8, 9, 11, 27, 28, 30, 32, 33, 35
- **NUMA node2 CPU(s):** 12-14, 16, 17, 22, 36-38, 40, 41, 46
- **NUMA node3 CPU(s):** 15, 18-21, 23, 39, 42-45, 47

**Flags:**
- fpu
- vme
- de
- pse
- tsc
- mtrr
- 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
- aperf
- mpn
- msr
- psep
- mtrr
- pae
- mce
- cx8
- apic
- sep
- mtrr
- pge
- mca
- cmov
- pat
- pse36
- clflush
dts

From numactl --hardware

<table>
<thead>
<tr>
<th>Available: 4 nodes (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 0 cpus: 0 1 2 5 7 10 24 25 26 29 31 34</td>
</tr>
<tr>
<td>node 0 size: 96437 MB</td>
</tr>
<tr>
<td>node 0 free: 93162 MB</td>
</tr>
<tr>
<td>node 1 cpus: 3 4 6 8 9 11 27 28 30 32 33 35</td>
</tr>
<tr>
<td>node 1 size: 98304 MB</td>
</tr>
<tr>
<td>node 1 free: 95591 MB</td>
</tr>
<tr>
<td>node 2 cpus: 12 13 14 16 17 22 36 37 38 40 41 46</td>
</tr>
<tr>
<td>node 2 size: 98304 MB</td>
</tr>
<tr>
<td>node 2 free: 95675 MB</td>
</tr>
<tr>
<td>node 3 cpus: 15 18 19 20 21 23 39 42 43 44 45 47</td>
</tr>
<tr>
<td>node 3 size: 98304 MB</td>
</tr>
<tr>
<td>node 3 free: 95517 MB</td>
</tr>
<tr>
<td>node distances:</td>
</tr>
<tr>
<td>node 0 1 2 3</td>
</tr>
<tr>
<td>0: 10 11 21 21</td>
</tr>
<tr>
<td>1: 11 10 21 21</td>
</tr>
<tr>
<td>2: 21 21 10 11</td>
</tr>
</tbody>
</table>

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Platform Notes (Continued)

3:  21  21  11  10

From /proc/meminfo
MemTotal: 394174208 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)
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 Jun 21 21:16

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs 1.8T 37G 1.7T 3% /

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. 0.62 03/26/2018
Memory:
   24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(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)
==============================================================================

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## Compiler Version Notes (Continued)

```plaintext
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
CC 500.perlbench_r(peak) 502.gcc_r(peak)
```

```plaintext
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
```

```plaintext
icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak) 541.leela_r(peak)
```

```plaintext
icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
FC 548.exchange2_r(base, peak)
```

```plaintext
ifort (IFORT) 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
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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

Fortran benchmarks:
-m64
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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/jemalloc

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/jemalloc

505.mcf_r: -basepeak = yes

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/usr/local/jemalloc

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

557.xz\_r: basepeak = yes

C++ benchmarks:

520.omnetpp\_r: basepeak = yes

523.xalancbmk\_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/jemalloc`

531.deepsjeng\_r: basepeak = yes

541.leela\_r: `-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/jemalloc`

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:

- [Intel-ic18.0-official-linux64.html](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html)
- [Huawei-Platform-Settings-SKL-V1.9-revC.html](http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.html)

You can also download the XML flags sources by saving the following links:

- [Intel-ic18.0-official-linux64.xml](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml)
- [Huawei-Platform-Settings-SKL-V1.9-revC.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.

Tested with SPEC CPU2017 v1.0.2 on 2018-06-22 05:17:00-0400.
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