### SPEC® CPU2017 Integer Rate Result

**Huawei**

**Huawei 5288 V5 (Intel Xeon Silver 4108)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
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<tr>
<td>SPECrate2017_int_peak</td>
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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  
**Test Date:** Jul-2018  
**Hardware Availability:** Jul-2017  
**Software Availability:** Jan-2018

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<tr>
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<tr>
<td>557.xz_r 32</td>
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**Hardware**

- **CPU Name:** Intel Xeon Silver 4108  
- **Max MHz.:** 3000  
- **Nominal:** 1800  
- **Enabled:** 16 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:** 11 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 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)* 3.10.0-693.11.6.el7.x86_64  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
  Fortran: Version 18.0.0.128 of Intel Fortran  
- **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;
SPEC CPU2017 Integer Rate Result

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SPECrate2017_int_peak = 68.9

CPU2017 License: 3175
Test Date: Jul-2018
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Results Table

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SPECrate2017_int_base = 64.9
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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)
**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 96c45e4568ad54c135fd618bccc091c0f
running on localhost.localdomain Fri Jul 20 12:00:40 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 4108 CPU @ 1.80GHz
  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 4108 CPU @ 1.80GHz
Stepping:               4
```

(Continued on next page)
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Hardware Availability: Jul-2017

Platform Notes (Continued)

CPU MHz: 1800.000
BogoMIPS: 3600.00
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: fpus 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 pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs rep_good nontime nonstop_tsc
aperfmon perf core i7_5500U CPU @ 2.40GHz

From /proc/cpuinfo cache data
  cache size : 11264 KB

From numactl --hardware WARNING: a numa 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: 195701 MB
  node 0 free: 189371 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
  node 1 size: 196608 MB
  node 1 free: 190817 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395141240 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"

(Continued on next page)
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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 Jul 16 13:28

SPEC is set to: /spec2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda4 xfs 700G 35G 666G 5% /

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, 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.
------------------------------------------------------------------------------

(Continued on next page)
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**Compiler Version Notes (Continued)**

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

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

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

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

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

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

**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
![SPEC CPU2017 Integer Rate Result](Standard Performance Evaluation Corporation)

**Huawei**

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### Peak Portability Flags

- `500.perlbench_r`: `-DSPEC_LP64`  
- `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`  
- `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-AVX2`  
  `-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-AVX2`  
  `-O3`  
  `-no-prec-div`  
  `-qopt-mem-layout-trans=3`  
  `-L/usr/local/je5.0.1-32/lib`  
  `-ljemalloc`

- `505.mcf_r`: `basepeak = yes`

- `525.x264_r`: `-Wl,-z,muldefs`  
  `-xCORE-AVX2`  
  `-ipo`  
  `-O3`  
  `-no-prec-div`  
  `-qopt-mem-layout-trans=3`  
  `-fno-alias`  
  `-L/usr/local/je5.0.1-64/lib`  
  `-ljemalloc`

- `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-AVX2`  
  `-O3`  
  `-no-prec-div`  
  `-qopt-mem-layout-trans=3`  
  `-L/usr/local/je5.0.1-32/lib`  
  `-ljemalloc`

- `531.deepsjeng_r`: `basepeak = yes`

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

541.leela_r: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -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`

## 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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