### SPEC® CPU2017 Integer Rate Result

**Huawei**

Huawei 1288H V5 (Intel Xeon Platinum 8160)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>225</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>243</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Platinum 8160</th>
<th>OS: Red Hat Enterprise Linux Server release 7.3 (Maipo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.: 3700</td>
<td>3.10.0-514.el7.x86_64</td>
</tr>
<tr>
<td>Nominal: 2100</td>
<td></td>
</tr>
<tr>
<td>Enabled: 48 cores, 2 chips, 2 threads/core</td>
<td>Compiler: C/C++: Version 18.0.0.128 of Intel C/C++</td>
</tr>
<tr>
<td>Orderable: 1.2 chips</td>
<td>Compiler for Linux:</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Fortran: Version 18.0.0.128 of Intel Fortran</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Compiler for Linux:</td>
</tr>
<tr>
<td>L3: 33 MB I+D on chip per chip</td>
<td></td>
</tr>
<tr>
<td>Other: None</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)</td>
<td>Firmware: Version 0.31 Released Sep-2017</td>
</tr>
<tr>
<td>Storage: 1 x 1200 GB SAS, 10000 RPM</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

#### Hardware

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate2017_int_base (225)</th>
<th>SPECrate2017_int_peak (243)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>96</td>
<td>183</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>96</td>
<td>232</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>96</td>
<td>149</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>96</td>
<td>176</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>96</td>
<td>194</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>96</td>
<td>198</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>96</td>
<td>202</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>96</td>
<td>194</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>96</td>
<td>152</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>96</td>
<td>207</td>
</tr>
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#### Software
Huawei

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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Ratio</th>
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</tr>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>96</td>
<td>863</td>
<td>177</td>
<td>871</td>
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<td>876</td>
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<tr>
<td>505.mcf_r</td>
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<td>520.omnetpp_r</td>
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<td>843</td>
<td>149</td>
<td>843</td>
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<td>841</td>
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<td>548.exchange2_r</td>
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<td>152</td>
<td>96</td>
<td>744</td>
<td>139</td>
<td>636</td>
<td>152</td>
<td>683</td>
<td>152</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

Huawei 1288H V5 (Intel Xeon Platinum 8160)

SPECrate2017_int_base = 225
SPECrate2017_int_peak = 243

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General Notes (Continued)

jemalloc: sources available from jemalloc.net or

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

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 Tue Dec 26 22:30:07 2017

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 8160 CPU @ 2.10GHz
  2 "physical id"s (chips)
  96 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
examples from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 24

(Continued on next page)
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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:
Architectures: 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 8160 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2100.000
BogoMIPS: 4204.23
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 33792K
NUMA node0 CPU(s): 0-2, 6-8, 12-14, 18-20, 48-50, 54-56, 60-62, 66-68
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: 93245 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: 95442 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: 94668 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)
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SPECrate2017_int_base = 225
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Platform Notes (Continued)

node 3 size: 98304 MB
node 3 free: 95406 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 Dec 26 00:45

SPEC is set to: /spec2017
  Filesystem   Type  Size  Used Avail Use% Mounted on
  /dev/sda2     xfs   859G  48G  812G  6% /

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 sysinfo program)
## SPEC CPU2017 Integer Rate Result

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### Compiler Version Notes

```plaintext
==============================================================================
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.
------------------------------------------------------------------------------
==============================================================================
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

*(Continued on next page)*
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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:
-W1,-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:
-W1,-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:
-W1,-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
Huawei

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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)
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Peak Optimization Flags (Continued)

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/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-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc
531.deepsjeng_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/je5.0.1-64/lib -ljemalloc
541.leela_r: Same as 531.deepsjeng_r

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

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
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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/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/Intel-ic18.0-official-linux64.xml)

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