Huawei 5288 V5 (Intel Xeon Platinum 8156)

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Red Hat Enterprise Linux Server release 7.4 (Maipo) 3.10.0-693.11.6.el7.x86_64</td>
<td>CPU Name: Intel Xeon Platinum 8156</td>
</tr>
<tr>
<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>
<td>Max MHz.: 3700</td>
</tr>
<tr>
<td>Parallel: No</td>
<td>Nominal: 3600</td>
</tr>
<tr>
<td>Firmware: Version 0.62 Released Apr-2018</td>
<td>Enabled: 8 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>File System: xfs</td>
<td>Orderable: 1,2 chips</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
<td>L3: 16.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: jemalloc: jemalloc memory allocator library V5.0.1;</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

| Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R) | Storage: 1 x 1200 GB SAS, 10000 RPM |

Huawei 5288 V5 (Intel Xeon Platinum 8156)

SPECrace2017_int_base = 57.0
SPECrace2017_int_peak = 60.3

Copyright 2017-2018 Standard Performance Evaluation Corporation
### 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>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>16</td>
<td>624</td>
<td>40.8</td>
<td>628</td>
<td>40.5</td>
<td>624</td>
<td>40.8</td>
</tr>
<tr>
<td>502.mcf_r</td>
<td>16</td>
<td>362</td>
<td>71.5</td>
<td>591</td>
<td>35.5</td>
<td>592</td>
<td>35.4</td>
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<tr>
<td>523.xalancbmk_r</td>
<td>16</td>
<td>261</td>
<td>64.9</td>
<td>259</td>
<td>65.2</td>
<td>259</td>
<td>65.2</td>
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<tr>
<td>525.x264_r</td>
<td>16</td>
<td>243</td>
<td>115</td>
<td>240</td>
<td>117</td>
<td>240</td>
<td>117</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>16</td>
<td>387</td>
<td>47.4</td>
<td>387</td>
<td>47.4</td>
<td>387</td>
<td>47.4</td>
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<tr>
<td>541.leela_r</td>
<td>16</td>
<td>603</td>
<td>44.0</td>
<td>597</td>
<td>44.4</td>
<td>603</td>
<td>43.9</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>16</td>
<td>401</td>
<td>104</td>
<td>402</td>
<td>104</td>
<td>402</td>
<td>104</td>
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<tr>
<td>557.xz_r</td>
<td>16</td>
<td>418</td>
<td>41.3</td>
<td>418</td>
<td>41.2</td>
<td>420</td>
<td>41.1</td>
</tr>
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</table>

SPECrate2017_int_base = 57.0
SPECrate2017_int_peak = 60.3

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)
Huawei

Huawei 5288 V5 (Intel Xeon Platinum 8156)

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CPU2017 License: 3175
Test Date: Jun-2018
Test Sponsor: Huawei
Hardware Availability: Jul-2017
Tested by: Huawei
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 Wed Jun 20 17:55:12 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 8156 CPU @ 3.60GHz
2 "physical id"s (chips)
16 "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 : 4
siblings : 8
physical 0: cores 5 8 10 11
physical 1: cores 1 5 9 13

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
Huawei 5288 V5 (Intel Xeon Platinum 8156)

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

---

**Platform Notes (Continued)**

Model name: Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz  
Stepping: 4  
CPU MHz: 3600.000  
BogoMIPS: 7200.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 16896K  
NUMA node0 CPU(s): 0,2,9,10  
NUMA node1 CPU(s): 1,3,8,11  
NUMA node2 CPU(s): 4,6,12,14  
NUMA node3 CPU(s): 5,7,13,15  
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pae syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmpref gather fpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abml lahf_lm abml 3dnowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt spec_ctrl ibpb_support tpr_shadow vnmi flexpriority ept vpid fsqsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512ld avx512bw avx512vl xsaveopt xsaves vgetbv1 cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts

/proc/cpuinfo cache data  
cache size : 16896 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 2 9 10  
node 0 size: 96437 MB  
node 0 free: 93918 MB  
node 1 cpus: 1 3 8 11  
node 1 size: 98304 MB  
node 1 free: 95815 MB  
node 2 cpus: 4 6 12 14  
node 2 size: 98304 MB  
node 2 free: 96079 MB  
node 3 cpus: 5 7 13 15  
node 3 size: 98304 MB  
node 3 free: 96050 MB  
node distances:  
node 0 1 2 3  
0: 10 11 21 21  
1: 11 10 21 21  
2: 21 21 10 11

(Continued on next page)
SPEC CPU2017 Integer Rate Result

Huawei
Huawei 5288 V5 (Intel Xeon Platinum 8156)

SPECrate2017_int_base = 57.0
SPECrate2017_int_peak = 60.3

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

Platform Notes (Continued)

3: 21 21 11 10

From /proc/meminfo
MemTotal: 394174812 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 20 17:53

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 781G 34G 748G 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 04/03/2018
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)

(Continued on next page)
## Huawei

### Huawei 5288 V5 (Intel Xeon Platinum 8156)

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**CPU2017 License:** 3175  
**Test Date:** Jun-2018

**Test Sponsor:** Huawei  
**Hardware Availability:** Jul-2017

**Tested by:** Huawei  
**Software Availability:** Jan-2018

### Compiler Version Notes (Continued)

```
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

**Fortran benchmarks:**

- ifort
Huawei

Huawei 5288 V5 (Intel Xeon Platinum 8156)

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

Test Date: Jun-2018
Hardware Availability: Jul-2017
Software Availability: Jan-2018

### 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`
## SPEC CPU2017 Integer Rate Result

<table>
<thead>
<tr>
<th>Huawei 5288 V5 (Intel Xeon Platinum 8156)</th>
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</table>

### 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`


- `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`
# SPEC CPU2017 Integer Rate Result

## Huawei

**Huawei 5288 V5 (Intel Xeon Platinum 8156)**

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**Software Availability:** Jan-2018

### Peak Optimization Flags (Continued)

- **557.xz_r**: `-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:

- **520.omnetpp_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`

- **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**: Same as **520.omnetpp_r**

- **541.leela_r**: Same as **520.omnetpp_r**

Fortran benchmarks:

- **502.gcc_r**: `-m64 -std=c11`

### 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](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html)
Huawei

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

http://www.spec.org/cpu2017/flags/Intel-icl18.0-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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