Huawei 5288 V5 (Intel Xeon Silver 4114)

**SPECrate2017_int_base** = 93.0

**SPECrate2017_int_peak** = 99.1

**CPU2017 License:** 3175

**Test Date:** Jun-2018

**Test Sponsor:** Huawei

**Hardware Availability:** Jul-2017

**Tested by:** Huawei

**Software Availability:** Jan-2018

<table>
<thead>
<tr>
<th>Test</th>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
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<tbody>
<tr>
<td>perlbench</td>
<td>71.7</td>
<td>87.4</td>
</tr>
<tr>
<td>gcc</td>
<td>82.0</td>
<td>97.0</td>
</tr>
<tr>
<td>mcf</td>
<td>62.2</td>
<td>118</td>
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<tr>
<td>omnetpp</td>
<td>95.0</td>
<td>117</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>177</td>
<td>185</td>
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<tr>
<td>x264</td>
<td>80.2</td>
<td>175</td>
</tr>
<tr>
<td>deepsjeng</td>
<td>73.8</td>
<td>75.2</td>
</tr>
<tr>
<td>leela</td>
<td>64.5</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4114
- **Max MHz.:** 3000
- **Nominal:** 2200
- **Enabled:** 20 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:** 13.75 MB I+D on chip per chip
- **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++ 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;
Huawei

Huawei 5288 V5 (Intel Xeon Silver 4114)

SPECrate2017_int_base = 93.0

SPECrate2017_int_peak = 99.1

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>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>40</td>
<td>886</td>
<td>71.9</td>
<td>890</td>
<td>71.5</td>
<td>888</td>
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<td>681</td>
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<td>82.0</td>
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<td>81.7</td>
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<td>505.mcf_r</td>
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<td>548</td>
<td>118</td>
<td>560</td>
<td>115</td>
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<td>520.omnetpp_r</td>
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<td>843</td>
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<td>531.deepsjeng_r</td>
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<td>80.4</td>
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<td>541.leela_r</td>
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<tr>
<td>548.exchange2_r</td>
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</tr>
<tr>
<td>557.xz_r</td>
<td>40</td>
<td>670</td>
<td>64.5</td>
<td>669</td>
<td>64.6</td>
<td>672</td>
<td>64.3</td>
</tr>
</tbody>
</table>

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.:
umactl --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)
SPEC CPU2017 Integer Rate Result

Huawei
Huawei 5288 V5 (Intel Xeon Silver 4114)

| SPECrate2017_int_base | 93.0 |
| SPECrate2017_int_peak | 99.1 |

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

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 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Thu Jun 28 05:15:33 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 4114 CPU @ 2.20GHz
- 2 "physical id"s (chips)
- 40 "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 : 10
  - siblings : 20
  - physical 0: cores 0 1 2 3 4 8 9 10 11 12
  - physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 40
- On-line CPU(s) list: 0-39
- Thread(s) per core: 2
- Core(s) per socket: 10
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
- Stepping: 4

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Silver 4114)

**SPEC CPU2017 Integer Rate Result**

**Huawei**

**Huawei 5288 V5 (Intel Xeon Silver 4114)**

SPEC CPU2017 License: 3175

Test Sponsor: Huawei

Tested by: Huawei

Test Date: Jun-2018

Hardware Availability: Jul-2017

Software Availability: Jan-2018

**SPECrate2017_int_base = 93.0**

**SPECrate2017_int_peak = 99.1**

CPU MHz: 2200.000

BogoMIPS: 4400.00

Virtualization: VT-x

L1d cache: 32K

L1i cache: 32K

L2 cache: 1024K

L3 cache: 14080K

NUMA node0 CPU(s): 0-9,20-29

NUMA node1 CPU(s): 10-19,30-39

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 pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good ntopology nonstop_tsc
aperfmpref eagerfpu 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 abm 3dnowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt
```

```
spec_ctrl ibpb_support tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
```

```
vm1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx
```

```
smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cqm_llc
```

```
cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts
```

/platform Notes (Continued)

```
From numactl --hardware WARNING: a numactl '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 8 9 20 21 22 23 24 25 26 27 28 29
node 0 size: 195701 MB
node 0 free: 189473 MB
node 0 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 0 size: 196608 MB
node 0 free: 190401 MB
node distances:
  node 0: 10 21
  node 1: 21 10
```

From /proc/meminfo

```
MemTotal: 395141240 kB
```

```
HugePages_Total: 0
```

```
Hugepagesize: 2048 kB
```

From /etc/*release* /etc/*version*

```
NAME="Red Hat Enterprise Linux Server"
VERSION="7.4 (Maipo)"
ID="rhel"
```

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Silver 4114)

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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)

    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 25 05:34

    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.
------------------------------------------------------------------------------

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

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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Huawei

Huawei 5288 V5 (Intel Xeon Silver 4114)

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CPU2017 License: 3175
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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
**Huawei 5288 V5 (Intel Xeon Silver 4114)**

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

### 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-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

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
Huawei

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Hardware Availability: Jul-2017
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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:
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
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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Tested with SPEC CPU2017 v1.0.2 on 2018-06-28 05:15:32-0400.
Originally published on 2018-07-27.