Huawei 5288 V5 (Intel Xeon Gold 6142)

**SPECrate2017_int_base** = 178
**SPECrate2017_int_peak** = 189

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

---

**Hardware**

- **CPU Name:** Intel Xeon Gold 6142
- **Max MHz.:** 3700
- **Nominal:** 2600
- **Enabled:** 32 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:** 22 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) 3.10.0-693.11.6.el7.x86_64
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
  Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
- **Parallel:** No
- **Firmware:** Version 0.81 Released Jul-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc memory allocator V5.0.1
Huawei
Huawei 5288 V5 (Intel Xeon Gold 6142)

CPU2017 License: 3175
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SPECrate2017_int_base = 178
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
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<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>122</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 178
SPECrate2017_int_peak = 189

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 i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
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>
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)
## SPEC CPU2017 Integer Rate Result

**Huawei**

**Huawei 5288 V5 (Intel Xeon Gold 6142)**

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**CPU2017 License:** 3175  
**Test Date:** Aug-2018  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  

**Hardware Availability:** Jul-2017  
**Software Availability:** Mar-2018

---

### General Notes (Continued)

is mitigated in the system as tested and documented.  
jemalloc, a general purpose malloc implementation  
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  

### 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 96c45e4568ad54c135fd618bccc091c0f  
- running on localhost.localdomain Sat Aug 25 06:00:22 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 6142 CPU @ 2.60GHz  
  - 2 "physical id"s (chips)  
  - 64 "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: 16  
  - siblings: 32  
  - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
  - physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

**From lscpu:**

- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 64  
- On-line CPU(s) list: 0-63  
- Thread(s) per core: 2  
- Core(s) per socket: 16  
- Socket(s): 2  
- NUMA node(s): 4  
- Vendor ID: GenuineIntel  
- CPU family: 6  
- Model: 85  
- Model name: Intel(R) Xeon(R) Gold 6142 CPU @ 2.60GHz  
- Stepping: 4

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Gold 6142)

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<td>Mar-2018</td>
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**Platform Notes (Continued)**

```
CPU MHz:               2600.000
BogoMIPS:              5200.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              22528K
NUMA node0 CPU(s):     0-3, 8-11, 32-35, 40-43
NUMA node1 CPU(s):     4-7, 12-15, 36-39, 44-47
NUMA node2 CPU(s):     16-19, 24-27, 48-51, 56-59
NUMA node3 CPU(s):     20-23, 28-31, 52-55, 60-63
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
                       pat pse36 clflush dtsc arch_perfmon pebs bts rep_good nopl xtopology
                       nonstop_tsc aperfmperf 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 3nowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt
                       spec_ctrl ibpb_support tpr_shadow vnmi fpuflexprior ept vpid fsgsbase
                       tsc_adjust bm1 hle avx2 smep bmi2 amsi invpcid rtm cmx mxpx rdt_a
                       avx512f avx512fd rdtsc adx smap clflushopt clwb avx512cd avx512bw
                       avx512vl xsaveopt xsaves vec xgetbv1 cmp2xx cmp1mb cmp2mb cmp2icl
                       cmp_occup_llc cmp_mbmc_total cmp_mbmc_local dtherm ida arat pln pts

/proc/cpuinfo cache data

  cache size : 22528 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 3 8 9 10 11 32 33 34 35 40 41 42 43
  node 0 size: 96437 MB
  node 0 free: 93886 MB
  node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
  node 1 size: 98304 MB
  node 1 free: 95984 MB
  node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
  node 2 size: 98304 MB
  node 2 free: 95441 MB
  node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
  node 3 size: 98304 MB
  node 3 free: 95998 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

(Continued on next page)
Platform Notes (Continued)

From /proc/meminfo
MemTotal: 394174484 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 Aug 25 05:58

SPEC is set to: /spec2017
  Filesystem Type Size Used Avail Use% Mounted on
  /devmapper/rhel-root xfs 1.8T 53G 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. 0.81 07/02/2018
  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) 525.x264_r(base)
557.xz_r(base)
==============================================================================

icc (ICC) 18.0.2 20180210

(Continued on next page)
## SPEC CPU2017 Integer Rate Result

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### Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```plaintext
---
CC   500.perlbench_r(peak) 502.gcc_r(peak) 505.mcf_r(peak) 525.x264_r(peak)
     557.xz_r(peak)
---
iccc ICC 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
     541.leela_r(base)
---
icpc ICC 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
     541.leela_r(peak)
---
icpc ICC 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
FC  548.exchange2_r(base)
---
ifort IFORT 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
FC  548.exchange2_r(peak)
---
ifort IFORT 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
```

### Base Compiler Invocation

C benchmarks:

```bash
icc -m64 -std=c11
```

(Continued on next page)
Huawei

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Base Compiler Invocation (Continued)

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11

(Continued on next page)
Peak Compiler Invocation (Continued)

502.gcc_r: icc -m32 -std=c11 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

C++ benchmarks (except as noted below):
icpc -m64

523.xalancbmk_r: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

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
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 -03 -no-prec-div -qopt-mem-layout-trans=3
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -03 -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: basepeak = yes
557.xz_r: basepeak = yes

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

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_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/je5.0.1-32/lib -ljemalloc

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/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:

548.exchange2_r: basepeak = yes

The flags files that were used to format this result can be browsed at

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.xml

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