Huawei XH628 V5 (Intel Xeon Silver 4108)

**SPECrate2017_int_base** = 65.3

**SPECrate2017_int_peak** = 69.8

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
</table>

**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 (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)

**Storage:** 1 x 1800 GB SAS, 10000 RPM

**Other:** None

**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 0.86 Released Aug-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
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>769</td>
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<td>82.7</td>
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<td>557.xz_r</td>
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<td>687</td>
<td>50.3</td>
<td>693</td>
<td>49.9</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 i7-6700K 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/transparent_hugepage/defrag
```

runcpu command invoked through numactl i.e.:

```
umactl --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) is mitigated in the system as tested and documented.

(Continued on next page)
Huawei
Huawei XH628 V5 (Intel Xeon Silver 4108)

**SPECrate2017_int_base** = 65.3
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<th>CPU2017 License:</th>
<th>3175</th>
<th>Test Date:</th>
<th>Aug-2018</th>
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<tr>
<td>Test Sponsor:</td>
<td>Huawei</td>
<td>Hardware Availability:</td>
<td>Aug-2018</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Huawei</td>
<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

**General Notes (Continued)**

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
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Tue Aug 21 09:53:58 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
  CPU MHz: 1800.000
  BogoMIPS: 3600.00
  Virtualization: VT-x
  L1d cache: 32K

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Silver 4108)

| SPECrate2017_int_base = 65.3 |
| SPECrate2017_int_peak = 69.8 |

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

### Platform Notes (Continued)

```
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: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
       pat pse36 clflush dts msr pae mce cx8 apic sep mtrr pge mca cmov
       lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
       aperfmperf eagerfpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 fma cx16 xtp
       pdcm pcid dcasse41 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 vmx flexpriority ept vpid fsgsbase tsc_adjust
       bmi1 hle avx2 smep bmi2  erms invpcid rtm cqm mpx rdtda avx512f avx512dq rdseed adx
       smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveopt xsavec xgetbv1 cqm_llc
       cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts
```

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 16 17 18 19 20 21 22 23
node 0 size: 195701 MB
node 0 free: 190565 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: 192102 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10
```

From `/proc/meminfo`

```
MemTotal: 395141612 kB
HugePages_Total: 0
Hugepagesize: 4096 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"
```

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Huawei

Huawei XH628 V5 (Intel Xeon Silver 4108)

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

Platform Notes (Continued)

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 21 09:53

SPEC is set to: /spec2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p4 xfs   1.5T  8.3G  1.5T   1% /

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. 0.86 08/06/2018
    Memory:
        4x NO DIMM NO DIMM
        12x Samsung M393A4K40BB2-CTD 32 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) 525.x264_r(base)
   557.xz_r(base)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CC  500.perlbench_r(peak) 502.gcc_r(peak) 505.mcf_r(peak) 525.x264_r(peak)
   557.xz_r(peak)
==============================================================================
icc (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)

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Silver 4108)

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

Test Date: Aug-2018
Hardware Availability: Aug-2018
Software Availability: Mar-2018

Compiler Version Notes (Continued)

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:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64

(Continued on next page)
Huawei

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| Test Sponsor: Huawei           | Hardware Availability: Aug-2018 |
| Tested by: Huawei              | Software Availability: Mar-2018 |

**Base Portability Flags (Continued)**

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

**Peak Compiler Invocation**

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

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
Huawei

Huawei XH628 V5 (Intel Xeon Silver 4108)

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: -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: -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

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

531.deepsjeng_r: basepeak = yes

C++ benchmarks:

520.omnetpp_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

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

531.deepsjeng_r: basepeak = yes

(Continued on next page)
**Huawei**

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**Test Date**: Aug-2018  
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**Software Availability**: Mar-2018

### Peak Optimization Flags (Continued)

541.leela_r: Same as 520.omnetpp_r

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:


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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2018-08-21 05:53:57-0400.  
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