Huawei

Huawei XH628 V5 (Intel Xeon Platinum 8164)

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

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

SPECrate2017_int_peak = 238
SPECrate2017_int_base = 223

500.perlbench_r 104
502.gcc_r 104
505.mcf_r 104
520.omnetpp_r 104
523.xalancbmk_r 104
525.x264_r 104
531.deepsjeng_r 104
541.leela_r 104
548.exchange2_r 104
557.xz_r 104

Hardware
CPU Name: Intel Xeon Platinum 8164
Max MHz.: 3700
Nominal: 2000
Enabled: 52 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: 35.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 1800 GB SAS, 10000 RPM
Other: None

Software
OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
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
## SPEC CPU2017 Integer Rate Result

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>104</td>
<td>944</td>
<td>175</td>
<td>966</td>
<td>171</td>
<td>959</td>
<td>173</td>
<td>104</td>
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<tr>
<td>502.gcc_r</td>
<td>104</td>
<td>766</td>
<td>192</td>
<td>769</td>
<td>191</td>
<td>774</td>
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<td>505.mcf_r</td>
<td>104</td>
<td>624</td>
<td>269</td>
<td>642</td>
<td>262</td>
<td>652</td>
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<td>147</td>
<td>969</td>
<td>141</td>
<td>104</td>
<td>930</td>
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<td>523.xalanbmkm_r</td>
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<td>548</td>
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<td>555</td>
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<td>198</td>
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<td>525.x264_r</td>
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<td>398</td>
<td>458</td>
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<td>394</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>196</td>
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<td>595</td>
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<tr>
<td>541.leela_r</td>
<td>104</td>
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<td>902</td>
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<tr>
<td>548.exchange2_r</td>
<td>104</td>
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<td>437</td>
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<td>557.xz_r</td>
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<td>709</td>
<td>158</td>
<td>709</td>
<td>158</td>
<td>104</td>
<td>708</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:

```
LD_LIBRARY_PATH = "'/spec2017/lib/ia32:/spec2017/lib/intel64:/spec2017/je5.0.1-32:/spec2017/je5.0.1-64"
```

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) is mitigated in the system as tested and documented.

(Continued on next page)
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SPECrate2017_int_peak = 238
SPECrate2017_int_base = 223

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 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Tue Sep  4 13:21:49 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 8164 CPU @ 2.00GHz
    2  "physical id"s (chips)
    104 "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 : 26
siblings : 52
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
29

From lscpu:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 104
    On-line CPU(s) list: 0-103
    Thread(s) per core: 2
    Core(s) per socket: 26
    Socket(s): 2
    NUMA node(s): 4
    Vendor ID: GenuineIntel
    CPU family: 6
    Model: 85

(Continued on next page)
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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Platinum 8164 CPU @ 2.00GHz
Stepping: 4
CPU MHz: 2000.000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3,7-9,13-15,20-22,52-55,61,65-67,72-74
NUMA node1 CPU(s): 4-6,10-12,16-19,23-25,56-64,68-71,75-77
NUMA node2 CPU(s): 26-29,33-35,39-41,46-48,78-81,85-87,91-93,98-100
NUMA node3 CPU(s): 30-32,36-38,42-45,49-51,82-84,88-90,94-97,101-103
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aarch64 edx vmm cmov pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx
f16c rdrand lahf_lm lahfl_lm abm 3nowprefetch epb cat_l3 cdp_l3 invpcid_single intel_prestigegx
spec_ctrl ibpb_support tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
bmi1 hle avx2 smep bmi2 3dnowprecpred vptpin f16caves avx512pmulll1b avx512_mcf avx512_mld
avx512_stitch feathers fma4 avx512_pack2x16 Generateska_l1b dhs
/proc/cpuinfo cache data
   cache size : 36608 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 7 8 9 13 14 15 20 21 22 52 53 54 55 59 60 61 65 66 67 72 74
 node 0 size: 96437 MB
 node 0 free: 93778 MB
 node 1 cpus: 4 5 6 10 11 12 14 15 17 18 19 23 24 25 26 29 31 36 37 38 42 43 44 45 49 50 51 82
 node 1 size: 98304 MB
 node 1 free: 95139 MB
 node 2 cpus: 26 27 28 29 33 34 35 39 40 41 46 47 48 78 79 80 81 85 86 87 91 92 93 98 99 100
 node 2 size: 98304 MB
 node 2 free: 95990 MB
 node 3 cpus: 30 31 32 36 37 38 42 43 44 45 49 50 51 82 83 84 88 89 90 94 95 96 97 101
 node 3 size: 98304 MB
 node 3 free: 95944 MB
 node distances:
 node 0 1 2 3
 0: 10 11 21 23

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Huawei

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</table>

Platform Notes (Continued)

1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

From /proc/meminfo

- MemTotal: 394174376 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

- 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)

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 Sep 4 13:20

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 553G 8.7G 544G 2% /

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

(End of data from sysinfo program)
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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) |
| 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 |
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## SPEC CPU2017 Integer Rate Result

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**Test Sponsor:** Huawei  
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### 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  
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
```
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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

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: -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

505.mcf_r: basepeak = yes

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

525.x264_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-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: -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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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 2018-09-04 09:21:48-0400.  
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