Huawei

Huawei XH628 V5 (Intel Xeon Gold 5120)

SPEC® CPU2017 Integer Rate Result

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

SPECratedata2017_int_base = 135
SPECratedata2017_int_peak = 144

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

Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>56</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>56</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>56</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>56</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>56</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>56</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>56</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>56</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>56</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>56</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Gold 5120
Max MHz.: 3200
Nominal: 2200
Enabled: 28 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: 19.25 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

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
Huawei

Huawei XH628 V5 (Intel Xeon Gold 5120)

<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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbnc_r</td>
<td>56</td>
<td>846</td>
<td>105</td>
<td>870</td>
<td>102</td>
<td>870</td>
<td>102</td>
<td>56</td>
<td>687</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>56</td>
<td>658</td>
<td>121</td>
<td>656</td>
<td>121</td>
<td>658</td>
<td>120</td>
<td>56</td>
<td>557</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>56</td>
<td>538</td>
<td>168</td>
<td>531</td>
<td>170</td>
<td>552</td>
<td>164</td>
<td>56</td>
<td>538</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>56</td>
<td>804</td>
<td>91.4</td>
<td>806</td>
<td>91.2</td>
<td>802</td>
<td>91.6</td>
<td>56</td>
<td>804</td>
</tr>
<tr>
<td>523.xmlancbmk_r</td>
<td>56</td>
<td>436</td>
<td>136</td>
<td>435</td>
<td>136</td>
<td>434</td>
<td>136</td>
<td>56</td>
<td>353</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>56</td>
<td>405</td>
<td>242</td>
<td>406</td>
<td>242</td>
<td>408</td>
<td>240</td>
<td>56</td>
<td>388</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>56</td>
<td>525</td>
<td>122</td>
<td>524</td>
<td>122</td>
<td>533</td>
<td>120</td>
<td>56</td>
<td>525</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>56</td>
<td>859</td>
<td>108</td>
<td>866</td>
<td>107</td>
<td>861</td>
<td>108</td>
<td>56</td>
<td>852</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>56</td>
<td>579</td>
<td>254</td>
<td>578</td>
<td>254</td>
<td>579</td>
<td>253</td>
<td>56</td>
<td>579</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>56</td>
<td>583</td>
<td>104</td>
<td>628</td>
<td>96.3</td>
<td>636</td>
<td>95.0</td>
<td>56</td>
<td>583</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 135
SPECrate2017_int_peak = 144

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.:
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.
Huawei
Huawei XH628 V5 (Intel Xeon Gold 5120)

SPECrate2017_int_base = 135
SPECrate2017_int_peak = 144

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

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
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 96c45e4568ad54c135fd618bce091c0f
running on localhost.localdomain Fri Aug 17 17:17:40 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 5120 CPU @ 2.20GHz
 2 "physical id"s (chips)
56 "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 : 14
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 2
Core(s) per socket: 14
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2200.000

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Gold 5120)

spec

SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 135
SPECrate2017_int_peak = 144

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

Platform Notes (Continued)

BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-3, 7-9, 28-31, 35-37
NUMA node1 CPU(s): 4-6, 10-13, 32-34, 38-41
NUMA node2 CPU(s): 14-17, 21-23, 42-45, 49-51
NUMA node3 CPU(s): 18-20, 24-27, 46-48, 52-55

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 nopl xtopology nonstop_tsc
aprfmperf eagerfpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 fma cx16 xtpre
\nFrom /proc/cpuinfo cache data
cache size : 19712 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 28 29 30 31 35 36 37
node 0 size: 96437 MB
node 0 free: 93884 MB
node 1 cpus: 4 5 6 10 11 12 13 32 33 34 38 39 40 41
node 1 size: 98304 MB
node 1 free: 96043 MB
node 2 cpus: 14 15 16 17 21 22 23 42 43 44 45 49 50 51
node 2 size: 98304 MB
node 2 free: 95966 MB
node 3 cpus: 18 19 20 24 25 26 27 46 47 48 52 53 54 55
node 3 size: 98304 MB
node 3 free: 95525 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

From /proc/meminfo

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Gold 5120)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 135</th>
<th>SPECrate2017_int_peak = 144</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 3175</td>
<td>Test Date: Aug-2018</td>
</tr>
<tr>
<td>Test Sponsor: Huawei</td>
<td>Hardware Availability: Aug-2018</td>
</tr>
<tr>
<td>Tested by: Huawei</td>
<td>Software Availability: Mar-2018</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

<table>
<thead>
<tr>
<th>MemTotal: 394174376 kB</th>
</tr>
</thead>
<tbody>
<tr>
<td>HugePages_Total: 0</td>
</tr>
<tr>
<td>Hugepagesize: 2048 kB</td>
</tr>
</tbody>
</table>

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 17 16:47
```

SPEC is set to: /spec2017

```
  Filesystem   Type  Size  Used Avail Use% Mounted on
  /dev/sda4      xfs   553G  8.2G  545G   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, 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
```

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Gold 5120)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
<td>144</td>
</tr>
</tbody>
</table>

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

**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)
------------------------------------------------------------------------------
```

```plaintext
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
------------------------------------------------------------------------------
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
```

```plaintext
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
------------------------------------------------------------------------------
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
      541.leela_r(peak)
------------------------------------------------------------------------------
```

```plaintext
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
------------------------------------------------------------------------------
FC  548.exchange2_r(base)
------------------------------------------------------------------------------
```

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
------------------------------------------------------------------------------
FC  548.exchange2_r(peak)
------------------------------------------------------------------------------
```

```plaintext
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
```
SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Huawei
Huawei XH628 V5 (Intel Xeon Gold 5120)

| SPECrate2017_int_base = 135 |
| SPECrate2017_int_peak = 144 |

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

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

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:
-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=gnu

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Gold 5120)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>135</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>144</td>
</tr>
</tbody>
</table>

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

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.xalanchmk_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

525.x264_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-alias -L/usr/local/je5.0.1-64/lib -ljemalloc

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Gold 5120)

SPECrate2017_int_base = 135
SPECrate2017_int_peak = 144

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

Peak Optimization Flags (Continued)

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-AVX2 -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-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

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

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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