### SPEC® CPU2017 Integer Rate Result

#### Huawei

**Huawei XH321 V5 (Intel Xeon Bronze 3104)**

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jun-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Huawei</td>
</tr>
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<td>Tested by:</td>
<td>Huawei</td>
</tr>
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<td>Jul-2017</td>
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</table>

**SPECrater2017_int_base** = 33.1

**SPECrater2017_int_peak** = 34.6

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
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<td>557.xz_r</td>
<td>12</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Bronze 3104
- **Max MHz.:** 1700
- **Nominal:** 1700
- **Enabled:** 12 cores, 2 chips
- **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:** 8.25 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2133)
- **Storage:** 1 x 1200 GB SAS, 10000 RPM
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.3 (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 0.59 Released Feb-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;
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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</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:
LD_LIBRARY_PATH = "/spec/lib/ia32:/spec/lib/intel64:/spec/je5.0.1-32:/spec/je5.0.1-64"

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.:
numactl --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)
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**Huawei**

**Huawei XH321 V5 (Intel Xeon Bronze 3104)**

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

**Test Date:** Jun-2018  
**Hardware Availability:** Jul-2017  
**Software Availability:** Jan-2018

## 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  
ADDDC Sparing Set to Disabled  
Sysinfo program /spec/bin/sysinfo

Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on localhost.localdomain Thu Jun 14 10:41:17 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) Bronze 3104 CPU @ 1.70GHz  
2 "physical id"s (chips)  
12 "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 : 6  
siblings : 6  
physical 0: cores 0 1 2 3 4 5  
physical 1: cores 0 1 2 3 4 5

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 12  
On-line CPU(s) list: 0-11  
Thread(s) per core: 1  
Core(s) per socket: 6  
Socket(s): 2  
NUMA node(s): 2  
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) Bronze 3104 CPU @ 1.70GHz |
| Stepping:              | 4                                             |
| CPU MHz:               | 1700.000                                      |
| BogoMIPS:              | 3405.10                                       |
| Virtualization:        | VT-x                                          |
| L1d cache:             | 32K                                           |
| L1i cache:             | 32K                                           |
| L2 cache:              | 1024K                                         |
| L3 cache:              | 8448K                                         |
| NUMA node0 CPU(s):     | 0-5                                           |
| NUMA node1 CPU(s):     | 6-11                                          |

From /proc/cpuinfo cache data

```
cache size : 8448 KB
```

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
node 0 size: 195701 MB
node 0 free: 190783 MB
node 1 cpus: 6 7 8 9 10 11
node 1 size: 196608 MB
node 1 free: 192099 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

From /proc/meminfo

```
MemTotal:       395141652 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```
NAME="Red Hat Enterprise Linux Server"
VERSION="7.3 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.3"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
```

(Continued on next page)
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Platform Notes (Continued)

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 14 10:26

SPEC is set to: /spec
    Filesystem     Type  Size  Used  Avail  Use% Mounted on
    /dev/sda8      xfs   325G  145G  180G  45%  /

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. 0.59 02/24/2018
    Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2133

(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.
==============================================================================

==============================================================================
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.
==============================================================================

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541.leela_r(peak)

icpc (ICC) 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
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
SPEC CPU2017 Integer Rate Result

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| SPECrate2017_int_peak | 34.6 |

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

---

**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`

---

**Peak Portability Flags**

500.perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`

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

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 -03 -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 -03 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -03 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib
-ljemalloc

525.x264_r: basepeak = yes

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -03 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-64/lib -ljemalloc

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 -03 -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)
Peak Optimization Flags (Continued)

541.leela_r: Same as 520.omnetpp_r

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

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