## SPEC® CPU2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL360 Gen10  
(1.70 GHz, Intel Xeon Bronze 3106)

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<tr>
<td>Tested by: HPE</td>
<td>Hardware Availability: Oct-2017</td>
</tr>
<tr>
<td>CPU2017 License: 3</td>
<td>Test Date: Nov-2017</td>
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</table>

**SPECrate2017_int_base** = 44.7

**SPECrate2017_int_peak** = Not Run

### Hardware

- **CPU Name:** Intel Xeon Bronze 3106  
- **Max MHz.:** 1700  
- **Nominal:** 1700  
- **Enabled:** 16 cores, 2 chips  
- **Orderable:** 1, 2 chip(s)  
- **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:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2133)  
- **Storage:** 1 x 600 GB SATA SSD, RAID 0  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 (x86_64) SP2  
- **Kernel:** 4.4.21-68-default  
- **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:** HPE BIOS Version U32 released Oct-2017 (tested with U32 9/29/2017)  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1; 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 releases

### Benchmark Results

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<tr>
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<th>Rate</th>
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<td>16</td>
<td>44.3</td>
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<td>520.omnetpp_r</td>
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<td>525.x264_r</td>
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<td>531.deepsjeng_r</td>
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<td>541.leela_r</td>
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<td>548.exchange2_r</td>
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**SPECrate2017_int_base (44.7)**
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**RESULTS**  

| SPECrate2017_int_base = | 44.7 |  
| SPECrate2017_int_peak = | Not Run |  

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"  
Prior to runcpu invocation
Filesystme 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>  
irqbalance disabled with "service irqbalance stop"  
tuned profile set with "tuned-adm profile throughput-performance"  
VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"  
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"

**General Notes**

Environment variables set by runcpu before the start of the run:  
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/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
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<td>Software Availability:</td>
<td>Sep-2017</td>
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**Platform Notes**

BIOS Configuration:
- Thermal Configuration set to Maximum Cooling
- LLC Prefetch set to Enabled
- LLC Dead Line Allocation set to Disabled
- Memory Patrol Scrubbing set to Disabled
- Workload Profile set to General Throughput Compute
  - Minimum Processor Idle Power Core C-State set to C1E
- Workload Profile set to Custom
  - Sub-Numa Clustering set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-perm Sun Nov 12 22:29:02 2017

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 3106 CPU @ 1.70GHz
- 2 "physical id"s (chips)
- 16 "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: 8
  - 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): 16
- On-line CPU(s) list: 0-15
- Thread(s) per core: 1
- 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) Bronze 3106 CPU @ 1.70GHz
- Stepping: 4
- CPU MHz: 1696.014
- BogoMIPS: 3392.02
- Virtualization: VT-x
- L1d cache: 32K

(Continued on next page)
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platform Notes (Continued)

L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-3,8-11
NUMA node1 CPU(s): 4-7,12-15

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 bs rep_good ntopology nonstop_tsc
aperfmpref eagerfpu nni pclmulqdq dtsc64 monitor ds_cpl vmx smx est tm2 sse3 sbp
fma cx16 xtpr pdcn pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch arat epb pln pts dtherm intel_pt
tpr_shadow vnumi flexpriority ept vpid fsbsbase tsc_adjust bslh hle avx2 smep bmi2
erms invcnt rtm cqm mpmp avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsaveopt xsave xgetbv1 cqm_llc cqm_occup_llc

/format/cpuinfo cache data

cache size: 11264 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 8 9 10 11
node 0 size: 96350 MB
node 0 free: 91108 MB
node 1 cpus: 4 5 6 7 12 13 14 15
node 1 size: 96766 MB
node 1 free: 91550 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 197751660 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SUSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
NAME='SLES'
VERSION='12-SP2'

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Platform Notes (Continued)

VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
    Linux linux-perm 4.4.21-68-default #1 SMP Tue Oct 18 18:19:37 UTC 2016 (63cf368)
    x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 12 11:05

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 517G 80G 438G 16% /home

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 HPE U32 09/29/2017
Memory:
    24x UNKNOWN NOT AVAILABLE 8 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) 525.x264_r(base)
      557.xz_r(base)
==========================================================================================================

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.

==========================================================================================================
 FC  548.exchange2_r(base)
(Continued on next page)
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**Compiler Version Notes (Continued)**

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```plaintext
ifort (IFORT) 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`

---

**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`

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revG.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revG.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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