**SPEC® CPU2017 Integer Rate Result**

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Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL360 Gen10  
(2.20 GHz, Intel Xeon Silver 4114)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
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</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
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**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE  
**Test Date:** Oct-2017  
**Hardware Availability:** Oct-2017  
**Software Availability:** Sep-2017

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**Hardware**

**CPU Name:** Intel Xeon Silver 4114  
**Max MHz.:** 3000  
**Nominal:** 2200  
**Enabled:** 20 cores, 2 chips, 2 threads/core  
**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:** 13.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)  
**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
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ProLiant DL360 Gen10  
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CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE  

Test Date: Oct-2017  
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Software Availability: Sep-2017

### Results Table

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<td>64.3</td>
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</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"  
Prior to runcpu invocation  
Filesystem page cache synced and cleared with:  
  sync; echo 3> /proc/sys/vm/drop_caches  
runspec command invoked through numactl i.e.:  
umactl --interleave=all runspec <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"  
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/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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SPECrate2017_int_peak = Not Run
SPECrate2017_int_base = 93.2

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Test Date: Oct-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Platform Notes

BIOS Configuration:
Thermal Configuration set to Maximum Cooling
LLC Prefetcher set to Enabled
LLC Dead Line Allocation set to Disabled
Stale A to S 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
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-perm Tue Oct 17 22:03:24 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) Silver 4114 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2194.848
BogoMIPS: 4389.69
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Platform Notes (Continued)

- L2 cache: 1024K
- L3 cache: 14080K
- NUMA node0 CPU(s): 0-9, 20-29
- NUMA node1 CPU(s): 10-19, 30-39
- Flags: fpu vme de pse tsc msr pae 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 ntop xtopology nonstop_tsc aperfmperf eagerfpu nni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcpid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cqm_llc cqm_occup_llc

/proc/cpuinfo cache data
- cache size: 14080 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 6 7 8 9 20 21 22 23 24 25 26 27 28 29
- node 0 size: 96348 MB
- node 0 free: 84492 MB
- node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
- node 1 size: 96764 MB
- node 1 free: 85089 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

From /proc/meminfo
- MemTotal: 197747456 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"
  - VERSION_ID="12.2"

(Continued on next page)
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SPECrate2017_int_peak = Not Run

Platform Notes (Continued)

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

runch-level 3 Oct 17 04:43

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 517G 99G 419G 20% /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 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) 18.0.0 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)

```
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
  -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
  ```

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- 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-revD.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-revD.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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