## SPEC® CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL560 Gen10  
(3.00 GHz, Intel Xeon Platinum 8158)

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### Threads

<table>
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<tr>
<th>Benchmark</th>
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<th>SPECspeed2017_int_base</th>
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<td>8.85</td>
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<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>10.9</td>
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<td>620.omnetpp_s</td>
<td>48</td>
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</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>48</td>
<td>9.38</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>48</td>
<td>11.4</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
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<td>641.leela_s</td>
<td>48</td>
<td>4.30</td>
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<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>13.4</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>48</td>
<td>22.5</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8158  
- **Max MHz.:** 3700  
- **Nominal:** 3000  
- **Enabled:** 48 cores, 4 chips  
- **Orderable:** 1, 2, 4 chip(s)  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 24.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 480 GB SSD SATA, RAID 0  
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux Server release 7.3  
- **Kernel:** 4.4.73-5-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  
- **Firmware:** HPE BIOS Version U34 released Oct-2017 (tested with U34 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 via jemalloc.net
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Threads</th>
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<td>48</td>
<td>275</td>
<td>22.5</td>
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</table>

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
irqbalance disabled with "systemctl stop irqbalance"
tuned profile set with "tuned-adm profile throughput-performance"

General Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/cpu2017/lib/ia32:/cpu2017/lib/intel64:/cpu2017/je5.0.1-32"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4

Platform Notes

BIOS Configuration:
Intel Hyperthreading set to Disabled
Thermal Configuration set to Maximum Cooling
Memory Patrol Scrubbing set to Disabled
LLC Prefetcher set to Enabled
LLC Dead Line Allocation set to Disabled
Stale A to S set to Enabled
Workload Profile set to General Peak Frequency Compute

(Continued on next page)
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Tested by: HPE
Test Date: Oct-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Platform Notes (Continued)

Energy/Performance Bias set to Maximum Performance
Uncore Frequency Scaling set to Auto
Workload Profile set to General Peak Frequency Compute
NUMA Group Size Optimization set to Flat

Sysinfo program /cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c91c0f
running on DL560-Gen10 Fri Oct 20 13:44:01 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) Platinum 8158 CPU @ 3.00GHz
  4 "physical id"s (chips)
  48 "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 : 12
siblings : 12
physical 0: cores 0 1 3 9 10 16 18 19 24 25 26 27
physical 1: cores 0 2 3 4 9 10 16 18 19 25 26
physical 2: cores 0 2 3 4 9 10 16 18 19 25 26
physical 3: cores 0 2 3 4 9 10 16 18 19 25 26

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 12
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8158 CPU @ 3.00GHz
Stepping: 4
CPU MHz: 3000.000
BogoMIPS: 6006.11
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K

(Continued on next page)
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**Platform Notes (Continued)**

```
L3 cache: 25344K  
NUMA node0 CPU(s): 0-11  
NUMA node1 CPU(s): 12-23  
NUMA node2 CPU(s): 24-35  
NUMA node3 CPU(s): 36-47
```

```
/platforminfo cache data  
cache size: 25344 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 4 5 6 7 8 9 10 11  
node 0 size: 196266 MB  
node 0 free: 191461 MB  
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23  
node 1 size: 196608 MB  
node 1 free: 192279 MB  
node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35  
node 2 size: 196608 MB  
node 2 free: 192015 MB  
node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47  
node 3 size: 196607 MB  
node 3 free: 192290 MB  
node distances:  
node 0 1 2 3  
0: 10 21 21 21  
1: 21 10 21 21  
2: 21 21 10 21  
3: 21 21 21 10
```

From `/proc/meminfo`  
```
MemTotal: 792074900 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

From `/etc/*release* /etc/*version*`  
```
os-release:  
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)
```

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**Platform Notes (Continued)**

```
system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)  
uname -a:  
  Linux DL560-Gen10 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016 x86_64  
  x86_64 x86_64 GNU/Linux  
run-level 3 Oct 20 11:54  
SPEC is set to: /cpu2017  
  Filesystem      Type  Size  Used Avail Use% Mounted on  
  /dev/sdb1       xfs   447G   32G  416G   7% /
```

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 U34 09/29/2017  
Memory:  
  48x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666  

(End of data from sysinfo program)

**Compiler Version Notes**

```
------------------------------------------------------------------
 CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)  
     657.xz_s(base)  
------------------------------------------------------------------
 icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
------------------------------------------------------------------
 CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)  
      641.leela_s(base)  
------------------------------------------------------------------
 icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
------------------------------------------------------------------
 FC 648.exchange2_s(base)  
------------------------------------------------------------------
 ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
------------------------------------------------------------------
```

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**Compiler Version Notes (Continued)**

**Base Compiler Invocation**

C benchmarks:
```
icc
```

C++ benchmarks:
```
icpc
```

Fortran benchmarks:
```
ifort
```

**Base Portability Flags**

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:
```
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-IP/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:
```
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -I/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:
```
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-IP/usr/local/je5.0.1-64/lib -ljemalloc
```
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### 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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