SPEC® CPU2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(3.60 GHz, Intel Xeon Platinum 8156)

SPECspeed2017_int_base = 8.19
SPECspeed2017_int_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>8</td>
<td>6.10</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>8</td>
<td>8.77</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>8</td>
<td>11.0</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>8</td>
<td>5.38</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>8</td>
<td>9.18</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>8</td>
<td>11.6</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>8</td>
<td>5.06</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>8</td>
<td>4.32</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>8</td>
<td>13.3</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>8</td>
<td>13.7</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Platinum 8156
Max MHz.: 3700
Nominal: 3600
Enabled: 8 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: 16.5 MB I+D on chip per chip
Other: None
Memory: 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 400 GB SATA SSD, RAID 0
Other: None

Software
OS: Red Hat Enterprise Linux Server release 7.3
(Maipo)
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: Yes
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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CPU2017 License: 3
Test Sponsor: HPE
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Test Date: Nov-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>8</td>
<td>291</td>
<td>6.09</td>
<td>290</td>
<td>6.12</td>
<td>291</td>
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<td>gcc_s</td>
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<td>mcf_s</td>
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<td>11.0</td>
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<td>omnetpp_s</td>
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<td>5.38</td>
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<td>302</td>
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<td>xalancbmk_s</td>
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<td>9.14</td>
<td>154</td>
<td>9.18</td>
<td>152</td>
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<tr>
<td>x264_s</td>
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<td>152</td>
<td>11.6</td>
<td>152</td>
<td>11.6</td>
<td>151</td>
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<tr>
<td>deepsjeng_s</td>
<td>8</td>
<td>283</td>
<td>5.06</td>
<td>283</td>
<td>5.07</td>
<td>283</td>
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<tr>
<td>leela_s</td>
<td>8</td>
<td>395</td>
<td>4.32</td>
<td>395</td>
<td>4.32</td>
<td>395</td>
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<tr>
<td>exchange2_s</td>
<td>8</td>
<td>220</td>
<td>13.3</td>
<td>221</td>
<td>13.3</td>
<td>220</td>
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<tr>
<td>xz_s</td>
<td>8</td>
<td>452</td>
<td>13.7</td>
<td>450</td>
<td>13.7</td>
<td>452</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.19
SPECspeed2017_int_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"
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
IRQ balance service was stop using "service irqbalance stop"
Tuned-adm profile was set to Throughtput-Performance

General Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
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
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Memory Patrol Scrubbing set to Disabled
Workload Profile set to General Peak Frequency Compute

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

Energy/Performance Bias set to Maximum Performance
Workload Profile set to Custom
NUMA Group Size Optimization set to Flat
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on DL360G10 Wed Nov 15 14:22:12 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 8156 CPU @ 3.60GHz
 2 "physical id"s (chips)
 8 "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 : 4
  siblings : 4
  physical 0: cores 1 2 5 11
  physical 1: cores 1 5 9 13
```

From lscpu:
```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                8
On-line CPU(s) list:   0-7
Thread(s) per core:    1
Core(s) per socket:    4
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz
Stepping:              4
CPU MHz:               3600.000
BogoMIPS:              7206.93
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              16896K
NUMA node0 CPU(s):     0-3
NUMA node1 CPU(s):     4-7
```

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Platform Notes (Continued)

/proc/cpuinfo cache data
  cache size : 16896 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
  node 0 size: 97964 MB
  node 0 free: 94032 MB
  node 1 cpus: 4 5 6 7
  node 1 size: 98303 MB
  node 1 free: 95447 MB
  node distances:
    node 0 1
    0:  10  21
    1:  21  10

From /proc/meminfo
  MemTotal:       197751968 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)
  system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

uname -a:
  Linux DL360G10 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 Nov 15 10:04

SPEC is set to: /home/cpu2017
  Filesystem    Type  Size  Used  Avail Use% Mounted on
  /dev/mapper/rhel_dl360g10-home  xfs  318G   40G  279G  13%  /home

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)
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Platform Notes (Continued)
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
(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.
------------------------------------------------------------------------------

Base Compiler Invocation
C benchmarks:
icc
C++ benchmarks:
icpc
Fortran benchmarks:
ifort
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### 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:**
- -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- -L/usr/local/je5.0.1-64/lib -ljemalloc

**C++ benchmarks:**
- -Wl,-z,muldefs -xCORE-AVX512 -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-AVX512 -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
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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](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](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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