SPEC® CPU2017 Integer Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.40 GHz, Intel Xeon Gold 6128)

SPECspeed2017_int_base = 8.61
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>SPECspeed2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>24</td>
<td>6.10</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>8.76</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>24</td>
<td>11.0</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>24</td>
<td>5.65</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>24</td>
<td>9.24</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>24</td>
<td>11.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>24</td>
<td>5.94</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>24</td>
<td>4.13</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>24</td>
<td>13.3</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

--- SPECspeed2017_int_base (8.61) ---

Hardware

CPU Name: Intel Xeon Gold 6128
Max MHz.: 3700
Nominal: 3400
Enabled: 24 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: 19.25 MB I+D on chip per chip
Other: None
Memory: 384 GB (48 x 8 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 960 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++
Fortran: Version 18.0.0.128 of Intel Fortran
Parallel: Yes
Firmware: HPE BIOS Version U34 09/29/2017 released Oct-2017
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator library V5.0.1
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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>24</td>
<td>291</td>
<td>6.10</td>
<td>293</td>
<td>6.06</td>
<td>288</td>
<td>6.17</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>455</td>
<td>8.75</td>
<td>289</td>
<td>5.65</td>
<td>288</td>
<td>5.66</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>24</td>
<td>430</td>
<td>11.0</td>
<td>154</td>
<td>9.21</td>
<td>153</td>
<td>9.24</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>24</td>
<td>289</td>
<td>5.65</td>
<td>289</td>
<td>5.65</td>
<td>288</td>
<td>5.66</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>24</td>
<td>285</td>
<td>5.04</td>
<td>285</td>
<td>5.04</td>
<td>285</td>
<td>5.03</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>24</td>
<td>394</td>
<td>4.33</td>
<td>394</td>
<td>4.33</td>
<td>394</td>
<td>4.33</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>24</td>
<td>221</td>
<td>13.3</td>
<td>220</td>
<td>13.4</td>
<td>221</td>
<td>13.3</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24</td>
<td>287</td>
<td>21.5</td>
<td>288</td>
<td>21.5</td>
<td>285</td>
<td>21.7</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.61
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
Filesystem page cache cleared with:
  shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
irqbalance service stopped using "systemctl stop irqbalance.service"
Used throughput-performance profile for tuned-adm: "tuned-adm profile throughput-performance profile"

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
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.40 GHz, Intel Xeon Gold 6128)

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

SPECspeed2017_int_base = 8.61
SPECspeed2017_int_peak = Not Run

General Notes (Continued)

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.htm.

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; built with RedHat Enterprise 7.4, and the system compiler gcc 4.8.5; sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

Platform Notes

BIOS Configuration:
Intel Hyper-Threading 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
Stale A to S set to Enabled
Workload Profile set to General Peak Frequency Compute
   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 96c45e4568ad54c135fd618bccc091c0f
running on DL560G10 Tue Dec 12 17:49:43 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) Gold 6128 CPU @ 3.40GHz
  4 "physical id"s (chips)
  24 "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 6 9 10 11 13
physical 1: cores 0 6 9 10 11 13

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.40 GHz, Intel Xeon Gold 6128)

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

**SPECspeed2017_int_base = 8.61**

**SPECspeed2017_int_peak = Not Run**

Platform Notes (Continued)

```plaintext
physical 2: cores 0 6 9 10 11 13
physical 3: cores 0 6 9 10 11 13

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6128 CPU @ 3.40GHz
Stepping: 4
CPU MHz: 3400.000
BogoMIPS: 6806.80
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-5
NUMA node1 CPU(s): 6-11
NUMA node2 CPU(s): 12-17
NUMA node3 CPU(s): 18-23
```

```
/proc/cpuinfo cache data

        cache size : 19712 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

From /proc/meminfo

        MemTotal:       395930336 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"

(Continued on next page)
```
SPEC CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.40 GHz, Intel Xeon Gold 6128)

| SPECspeed2017_int_base = 8.61 |
| SPECspeed2017_int_peak = Not Run |

| CPU2017 License: 3 | Test Date: Dec-2017 |
| Test Sponsor: HPE | Hardware Availability: Oct-2017 |
| Tested by: HPE | Software Availability: Sep-2017 |

---

**Platform Notes (Continued)**

```
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 DL560G10 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016 x86_64 x86_64 GNU/Linux
```
run-level 3 Dec 12 13:35

SPEC is set to: /home/cpu2017
```
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel_dl560g10-home xfs 839G 40G 799G 5% /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 U34 09/29/2017
Memory:
48x 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.
```

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.40 GHz, Intel Xeon Gold 6128)

SPECspeed2017_int_base = 8.61
SPECspeed2017_int_peak = Not Run

Compiler Version Notes (Continued)

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

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-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:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.40 GHz, Intel Xeon Gold 6128)

SPECspeed2017_int_base = 8.61
SPECspeed2017_int_peak = Not Run

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

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

Base Optimization Flags (Continued)

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

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-revH.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-revH.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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