Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(3.00 GHz, Intel Xeon Platinum 8158)

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

Hewlett Packard Enterprise
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SPECspeed2017_int_base = 8.70
SPECspeed2017_int_peak = Not Run

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>24</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>24</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>24</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>24</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>24</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>24</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>24</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>24</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>24</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.70

Hardware

CPU Name: Intel Xeon Platinum 8158
Max MHz.: 3700
Nominal: 3000
Enabled: 24 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: 24.75 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 480 GB SATA SSD, RAID 0
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
Kernel 3.10.0-693.el7.x86_64
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
Firmware: HPE BIOS Version I41 11/14/2017 released Nov-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
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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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>24</td>
<td>290</td>
<td>6.12</td>
<td>287</td>
<td>6.18</td>
<td>288</td>
<td>6.17</td>
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<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>445</td>
<td>8.94</td>
<td>448</td>
<td>8.89</td>
<td>448</td>
<td>8.89</td>
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<tr>
<td>605.mcf_s</td>
<td>24</td>
<td>430</td>
<td>11.0</td>
<td>435</td>
<td>10.9</td>
<td>435</td>
<td>10.9</td>
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<tr>
<td>620.omnetpp_s</td>
<td>24</td>
<td>263</td>
<td>6.20</td>
<td>258</td>
<td>6.32</td>
<td>259</td>
<td>6.30</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>24</td>
<td>151</td>
<td>9.38</td>
<td>152</td>
<td>9.31</td>
<td>153</td>
<td>9.29</td>
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<tr>
<td>625.x264_s</td>
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<td>11.7</td>
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<td>11.7</td>
<td>151</td>
<td>11.7</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>5.04</td>
<td>285</td>
<td>5.03</td>
<td>285</td>
<td>5.04</td>
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<tr>
<td>641.leela_s</td>
<td>24</td>
<td>395</td>
<td>4.32</td>
<td>395</td>
<td>4.32</td>
<td>395</td>
<td>4.32</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>24</td>
<td>221</td>
<td>13.3</td>
<td>223</td>
<td>13.2</td>
<td>220</td>
<td>13.4</td>
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<tr>
<td>657.xz_s</td>
<td>24</td>
<td>296</td>
<td>20.9</td>
<td>296</td>
<td>20.9</td>
<td>295</td>
<td>20.9</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base =  8.70
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

(Continued on next page)
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Test Sponsor: HPE
Tested by: HPE

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

General Notes (Continued)

Software described on this result page.

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
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 96c45e4568ad54c135fd618bcc091c0f
running on bl460c16 Mon Dec 11 17:50:28 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
  2 "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 : 12
siblings : 12
physical 0: cores 0 1 2 3 4 9 10 16 18 19 25 26
physical 1: cores 0 1 2 3 4 9 10 16 18 19 25 26

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| SPECspeed2017_int_base | 8.70 |
| SPECspeed2017_int_peak | Not Run |

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Platform Notes (Continued)

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: 12
Socket(s): 2
NUMA node(s): 2
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: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-11
NUMA node1 CPU(s): 12-23
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref perf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma
cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ebx cat_13 cdp_13 intel_pt
tptr_shadow vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle smp bmi2
ems invpcid rtm cqm mpx rd_t a avx512f avx512dq rdseed adx smap clflushopt clwb
avx512cd avx512bw avx512vl xsaves opt xsaveopt xsavexc xgetbv1 cqm_l1c cqm_occup_l1c
cqm_mbb_total cqm_mbb_local dtherm ida arat p1n pts

From /proc/cpuinfo cache data
  cache size: 25344 KB

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

From /proc/meminfo
  MemTotal: 197750296 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

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

From /etc/*release* /etc/*version*  
```bash
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.4 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VARIANT="Server"
  VARIANT_ID="server"
  VERSION_ID="7.4"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server
```

```bash
uname -a:
Linux bl460c16 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017 x86_64 x86_64 GNU/Linux
run-level 3 Dec 11 17:46
```

SPEC is set to: /home/cpu2017  
```bash
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home  xfs   839G   38G  802G   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 I41 11/14/2017  
Memory:  
4x UNKNOWN NOT AVAILABLE  
12x 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.
```

(Continued on next page)
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Compiler Version Notes (Continued)

CXXC 620.omnetpp_s(base) 623.xalanchbk_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

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.xalanchbk_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`

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

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

Tested with SPEC CPU2017 v1.0.2 on 2017-12-11 17:50:27-0500.
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