**SPEC® CPU2017 Integer Speed Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
Synergy 480 Gen10  
(3.50 GHz, Intel Xeon Gold 6144)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
<th>Test Date</th>
<th>Software Availability</th>
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</thead>
</table>

**CPU2017 License:** 3  
**Tested by:** HPE

**SPECspeed2017_int_base** = 9.61  
**SPECspeed2017_int_peak** = Not Run

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### Threads

<table>
<thead>
<tr>
<th>Test</th>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>16</td>
<td>9.71</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>16</td>
<td>12.0</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>16</td>
<td>6.72</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>16</td>
<td>10.5</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>16</td>
<td>13.0</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>16</td>
<td>5.61</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>16</td>
<td>4.91</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>16</td>
<td>15.2</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>16</td>
<td>21.5</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed2017_int_base (9.61)**

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### Hardware

- **CPU Name:** Intel Xeon Gold 6144  
- **Max MHz.:** 4200  
- **Nominal:** 3500  
- **Enabled:** 16 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:** 384 GB (24 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 7.3 (Maipo)  
- **Kernel:** 3.10.0-514.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 I42 09/27/2017 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
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SPECspeed2017_int_base = 9.61
SPECspeed2017_int_peak = Not Run

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>
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<tbody>
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<tr>
<td>Base</td>
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<td>600.perlbench_s</td>
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<tr>
<td>620.omnetpp_s</td>
<td>16</td>
<td>239</td>
<td>6.82</td>
<td>243</td>
<td>6.72</td>
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<td>6.59</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>16</td>
<td>135</td>
<td>10.5</td>
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<td>10.5</td>
<td>136</td>
<td>10.5</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>16</td>
<td>136</td>
<td>13.0</td>
<td>136</td>
<td>13.0</td>
<td>136</td>
<td>13.0</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>16</td>
<td>256</td>
<td>5.61</td>
<td>256</td>
<td>5.61</td>
<td>256</td>
<td>5.60</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>16</td>
<td>348</td>
<td>4.91</td>
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<td>4.91</td>
<td>347</td>
<td>4.91</td>
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<tr>
<td>648.exchange2_s</td>
<td>16</td>
<td>194</td>
<td>15.2</td>
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<td>15.2</td>
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<td>15.2</td>
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<tr>
<td>657.xz_s</td>
<td>16</td>
<td>288</td>
<td>21.5</td>
<td>285</td>
<td>21.7</td>
<td>288</td>
<td>21.5</td>
</tr>
</tbody>
</table>

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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SPECspeed2017_int_base = 9.61
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

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

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.

ejemalloc: 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;

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 96c45e4568ad54c135fd618bce091c0f
running on SY480_Hjp_RHEL Fri Dec 22 13:57:04 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 6144 CPU @ 3.50GHz
  2 "physical id"s (chips)
  16 "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 : 8
siblings : 8
  physical 0: cores 0 2 3 9 16 19 26 27
  physical 1: cores 0 2 3 9 16 19 26 27

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<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From lscpu:</td>
</tr>
<tr>
<td>Architecture: x86_64</td>
</tr>
<tr>
<td>CPU op-mode(s): 32-bit, 64-bit</td>
</tr>
<tr>
<td>Byte Order: LittleEndian</td>
</tr>
<tr>
<td>CPU(s): 16</td>
</tr>
<tr>
<td>On-line CPU(s) list: 0-15</td>
</tr>
<tr>
<td>Thread(s) per core: 1</td>
</tr>
<tr>
<td>Core(s) per socket: 8</td>
</tr>
<tr>
<td>Socket(s): 2</td>
</tr>
<tr>
<td>NUMA node(s): 2</td>
</tr>
<tr>
<td>Vendor ID: GenuineIntel</td>
</tr>
<tr>
<td>CPU family: 6</td>
</tr>
<tr>
<td>Model: 85</td>
</tr>
<tr>
<td>Model name: Intel(R) Xeon(R) Gold 6144 CPU @ 3.50GHz</td>
</tr>
<tr>
<td>Stepping: 4</td>
</tr>
<tr>
<td>CPU MHz: 3500.000</td>
</tr>
<tr>
<td>BogoMIPS: 7006.66</td>
</tr>
<tr>
<td>Virtualization: VT-x</td>
</tr>
<tr>
<td>L1d cache: 32K</td>
</tr>
<tr>
<td>L1i cache: 32K</td>
</tr>
<tr>
<td>L2 cache: 1024K</td>
</tr>
<tr>
<td>L3 cache: 25344K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s): 0-7</td>
</tr>
<tr>
<td>NUMA node1 CPU(s): 8-15</td>
</tr>
</tbody>
</table>

/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: 395932000 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"

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Platform Notes (Continued)

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 SY480_Hjp_RHEL 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 Dec 22 13:53
SPEC is set to: /home/cpu2017
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   392G   29G  363G   8% /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 I42 09/27/2017
Memory:
    24x 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

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Test Date: Dec-2017
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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:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -gopenmp -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

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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-revH.html](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](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 2017-12-22 13:57:03-0500.  