**SPEC® CPU2017 Floating Point Speed Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL560 Gen10  
(2.40 GHz, Intel Xeon Gold 6148)

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

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
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<tbody>
<tr>
<td>165</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

**Tested by:** HPE  
**Hardware Availability:** Oct-2017  
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### Threads

<table>
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<th>SPECspeed2017_fp_base (165)</th>
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<tbody>
<tr>
<td>0</td>
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<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>603.bwaves_s 80</td>
</tr>
<tr>
<td>607.cactuBSSN_s 80</td>
</tr>
<tr>
<td>619.lbm_s 80</td>
</tr>
<tr>
<td>621.wrf_s 80</td>
</tr>
<tr>
<td>627.cam4_s 80</td>
</tr>
<tr>
<td>628.pop2_s 80</td>
</tr>
<tr>
<td>638.imagick_s 80</td>
</tr>
<tr>
<td>644.nab_s 80</td>
</tr>
<tr>
<td>649.fotonik3d_s 80</td>
</tr>
<tr>
<td>654.roms_s 80</td>
</tr>
</tbody>
</table>

### 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 released Oct-2017 (tested with U34 9/29/2017)  
- **File System:** xfs  
- **System State:** Run level 3 (mult-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None  

### Hardware

- **CPU Name:** Intel Xeon Gold 6148  
- **Max MHz.:** 3700  
- **Nominal:** 2400  
- **Enabled:** 80 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:** 27.5 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 SATA SSD, RAID 0  
- **Other:** None
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SPECspeed2017_fp_base = 165
SPECspeed2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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SPECspeed2017_fp_base = 165
SPECspeed2017_fp_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 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=core,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
    Stale A to S set to Enabled
    Memory Patrol Scrubbing set to Disabled
    Workload Profile set to General Peak Frequency Compute

(Continued on next page)
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Test Date: Dec-2017
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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 localhost.localdomain Fri Dec 1 13:32:55 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 6148 CPU @ 2.40GHz
- 4 "physical id"s (chips)
- 80 "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: 20
  - siblings: 20
  - physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  - physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  - physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  - physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 80
- On-line CPU(s) list: 0-79
- Thread(s) per core: 1
- Core(s) per socket: 20
- Socket(s): 4
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
- Stepping: 4
- CPU MHz: 2400.000
- BogoMIPS: 4806.27
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 28160K
- NUMA node0 CPU(s): 0-19

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Platform Notes (Continued)

NUMA node1 CPU(s): 20–39
NUMA node2 CPU(s): 40–59
NUMA node3 CPU(s): 60–79

/procl/cpuintinfo cache data
    cache size : 28160 KB

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

From /proc/meminfo
    MemTotal: 792070276 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 localhost.localdomain 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 30 10:11

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sdb1 xfs 447G 30G 417G 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

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Platform Notes (Continued) 
(End of data from sysinfo program) 

Compiler Version Notes 
============================================================================== 
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base) 
============================================================================== 
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved. 
============================================================================== 
FC  607.cactuBSSN_s(base) 
============================================================================== 
icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
ifort (IFORT) 18.0.0 20170811  
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============================================================================== 
ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved. 
============================================================================== 
Base Compiler Invocation 
C benchmarks: 
icc  
Fortran benchmarks: 
ifort 

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Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte
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Base Other Flags

C benchmarks:
-m64 -std=c11

Fortran benchmarks:
-m64

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11

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 2017-12-01 14:32:54-0500.