# CPU2017 Floating Point Speed Result

## CPU2017 License: 3

### Test Sponsor: HPE

### Tested by: HPE

### Test Date: Oct-2017

### Hardware Availability: Oct-2017

### Software Availability: Sep-2017

## Hewlett Packard Enterprise

### ProLiant DL360 Gen10 (2.10 GHz, Intel Xeon Silver 4116)

**SPECspeed2017_fp_base** = 76.4

**SPECspeed2017_fp_peak** = Not Run

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>57.0</td>
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<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>48.7</td>
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<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>51.7</td>
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<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>60.1</td>
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<tr>
<td>628.pop2_s</td>
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<td>107</td>
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<td>638.imagick_s</td>
<td>24</td>
<td>69.8</td>
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<tr>
<td>644.nab_s</td>
<td>24</td>
<td>70.7</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>80.7</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>98.0</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4116
- **Max MHz.:** 3000
- **Nominal:** 2100
- **Enabled:** 24 cores, 2 chips
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 16.5 MB I+D on chip per chip
- **Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 600 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 U32 released Oct-2017 (tested with U32 9/29/2017)
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
SPEC CPU2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.10 GHz, Intel Xeon Silver 4116)

SPECspeed2017_fp_base = 76.4
SPECspeed2017_fp_peak = Not Run

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Results Table

<table>
<thead>
<tr>
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<th>Seconds</th>
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</table>

SPECspeed2017_fp_base = 76.4
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 wtih "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"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/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 Prefetcher set to Enabled
LLC Dead Line Allocation set to Disabled
Stale A to S set to Disabled
Memory Patrol Scrubbing set to disabled

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.10 GHz, Intel Xeon Silver 4116)

Specspeed2017_fp_base = 76.4
Specspeed2017_fp_peak = Not Run

CPU2017 License: 3
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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 DL360G10 Thu Oct 12 10:49:32 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) Silver 4116 CPU @ 2.10GHz
  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 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 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: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2100.000
BogoMIPS: 4205.21
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-11
NUMA node1 CPU(s): 12-23

(Continued on next page)
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Software Availability: Sep-2017

Platform Notes (Continued)

/proc/cpupinfo cache data
  cache size : 16896 KB

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

From /proc/meminfo
  MemTotal: 197750684 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 GNU/Linux
run-level 3 Oct 12 02:28

SPEC is set to: /home/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/mapper/rhel_dl360g10-home xfs 504G 37G 467G 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 U32 09/29/2017
  Memory:
    24x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
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<tr>
<td>icc (ICC) 18.0.0 20170811</td>
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<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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==-----------------------------------------------==

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

(Continued on next page)
### SPEC CPU2017 Floating Point Speed Result

**Hewlett Packard Enterprise**
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ProLiant DL360 Gen10
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<td></td>
</tr>
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</table>

**Base Compiler Invocation (Continued)**

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

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
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<tbody>
<tr>
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<td><code>-DSPEC_LP64</code> <code>-DSPEC_CASE_FLAG</code> <code>-convert big_endian</code> <code>-assume bytelecl</code></td>
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</table>

### 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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ProLiant DL360 Gen10  
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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-revD.html](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revD.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-revD.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revD.xml)

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Tested with SPEC CPU2017 v1.0.2 on 2017-10-12 10:49:31-0400.  
Report generated on 2018-10-31 13:00:50 by CPU2017 PDF formatter v6067.  
Originally published on 2017-11-14.