## SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(3.20 GHz, Intel Xeon Gold 6146)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>105</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Thread</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24 threads</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24 threads</td>
</tr>
</tbody>
</table>

**CPU Name:** Intel Xeon Gold 6146  
**Max MHz:** 4200  
**Nominal:** 3200  
**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:** 24.75 MB I+D on chip per chip  
**Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R)  
**Storage:** 1 x 960 GB SSD SATA, 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 U30 released Oct-2017 (tested with U30 9/29/2017)  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** None  
**Power Management:** --
Hewlett Packard Enterprise
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ProLiant DL380 Gen10
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CPU2017 License: 3
Test Sponsor: HPE
Test Date: Oct-2017
Tested by: HPE
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<td><strong>93.9</strong></td>
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<td>94.2</td>
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<td>93.9</td>
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<tr>
<td>644.nab_s</td>
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<td>170</td>
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<td>169</td>
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<td>649.fotonik3d_s</td>
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<td><strong>108</strong></td>
<td><strong>84.8</strong></td>
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<td>85.1</td>
<td>108</td>
<td>84.6</td>
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<td>654.roms_s</td>
<td>24</td>
<td>139</td>
<td>113</td>
<td><strong>139</strong></td>
<td><strong>113</strong></td>
<td>139</td>
<td>113</td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 105
SPECspeed®2017_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"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017/je5.0.1-64"
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
  Memory Patrol Scrubbing set to Disabled
  LLC Prefetcher set to Enabled
  LLC Dead Line Allocation set to Disabled
  Workload Profile set to General Peak Frequency Compute
  Energy/Performance Bias set to Maximum Performance

(Continued on next page)
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CPU2017 License: 3
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Platform Notes (Continued)

Uncore Frequency Scaling set to Auto
Workload Profile set to General Peak Frequency Compute
NUMA Group Size Optimization set to Flat

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bdc091c0f
running on DL380Gen10 Fri Oct 13 08:37:49 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 6146 CPU @ 3.20GHz
  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 8 9 10 11 18 19 24 27
  physical 1: cores 0 1 2 3 4 8 9 11 17 18 19 20

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) Gold 6146 CPU @ 3.20GHz
Stepping:              4
CPU MHz:               3200.000
BogoMIPS:              6406.16
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

(Continued on next page)
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Platform Notes (Continued)

/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: 197573260 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 DL380Gen10 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 Oct 13 08:36

SPEC is set to: /home/cpu2017
  Filesystem   Type  Size  Used  Avail  Use% Mounted on
  /dev/mapper/rhel-home xfs   839G  29G  811G   4% /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 U30 09/29/2017
  Memory:
    24x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666

(End of data from sysinfo program)
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Compiler Version Notes

==============================================================================
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<tbody>
<tr>
<td>icc (ICC) 18.0.0 20170811</td>
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<tr>
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<td>C++, C, Fortran</td>
<td>607.cactuBSSN_s(base)</td>
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<td>==============================================================================</td>
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Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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**Base Compiler Invocation (Continued)**

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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</table>

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

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

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

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