SPEC® CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.60 GHz, Intel Xeon Silver 4112)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>41.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

Threads:

- 603.bwaves_s: 8, SPECspeed2017_fp_base: 46.8
- 607.cactuBSSN_s: 8, SPECspeed2017_fp_base: 28.0
- 619.libm_s: 8, SPECspeed2017_fp_base: 32.3
- 621.wrf_s: 8, SPECspeed2017_fp_base: 20.0
- 627.cam4_s: 8, SPECspeed2017_fp_base: 33.6
- 628.pop2_s: 8, SPECspeed2017_fp_base: 26.1
- 638.imagick_s: 8, SPECspeed2017_fp_base: 45.0
- 644.nab_s: 8, SPECspeed2017_fp_base: 49.5
- 649.fotonik3d_s: 8, SPECspeed2017_fp_base: 40.0

--- SPECspeed2017_fp_base (41.4) ---

Hardware

CPU Name: Intel Xeon Silver 4112
Max MHz.: 3000
Nominal: 2600
Enabled: 8 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: 8.25 MB I+D on chip per chip
Other: None
Memory: 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)
Storage: 1 x 960 GB SATA SSD, RAID 0
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.3 (Maipo),
Kernel 3.10.0-514.6.1.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
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
**SPEC CPU2017 Floating Point Speed Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.60 GHz, Intel Xeon Silver 4112)

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Sponsor: HPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Date:</td>
<td>Hardware Availability: Oct-2017</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Software Availability: Sep-2017</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base =** 41.4  
**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>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>264</td>
<td></td>
<td>264</td>
<td></td>
<td>264</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>356</td>
<td><strong>46.8</strong></td>
<td>355</td>
<td>47.0</td>
<td>356</td>
<td>46.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>188</td>
<td>27.9</td>
<td>187</td>
<td><strong>28.0</strong></td>
<td>187</td>
<td>28.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td><strong>409</strong></td>
<td><strong>32.3</strong></td>
<td>408</td>
<td>32.4</td>
<td>410</td>
<td>32.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>443</td>
<td>20.0</td>
<td>443</td>
<td><strong>47.0</strong></td>
<td>443</td>
<td><strong>20.0</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>8</td>
<td>354</td>
<td>33.5</td>
<td>351</td>
<td>33.8</td>
<td><strong>354</strong></td>
<td><strong>33.6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>554</td>
<td>26.0</td>
<td>553</td>
<td><strong>26.1</strong></td>
<td>552</td>
<td>26.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>8</td>
<td>389</td>
<td>45.0</td>
<td>388</td>
<td><strong>45.0</strong></td>
<td>388</td>
<td>45.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>183</td>
<td>49.7</td>
<td><strong>184</strong></td>
<td><strong>49.5</strong></td>
<td>184</td>
<td>49.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>8</td>
<td>393</td>
<td>40.0</td>
<td><strong>393</strong></td>
<td><strong>40.0</strong></td>
<td>394</td>
<td>40.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base =** 41.4  
**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 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 = "/spec2017/lib/ia32:/spec2017/lib/intel64:/spec2017/je5.0.1-32"
- LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/spec2017/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
  - 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

(Continued on next page)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.60 GHz, Intel Xeon Silver 4112)  

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Oct-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Oct-2017</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Sep-2017</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 41.4  
SPECspeed2017_fp_peak = Not Run

Platform Notes (Continued)

Energy/Performance Bias set to Maximum Performance  
Workload Profile set to General Peak Frequency Compute  
NUMA Group Size Optimization set to Flat

Sysinfo program /spec2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on s1-DL380-RHEL73U Tue Oct 17 12:59:50 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 4112 CPU @ 2.60GHz
  2 "physical id"s (chips)
  8 "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 : 4
siblings : 4
physical 0: cores 1 2 4 5
physical 1: cores 0 2 3 4
```

From lscpu:

```
Architecture:       x86_64
CPU op-mode(s):     32-bit, 64-bit
Byte Order:         Little Endian
CPU(s):             8
On-line CPU(s) list: 0-7
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s):          2
NUMA node(s):       2
Vendor ID:          GenuineIntel
CPU family:         6
Model:              85
Model name:         Intel(R) Xeon(R) Silver 4112 CPU @ 2.60GHz
Stepping:           4
CPU MHz:            2600.000
BogoMIPS:           5205.78
Virtualization:     VT-x
L1d cache:          32K
L1i cache:          32K
L2 cache:           1024K
L3 cache:           8448K
NUMA node0 CPU(s):  0-3
NUMA node1 CPU(s):  4-7
```

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

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.60 GHz, Intel Xeon Silver 4112)  

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>41.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

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

---

**Platform Notes (Continued)**

/procb/cpuinfo cache data  
cache size : 8448 KB

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)  
  node 0 cpus: 0 1 2 3  
  node 0 size: 97964 MB  
  node 0 free: 94429 MB  
  node 1 cpus: 4 5 6 7  
  node 1 size: 98303 MB  
  node 1 free: 95011 MB  
  node distances:  
    node 0 1  
    0: 10 21  
    1: 21 10

From /proc/meminfo  
MemTotal: 197576408 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*  
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 s1-DL380-RHEL73U 3.10.0-514.6.1.el7.x86_64 #1 SMP Sat Dec 10 11:15:38 EST 2016  
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 16 17:52

SPEC is set to: /spec2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sdb4 xfs 889G 28G 862G 4% /

(Continued on next page)
Platform Notes (Continued)

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, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
 CC 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
 CC 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
==============================================================================
 icc (ICC) 18.0.0 20170811
 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
 ifort (IFORT) 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
 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
 FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
==============================================================================
 ifort (IFORT) 18.0.0 20170811
 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
 CC 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
==============================================================================
 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.
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10  
(2.60 GHz, Intel Xeon Silver 4112)  

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>SPECspeed2017 fp_base = 41.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>SPECspeed2017 fp_peak = Not Run</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td></td>
</tr>
</tbody>
</table>

**Base Compiler Invocation**

C benchmarks:  
`icc`

Fortran benchmarks:  
`ifort`

Benchmarks using both Fortran and C:  
`ifort icc`

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

**Base Portability Flags**

- `bwaves_s`: `-DSPEC_LP64`
- `cactuBSSN_s`: `-DSPEC_LP64`
- `lbm_s`: `-DSPEC_LP64`
- `wrf_s`: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
- `cam4_s`: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
- `pop2_s`: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl`
- `imagick_s`: `-DSPEC_LP64`
- `nab_s`: `-DSPEC_LP64`
- `fotonik3d_s`: `-DSPEC_LP64`
- `roms_s`: `-DSPEC_LP64`

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>License</th>
<th>Sponsor</th>
<th>Tested by</th>
<th>Date</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProLiant DL380 Gen10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2.60 GHz, Intel Xeon Silver 4112)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base = 41.4**

**SPECspeed2017_fp_peak = Not Run**

---

**Base Optimization Flags (Continued)**

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

**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)

---

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2017-10-17 13:59:50-0400.
Originally published on 2017-11-14.