



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

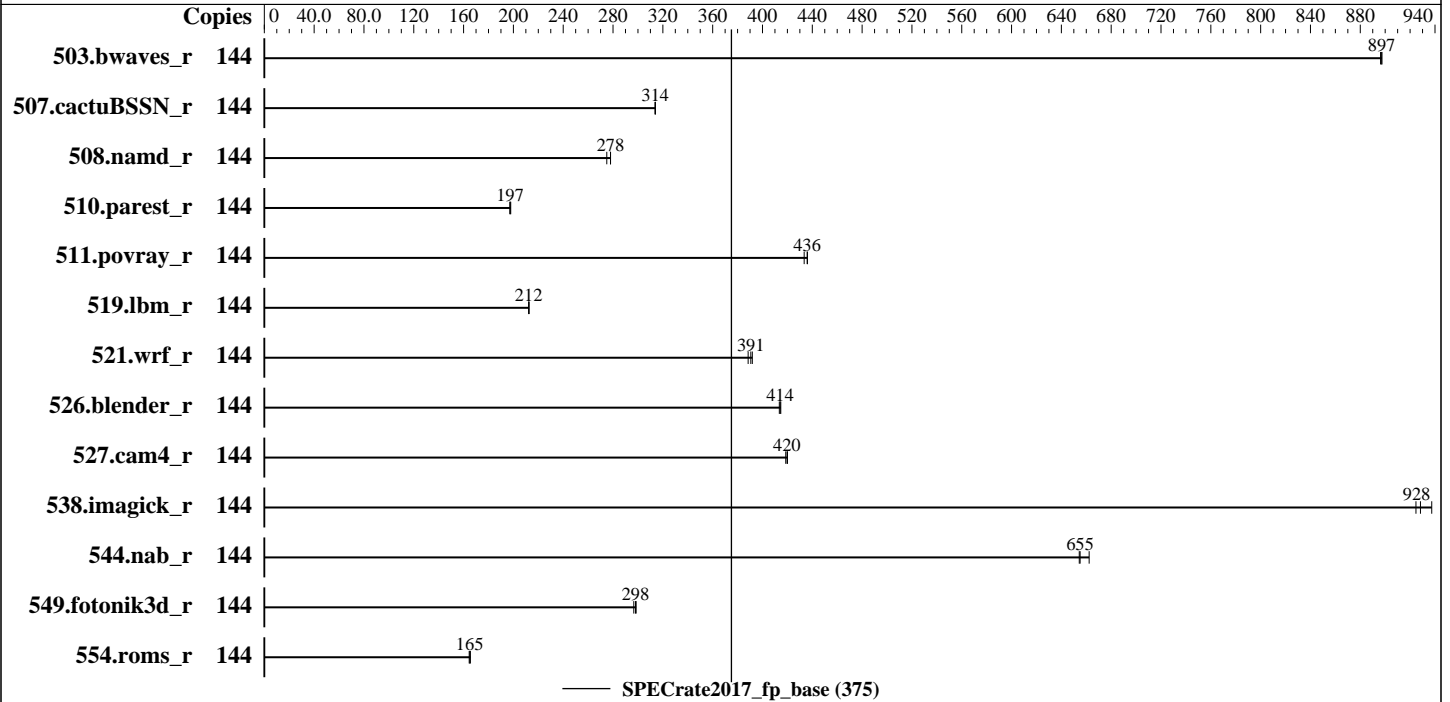
(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

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

Test Date: Jul-2018
Hardware Availability: Jun-2018
Software Availability: May-2018



Hardware

CPU Name: Intel Xeon Gold 6140
Max MHz.: 3700
Nominal: 2300
Enabled: 72 cores, 4 chips, 2 threads/core
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: 24.75 MB I+D on chip per chip
Other: None
Memory: 1536 GB (48 x 32 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 960 GB SATA SSD, RAID 0
Other: None

Software

OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
Kernel 4.4.132-94.33-default
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux
Parallel: No
Firmware: HPE BIOS Version U34 06/15/2018 released Jun-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

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

Test Date: Jul-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	144	1610	897	1609	897	1611	896							
507.cactuBSSN_r	144	581	314	581	314	581	314							
508.namd_r	144	492	278	498	275	492	278							
510.parest_r	144	1904	198	1908	197	1911	197							
511.povray_r	144	771	436	771	436	776	433							
519.lbm_r	144	714	213	715	212	715	212							
521.wrf_r	144	826	391	823	392	830	388							
526.blender_r	144	529	415	529	414	530	414							
527.cam4_r	144	600	420	600	420	602	419							
538.imagick_r	144	386	928	382	937	387	925							
544.nab_r	144	370	655	366	662	370	654							
549.fotonik3d_r	144	1880	299	1892	297	1883	298							
554.roms_r	144	1383	165	1387	165	1391	165							

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
IRQ balance service was stopped using "systemctl stop irqbalance.service"
Tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"
Numa Balancing disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"
Speculative Store Bypass (CVE-2018-3639) mitigation was disabled system-wide
via kernel boot parameter "spec_store_bypass_disable=off"
```



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

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

Test Date: Jul-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

General Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
```

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: 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.

Yes: 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.

Platform Notes

BIOS Configuration:

Workload Profile set to General Throughput Compute

Thermal Configuration set to Maximum Cooling

LLC Dead Line Allocation set to Disabled

Stale A to S set to Enabled

LLC Prefetch set to Enabled

Memory Patrol Scrubbing set to Disabled

Minimum Processor Idle Power Core C-State set to C1E

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on dl560gen10-2 Thu Jul 19 13:50:39 2018

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 6140 CPU @ 2.30GHz
```

```
4 "physical id"s (chips)
```

```
144 "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 : 18
```

```
siblings : 36
```

```
physical 0: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
```

```
physical 1: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
```

```
physical 2: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
```

```
physical 3: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:

```
Architecture: x86_64
```

```
CPU op-mode(s): 32-bit, 64-bit
```

(Continued on next page)



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

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

Test Date: Jul-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

Platform Notes (Continued)

```

Byte Order:           Little Endian
CPU(s):               144
On-line CPU(s) list: 0-143
Thread(s) per core:  2
Core(s) per socket:  18
Socket(s):            4
NUMA node(s):        8
Vendor ID:            GenuineIntel
CPU family:           6
Model:                85
Model name:           Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
Stepping:             4
CPU MHz:              2294.613
BogoMIPS:             4589.22
Virtualization:       VT-x
L1d cache:            32K
L1i cache:            32K
L2 cache:             1024K
L3 cache:             25344K
NUMA node0 CPU(s):   0-8,72-80
NUMA node1 CPU(s):   9-17,81-89
NUMA node2 CPU(s):   18-26,90-98
NUMA node3 CPU(s):   27-35,99-107
NUMA node4 CPU(s):   36-44,108-116
NUMA node5 CPU(s):   45-53,117-125
NUMA node6 CPU(s):   54-62,126-134
NUMA node7 CPU(s):   63-71,135-143
Flags:                fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl stibp retpoline kaiser tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bml hle avx2 smep bmi2 erms invpcid rtm
cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

```

```
/proc/cpuinfo cache data
cache size : 25344 KB
```

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 4 5 6 7 8 72 73 74 75 76 77 78 79 80
node 0 size: 193031 MB
node 0 free: 192756 MB

```

(Continued on next page)



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

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

Test Date: Jul-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

Platform Notes (Continued)

```

node 1 cpus: 9 10 11 12 13 14 15 16 17 81 82 83 84 85 86 87 88 89
node 1 size: 193533 MB
node 1 free: 193348 MB
node 2 cpus: 18 19 20 21 22 23 24 25 26 90 91 92 93 94 95 96 97 98
node 2 size: 193533 MB
node 2 free: 193331 MB
node 3 cpus: 27 28 29 30 31 32 33 34 35 99 100 101 102 103 104 105 106 107
node 3 size: 193533 MB
node 3 free: 193378 MB
node 4 cpus: 36 37 38 39 40 41 42 43 44 108 109 110 111 112 113 114 115 116
node 4 size: 193533 MB
node 4 free: 193418 MB
node 5 cpus: 45 46 47 48 49 50 51 52 53 117 118 119 120 121 122 123 124 125
node 5 size: 193533 MB
node 5 free: 193423 MB
node 6 cpus: 54 55 56 57 58 59 60 61 62 126 127 128 129 130 131 132 133 134
node 6 size: 193533 MB
node 6 free: 193422 MB
node 7 cpus: 63 64 65 66 67 68 69 70 71 135 136 137 138 139 140 141 142 143
node 7 size: 193389 MB
node 7 free: 193278 MB
node distances:
node  0  1  2  3  4  5  6  7
  0:  10  21  31  31  31  31  31  31
  1:  21  10  31  31  31  31  31  31
  2:  31  31  10  21  31  31  31  31
  3:  31  31  21  10  31  31  31  31
  4:  31  31  31  31  10  21  31  31
  5:  31  31  31  31  21  10  31  31
  6:  31  31  31  31  31  31  10  21
  7:  31  31  31  31  31  31  21  10

```

From /proc/meminfo

```

MemTotal:      1584762592 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

/usr/bin/lsb_release -d

SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*

SuSE-release:

```

SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3

```

```

# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.

```

(Continued on next page)



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

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

Test Date: Jul-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

Platform Notes (Continued)

os-release:

```
NAME="SLES"
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

uname -a:

```
Linux dl560gen10-2 4.4.132-94.33-default #1 SMP Tue May 29 20:09:56 UTC 2018 (76aae3b)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB
```

run-level 3 Jul 19 13:47

SPEC is set to: /home/cpu2017

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdb4       xfs   852G  100G  753G  12% /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 U34 06/15/2018

Memory:

48x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

```
=====  
CC 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)  
=====
```

icc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```
=====  
CXXC 508.namd_r(base) 510.parest_r(base)  
=====
```

(Continued on next page)



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jul-2018

Hardware Availability: Jun-2018

Software Availability: May-2018

Compiler Version Notes (Continued)

```
-----
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

```
=====
CC 511.povray_r(base) 526.blender_r(base)
-----
```

```
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

```
=====
FC 507.cactuBSSN_r(base)
-----
```

```
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

```
=====
FC 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
-----
```

```
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

```
=====
CC 521.wrf_r(base) 527.cam4_r(base)
-----
```

```
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

Base Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

(Continued on next page)



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jul-2018

Hardware Availability: Jun-2018

Software Availability: May-2018

Base Compiler Invocation (Continued)

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:

icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:

icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

503.bwaves_r: -DSPEC_LP64

507.cactuBSSN_r: -DSPEC_LP64

508.namd_r: -DSPEC_LP64

510.parest_r: -DSPEC_LP64

511.povray_r: -DSPEC_LP64

519.lbm_r: -DSPEC_LP64

521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian

526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG

538.imagick_r: -DSPEC_LP64

544.nab_r: -DSPEC_LP64

549.fotonik3d_r: -DSPEC_LP64

554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only

-qopt-mem-layout-trans=3

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only

-qopt-mem-layout-trans=3

(Continued on next page)



SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.30 GHz, Intel Xeon Gold 6140)

SPECrate2017_fp_base = 375

SPECrate2017_fp_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jul-2018

Hardware Availability: Jun-2018

Software Availability: May-2018

Base Optimization Flags (Continued)

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Benchmarks using both C and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.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/Intel-ic18.0-official-linux64.2017-12-21.xml>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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 v1.0.5 on 2018-07-19 15:50:38-0400.

Report generated on 2018-10-31 18:32:02 by CPU2017 PDF formatter v6067.

Originally published on 2018-08-07.