



# SPEC CPU®2017 Floating Point Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### Superdome Flex 280

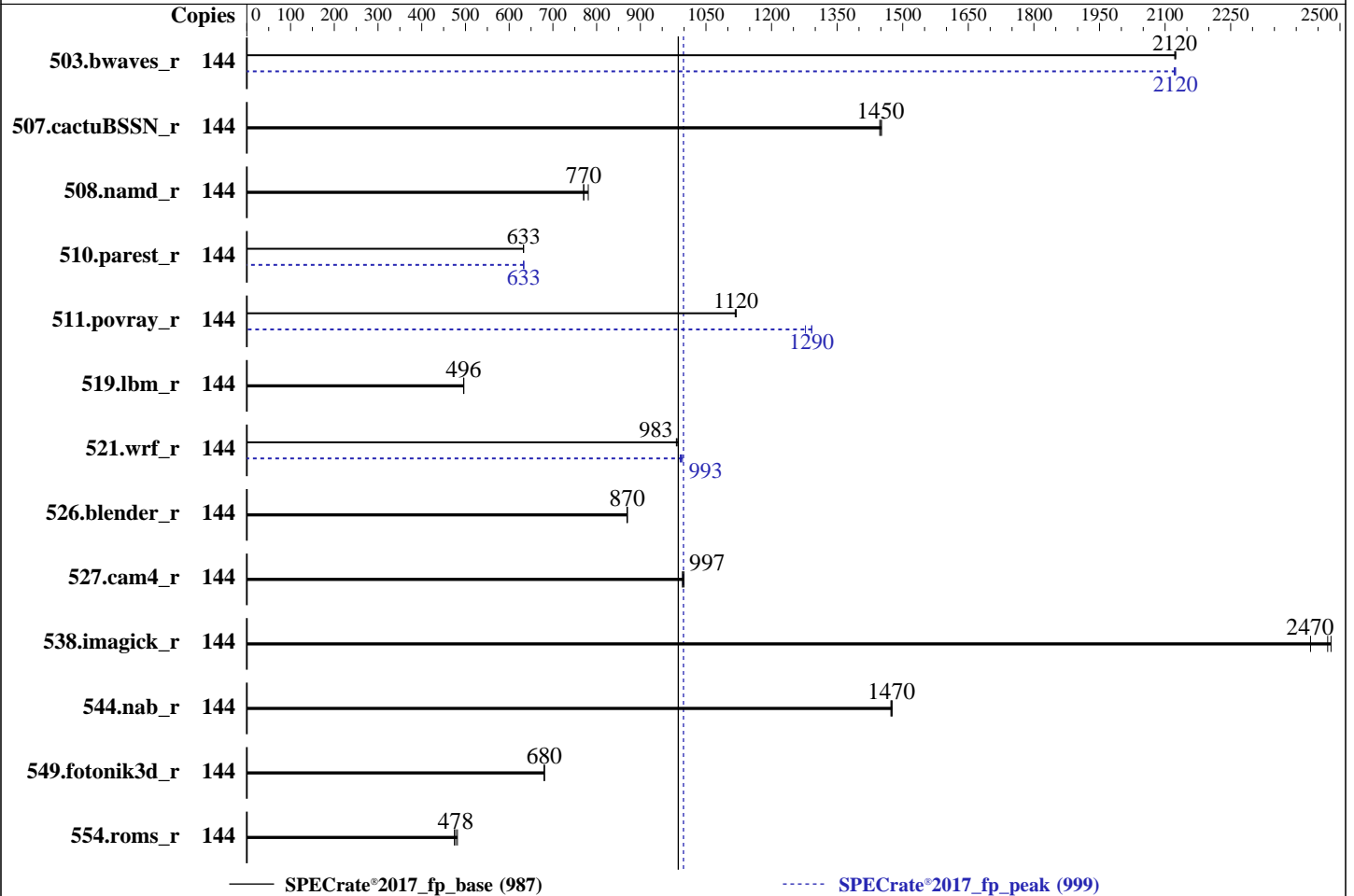
(3.10 GHz, Intel Xeon Platinum 8354H)

## SPECrate®2017\_fp\_base = 987

## SPECrate®2017\_fp\_peak = 999

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

**Test Date:** Nov-2020  
**Hardware Availability:** Nov-2020  
**Software Availability:** Apr-2020



### Hardware

CPU Name: Intel Xeon Platinum 8354H  
 Max MHz: 4300  
 Nominal: 3100  
 Enabled: 144 cores, 8 chips  
 Orderable: 2, 4, 8 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: 6 TB (48 x 128 GB 4Rx4 PC4-3200AA-L)  
 Storage: 2 x 480 GB SSD SATA  
 Other: None

### Software

OS: Red Hat Enterprise Linux release 8.2 (Ootpa)  
 Kernel 4.18.0-193.el8.x86\_64  
 Compiler: C/C++: Version 19.1.1.217 of Intel C/C++  
 Compiler Build 20200306 for Linux;  
 Fortran: Version 19.1.1.217 of Intel Fortran  
 Compiler Build 20200306 for Linux;  
 Parallel: No  
 Firmware: HPE Firmware Bundle Version 1.0.142 released Oct-2020  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: jemalloc memory allocator V5.0.1  
 HPE Foundation Software 2.4,  
 Build 734.0820.200723T0100.a.rhel82hpe-200723T0100  
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	144	680	2120	<b>680</b>	<b>2120</b>	680	2120	144	680	2120	681	2120	<b>680</b>	<b>2120</b>
507.cactuBSSN_r	144	<b>126</b>	<b>1450</b>	126	1450	126	1450	144	<b>126</b>	<b>1450</b>	126	1450	126	1450
508.namd_r	144	178	770	175	781	<b>178</b>	<b>770</b>	144	178	770	175	781	<b>178</b>	<b>770</b>
510.parest_r	144	<b>595</b>	<b>633</b>	596	633	595	633	144	<b>595</b>	<b>633</b>	595	633	595	633
511.povray_r	144	<b>301</b>	<b>1120</b>	301	1120	300	1120	144	263	1280	<b>260</b>	<b>1290</b>	260	1290
519.lbm_r	144	306	496	306	496	<b>306</b>	<b>496</b>	144	306	496	306	496	<b>306</b>	<b>496</b>
521.wrf_r	144	328	982	327	986	<b>328</b>	<b>983</b>	144	325	991	324	996	<b>325</b>	<b>993</b>
526.blender_r	144	<b>252</b>	<b>870</b>	252	869	252	870	144	<b>252</b>	<b>870</b>	252	869	252	870
527.cam4_r	144	253	996	<b>253</b>	<b>997</b>	252	1000	144	253	996	<b>253</b>	<b>997</b>	252	1000
538.imagick_r	144	144	2480	147	2430	<b>145</b>	<b>2470</b>	144	144	2480	147	2430	<b>145</b>	<b>2470</b>
544.nab_r	144	165	1470	<b>164</b>	<b>1470</b>	164	1480	144	165	1470	<b>164</b>	<b>1470</b>	164	1480
549.fotonik3d_r	144	<b>825</b>	<b>680</b>	825	680	825	681	144	<b>825</b>	<b>680</b>	825	680	825	681
554.roms_r	144	475	482	482	475	<b>479</b>	<b>478</b>	144	475	482	482	475	<b>479</b>	<b>478</b>

SPECrate®2017\_fp\_base = **987**

SPECrate®2017\_fp\_peak = **999**

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

## Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux  
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

## 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>  
Tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"



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## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"  
MALLOC\_CONF = "retain:true"

## General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0  
NA: 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.  
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5 sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

BIOS Configuration:

Workload Profile set to HPC  
Intel Hyper-Threading set to Disabled  
Workload Profile set to Custom  
Minimum Processor Idle Power Core C-State set to C6 State  
Sub-NUMA Clustering set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011  
running on ch-622.fchst.rdlabs.hpccorp.net Sun Nov 15 08:07:19 2020

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) Platinum 8354H CPU @ 3.10GHz  
8 "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 : 18  
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

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## Platform Notes (Continued)

```
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 4: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 5: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 6: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 7: cores 0 1 2 3 4 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
Byte Order:            Little Endian
CPU(s):                144
On-line CPU(s) list:  0-143
Thread(s) per core:    1
Core(s) per socket:    18
Socket(s):             8
NUMA node(s):         16
Vendor ID:             GenuineIntel
CPU family:            6
Model:                85
Model name:            Intel(R) Xeon(R) Platinum 8354H CPU @ 3.10GHz
Stepping:              11
CPU MHz:               3958.661
CPU max MHz:           4300.0000
CPU min MHz:           1000.0000
BogoMIPS:              6199.84
Virtualization:       VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              25344K
NUMA node0 CPU(s):    0-2,5,6,9,10,14,15
NUMA node1 CPU(s):    3,4,7,8,11-13,16,17
NUMA node2 CPU(s):    18-20,23,24,27,28,32,33
NUMA node3 CPU(s):    21,22,25,26,29-31,34,35
NUMA node4 CPU(s):    36-38,41,42,45,46,50,51
NUMA node5 CPU(s):    39,40,43,44,47-49,52,53
NUMA node6 CPU(s):    54-56,59,60,63,64,68,69
NUMA node7 CPU(s):    57,58,61,62,65-67,70,71
NUMA node8 CPU(s):    72-74,77,78,81,82,86,87
NUMA node9 CPU(s):    75,76,79,80,83-85,88,89
NUMA node10 CPU(s):   90-92,95,96,99,100,104,105
NUMA node11 CPU(s):   93,94,97,98,101-103,106,107
NUMA node12 CPU(s):   108-110,113,114,117,118,122,123
NUMA node13 CPU(s):   111,112,115,116,119-121,124,125
NUMA node14 CPU(s):   126-128,131,132,135,136,140,141
NUMA node15 CPU(s):   129,130,133,134,137-139,142,143
```

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## Platform Notes (Continued)

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 cpuid aperfperf 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 cpuid\_fault epb cat\_l3 cdp\_l3 invpcid\_single intel\_ppin ssbd mba ibrs ibpb stibp ibrs\_enhanced tpr\_shadow vnmi flexpriority ept vpid fsgsbase tsc\_adjust bmil hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt\_a avx512f avx512dq rdseed adx smap clflushopt clwb intel\_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total cqm\_mbm\_local avx512\_bf16 dtherm ida arat pln pts pku ospke avx512\_vnni md\_clear flush\_lld arch\_capabilities

```
/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: 16 nodes (0-15)
node 0 cpus: 0 1 2 5 6 9 10 14 15
node 0 size: 385551 MB
node 0 free: 385350 MB
node 1 cpus: 3 4 7 8 11 12 13 16 17
node 1 size: 387069 MB
node 1 free: 386981 MB
node 2 cpus: 18 19 20 23 24 27 28 32 33
node 2 size: 387069 MB
node 2 free: 386946 MB
node 3 cpus: 21 22 25 26 29 30 31 34 35
node 3 size: 387069 MB
node 3 free: 386978 MB
node 4 cpus: 36 37 38 41 42 45 46 50 51
node 4 size: 387069 MB
node 4 free: 386956 MB
node 5 cpus: 39 40 43 44 47 48 49 52 53
node 5 size: 387069 MB
node 5 free: 386975 MB
node 6 cpus: 54 55 56 59 60 63 64 68 69
node 6 size: 387069 MB
node 6 free: 386479 MB
node 7 cpus: 57 58 61 62 65 66 67 70 71
node 7 size: 387069 MB
node 7 free: 386971 MB
node 8 cpus: 72 73 74 77 78 81 82 86 87
node 8 size: 387069 MB
node 8 free: 386985 MB
node 9 cpus: 75 76 79 80 83 84 85 88 89
```

(Continued on next page)



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## Platform Notes (Continued)

```

node 9 size: 387069 MB
node 9 free: 386985 MB
node 10 cpus: 90 91 92 95 96 99 100 104 105
node 10 size: 387069 MB
node 10 free: 386927 MB
node 11 cpus: 93 94 97 98 101 102 103 106 107
node 11 size: 387069 MB
node 11 free: 386596 MB
node 12 cpus: 108 109 110 113 114 117 118 122 123
node 12 size: 387041 MB
node 12 free: 386957 MB
node 13 cpus: 111 112 115 116 119 120 121 124 125
node 13 size: 387069 MB
node 13 free: 386987 MB
node 14 cpus: 126 127 128 131 132 135 136 140 141
node 14 size: 387069 MB
node 14 free: 386964 MB
node 15 cpus: 129 130 133 134 137 138 139 142 143
node 15 size: 386037 MB
node 15 free: 385931 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
 0:  10 13 16 16 16 16 24 24 16 16 16 16 16 16 16 16
 1:  13 10 16 16 16 16 24 24 16 16 16 16 16 16 16 16
 2:  16 16 10 13 24 24 16 16 16 16 16 16 16 16 16 16
 3:  16 16 13 10 24 24 16 16 16 16 16 16 16 16 16 16
 4:  16 16 24 24 10 13 16 16 16 16 16 16 16 16 16 16
 5:  16 16 24 24 13 10 16 16 16 16 16 16 16 16 16 16
 6:  24 24 16 16 16 16 10 13 16 16 16 16 16 16 16 16
 7:  24 24 16 16 16 16 13 10 16 16 16 16 16 16 16 16
 8:  16 16 16 16 16 16 16 16 10 13 16 16 16 16 24 24
 9:  16 16 16 16 16 16 16 16 13 10 16 16 16 16 24 24
10:  16 16 16 16 16 16 16 16 16 16 10 13 24 24 16 16
11:  16 16 16 16 16 16 16 16 16 16 13 10 24 24 16 16
12:  16 16 16 16 16 16 16 16 16 16 24 24 10 13 16 16
13:  16 16 16 16 16 16 16 16 16 16 24 24 13 10 16 16
14:  16 16 16 16 16 16 16 16 16 24 24 16 16 16 10 13
15:  16 16 16 16 16 16 16 16 24 24 16 16 16 16 13 10

```

```

From /proc/meminfo
MemTotal:      6339106336 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d
Red Hat Enterprise Linux release 8.2 (Ootpa)

```

(Continued on next page)



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## Platform Notes (Continued)

```

From /etc/*release* /etc/*version*
hpe-foundation-release: HPE Foundation Software 2.4, Build
734.0820.200723T0100.a.rhel82hpe-200723T0100
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.2 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.2"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
Linux ch-622.fchst.rdlabs.hpecorp.net 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58
UTC 2020 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

itlb_multihit:                               Not affected
CVE-2018-3620 (L1 Terminal Fault):           Not affected
Microarchitectural Data Sampling:           Not affected
CVE-2017-5754 (Meltdown):                   Not affected
CVE-2018-3639 (Speculative Store Bypass):   Mitigation: Speculative Store Bypass disabled
via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):          Mitigation: usercopy/swaps barriers and __user
pointer sanitization
CVE-2017-5715 (Spectre variant 2):          Mitigation: Enhanced IBRS, IBPB: conditional,
RSB filling
tsx_async_abort:                             Not affected

run-level 3 Nov 15 08:05

SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs  392G   29G  363G   8% /home

From /sys/devices/virtual/dmi/id
BIOS:      HPE Bundle:1.0.142 SFW:008.000.189.000.2010080501 10/08/2020
Vendor:    HPE
Product:   Superdome Flex 280
Product Family: 1590PID02020001
Serial:    5UF0090539

```

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## 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.

Memory:

48x Hynix HMABAGL7ABR4N-XN 128 GB 4 rank 3200

48x NO DIMM NO DIMM

(End of data from sysinfo program)

## Compiler Version Notes

```
=====
C                | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                  | 544.nab_r(base, peak)
-----
```

```
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-----
```

```
=====
C++              | 508.namd_r(base, peak) 510.parest_r(base, peak)
-----
```

```
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-----
```

```
=====
C++, C          | 511.povray_r(base) 526.blender_r(base, peak)
-----
```

```
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-----
```

```
=====
C++, C          | 511.povray_r(peak)
-----
```

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

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## Compiler Version Notes (Continued)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====  
C++, C | 511.povray\_r(base) 526.blender\_r(base, peak)  
-----

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====  
C++, C | 511.povray\_r(peak)  
-----

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.1.217 Build 20200306

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.1.217 Build 20200306

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====  
C++, C, Fortran | 507.cactuBSSN\_r(base, peak)  
-----

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.1.1.217 Build 20200306

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====  
Fortran | 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak)  
554.roms\_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.1.1.217 Build 20200306

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**Software Availability:** Apr-2020

## Compiler Version Notes (Continued)

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=====  
Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base, peak)

-----  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304  
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=====  
Fortran, C | 521.wrf\_r(peak)

-----  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
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=====  
Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base, peak)

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=====  
Fortran, C | 521.wrf\_r(peak)

-----  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
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# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**Superdome Flex 280**

(3.10 GHz, Intel Xeon Platinum 8354H)

**SPECrate®2017\_fp\_base = 987**

**SPECrate®2017\_fp\_peak = 999**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Nov-2020

**Hardware Availability:** Nov-2020

**Software Availability:** Apr-2020

## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

ifort icc

Benchmarks using both C and C++:

icpc icc

Benchmarks using Fortran, C, and C++:

icpc icc ifort

## 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:

```
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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**Hardware Availability:** Nov-2020

**Software Availability:** Apr-2020

## Base Optimization Flags (Continued)

### C++ benchmarks:

```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

### Fortran benchmarks:

```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

### Benchmarks using both Fortran and C:

```
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

### Benchmarks using both C and C++:

```
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

### Benchmarks using Fortran, C, and C++:

```
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```



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**SPECrate®2017\_fp\_peak = 999**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Nov-2020

**Hardware Availability:** Nov-2020

**Software Availability:** Apr-2020

## Peak Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

ifort icc

Benchmarks using both C and C++:

icpc icc

Benchmarks using Fortran, C, and C++:

icpc icc ifort

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

519.lbm\_r: basepeak = yes

538.imagick\_r: basepeak = yes

544.nab\_r: basepeak = yes

C++ benchmarks:

508.namd\_r: basepeak = yes

510.parest\_r: -m64 -qnextgen

-Wl,-plugin-opt=-x86-branches-within-32B-boundaries

-Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -Ofast

-ffast-math -flto -mfpmath=sse -funroll-loops

-qopt-mem-layout-trans=4 -L/usr/local/jemalloc64-5.0.1/lib

-ljemalloc

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**CPU2017 License:** 3

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**Tested by:** HPE

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**Hardware Availability:** Nov-2020

**Software Availability:** Apr-2020

## Peak Optimization Flags (Continued)

Fortran benchmarks:

```
503.bwaves_r: -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

549.fotonik3d\_r: basepeak = yes

554.roms\_r: basepeak = yes

Benchmarks using both Fortran and C:

```
521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

527.cam4\_r: basepeak = yes

Benchmarks using both C and C++:

```
511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

526.blender\_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN\_r: basepeak = yes

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.3-CLX-revC.html>

[http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html)



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You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.3-CLX-revC.xml>

[http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-official-linux64_revA.xml)

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