



# SPEC CPU®2017 Floating Point Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### Superdome Flex 280

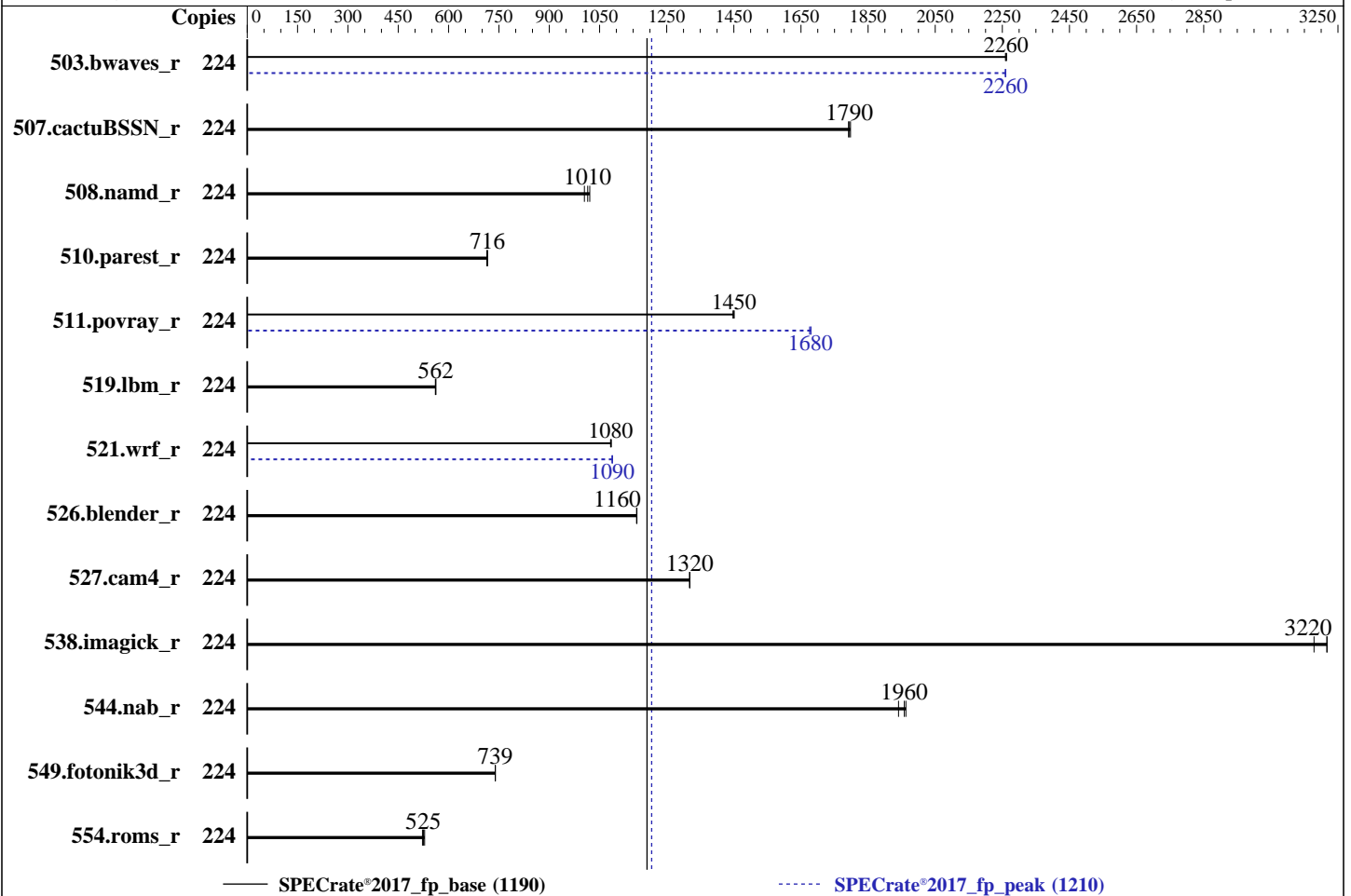
(2.60 GHz, Intel Xeon Platinum 8376H)

SPECrate®2017\_fp\_base = 1190

SPECrate®2017\_fp\_peak = 1210

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 8376H  
Max MHz: 4300  
Nominal: 2600  
Enabled: 224 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: 38.5 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	224	993	2260	<b>994</b>	<b>2260</b>	994	2260	224	994	2260	<b>994</b>	<b>2260</b>	995	2260
507.cactuBSSN_r	224	158	1800	158	1790	<b>158</b>	<b>1790</b>	224	158	1800	158	1790	<b>158</b>	<b>1790</b>
508.namd_r	224	<b>210</b>	<b>1010</b>	212	1000	208	1020	224	<b>210</b>	<b>1010</b>	212	1000	208	1020
510.parest_r	224	<b>819</b>	<b>716</b>	819	716	821	714	224	<b>819</b>	<b>716</b>	819	716	821	714
511.povray_r	224	361	1450	<b>361</b>	<b>1450</b>	361	1450	224	312	1680	311	1680	<b>312</b>	<b>1680</b>
519.lbm_r	224	421	561	<b>420</b>	<b>562</b>	420	562	224	421	561	<b>420</b>	<b>562</b>	420	562
521.wrf_r	224	462	1080	463	1080	<b>463</b>	<b>1080</b>	224	462	1090	461	1090	<b>461</b>	<b>1090</b>
526.blender_r	224	294	1160	294	1160	<b>294</b>	<b>1160</b>	224	294	1160	294	1160	<b>294</b>	<b>1160</b>
527.cam4_r	224	297	1320	297	1320	<b>297</b>	<b>1320</b>	224	297	1320	297	1320	<b>297</b>	<b>1320</b>
538.imagick_r	224	<b>173</b>	<b>3220</b>	173	3220	175	3180	224	<b>173</b>	<b>3220</b>	173	3220	175	3180
544.nab_r	224	194	1940	<b>193</b>	<b>1960</b>	192	1960	224	194	1940	<b>193</b>	<b>1960</b>	192	1960
549.fotonik3d_r	224	<b>1181</b>	<b>739</b>	1181	739	1181	739	224	<b>1181</b>	<b>739</b>	1181	739	1181	739
554.roms_r	224	<b>678</b>	<b>525</b>	673	529	682	522	224	<b>678</b>	<b>525</b>	673	529	682	522

SPECrate®2017\_fp\_base = **1190**

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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"  
MALLOCONF = "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 Sat Oct 31 17:13:21 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 8376H CPU @ 2.60GHz
 8 "physical id"s (chips)
224 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
```

(Continued on next page)



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## Platform Notes (Continued)

```

physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 4: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 5: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 6: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 7: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30

```

From lscpu:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
CPU(s):                 224
On-line CPU(s) list:   0-223
Thread(s) per core:    1
Core(s) per socket:    28
Socket(s):              8
NUMA node(s):          16
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85
Model name:             Intel(R) Xeon(R) Platinum 8376H CPU @ 2.60GHz
Stepping:               11
CPU MHz:                3842.043
CPU max MHz:            4300.0000
CPU min MHz:            1000.0000
BogoMIPS:               5199.79
Virtualization:        VT-x
L1d cache:              32K
L1i cache:              32K
L2 cache:               1024K
L3 cache:               39424K
NUMA node0 CPU(s):     0-3,7-9,14-17,21-23
NUMA node1 CPU(s):     4-6,10-13,18-20,24-27
NUMA node2 CPU(s):     28-31,35-37,42-45,49-51
NUMA node3 CPU(s):     32-34,38-41,46-48,52-55
NUMA node4 CPU(s):     56-59,63-65,70-73,77-79
NUMA node5 CPU(s):     60-62,66-69,74-76,80-83
NUMA node6 CPU(s):     84-87,91-93,98-101,105-107
NUMA node7 CPU(s):     88-90,94-97,102-104,108-111

```

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## Platform Notes (Continued)

NUMA node8 CPU(s): 112-115,119-121,126-129,133-135  
NUMA node9 CPU(s): 116-118,122-125,130-132,136-139  
NUMA node10 CPU(s): 140-143,147-149,154-157,161-163  
NUMA node11 CPU(s): 144-146,150-153,158-160,164-167  
NUMA node12 CPU(s): 168-171,175-177,182-185,189-191  
NUMA node13 CPU(s): 172-174,178-181,186-188,192-195  
NUMA node14 CPU(s): 196-199,203-205,210-213,217-219  
NUMA node15 CPU(s): 200-202,206-209,214-216,220-223

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  
aperfmpperf 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 fl6c 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 bmi1 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 : 39424 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 3 7 8 9 14 15 16 17 21 22 23
node 0 size: 385509 MB
node 0 free: 384802 MB
node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27
node 1 size: 387068 MB
node 1 free: 386765 MB
node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51
node 2 size: 387068 MB
node 2 free: 386933 MB
node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55
node 3 size: 387068 MB
node 3 free: 386983 MB
node 4 cpus: 56 57 58 59 63 64 65 70 71 72 73 77 78 79
node 4 size: 387068 MB
node 4 free: 386704 MB
node 5 cpus: 60 61 62 66 67 68 69 74 75 76 80 81 82 83
node 5 size: 387068 MB
node 5 free: 386955 MB
node 6 cpus: 84 85 86 87 91 92 93 98 99 100 101 105 106 107
node 6 size: 387068 MB
```

(Continued on next page)



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## Platform Notes (Continued)

```

node 6 free: 386976 MB
node 7 cpus: 88 89 90 94 95 96 97 102 103 104 108 109 110 111
node 7 size: 387068 MB
node 7 free: 386984 MB
node 8 cpus: 112 113 114 115 119 120 121 126 127 128 129 133 134 135
node 8 size: 387068 MB
node 8 free: 386966 MB
node 9 cpus: 116 117 118 122 123 124 125 130 131 132 136 137 138 139
node 9 size: 387068 MB
node 9 free: 386982 MB
node 10 cpus: 140 141 142 143 147 148 149 154 155 156 157 161 162 163
node 10 size: 387040 MB
node 10 free: 386954 MB
node 11 cpus: 144 145 146 150 151 152 153 158 159 160 164 165 166 167
node 11 size: 387068 MB
node 11 free: 386976 MB
node 12 cpus: 168 169 170 171 175 176 177 182 183 184 185 189 190 191
node 12 size: 387068 MB
node 12 free: 386944 MB
node 13 cpus: 172 173 174 178 179 180 181 186 187 188 192 193 194 195
node 13 size: 387068 MB
node 13 free: 386947 MB
node 14 cpus: 196 197 198 199 203 204 205 210 211 212 213 217 218 219
node 14 size: 387068 MB
node 14 free: 386979 MB
node 15 cpus: 200 201 202 206 207 208 209 214 215 216 220 221 222 223
node 15 size: 386036 MB
node 15 free: 385943 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 24 24 16 16 16 16 10 13
15: 16 16 16 16 16 16 16 16 24 24 16 16 16 16 13 10

```

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## Platform Notes (Continued)

From /proc/meminfo

MemTotal: 6339047120 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

/usr/bin/lsb\_release -d

Red Hat Enterprise Linux release 8.2 (Ootpa)

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 Oct 31 17:11

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/rhel-home	xfs	392G	262G	130G	67%	/home

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## Platform Notes (Continued)

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

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

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## Compiler Version Notes (Continued)

=====  
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 | 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.

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**SPECrate®2017\_fp\_peak = 1210**

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

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

## Compiler Version Notes (Continued)

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

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

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

=====  
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)  
=====

(Continued on next page)



# SPEC CPU®2017 Floating Point Rate Result

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**Hewlett Packard Enterprise**

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**Superdome Flex 280**

(2.60 GHz, Intel Xeon Platinum 8376H)

**SPECrate®2017\_fp\_base = 1190**

**SPECrate®2017\_fp\_peak = 1210**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Nov-2020

**Hardware Availability:** Nov-2020

**Software Availability:** Apr-2020

## Compiler Version Notes (Continued)

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

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

## 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



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**Software Availability:** Apr-2020

## 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
```

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
```

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**CPU2017 License:** 3

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## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

## 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:

(Continued on next page)



# SPEC CPU®2017 Floating Point Rate Result

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**Tested by:** HPE

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

## Peak Optimization Flags (Continued)

508.namd\_r: basepeak = yes

510.parest\_r: basepeak = yes

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



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

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

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