SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

Superdome Flex 280
(2.90 GHz, Intel Xeon Platinum 8380H)

$SPECrate®2017\_fp\_base = 1290$

$SPECrate®2017\_fp\_peak = 1300$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jan-2021

Hardware Availability: Dec-2020

Software Availability: Apr-2020

Copies scale: 0 150 300 450 600 750 900 1100 1300 1500 1700 1900 2100 2300 2500 2700 2900 3100 3300 3500 3800

Benchmark	Copies	Base	Peak
503.bwaves_r	224	2340	2340
507.cactuBSSN_r	224	1930	
508.namd_r	224	1130	
510.parest_r	224	783	783
511.povray_r	224	1690	1950
519.lbm_r	224	560	
521.wrf_r	224	1150	1150
526.blender_r	224	1350	
527.cam4_r	224	1450	
538.imagick_r	224	3730	
544.nab_r	224	2130	
549.fotonik3d_r	224	738	
554.roms_r	224	536	537

SPECrate®2017_fp_base (1290)   SPECrate®2017_fp_peak (1300)

Hardware

CPU Name: Intel Xeon Platinum 8380H

Max MHz: 4300

Nominal: 2900

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 1.0.176 released Dec-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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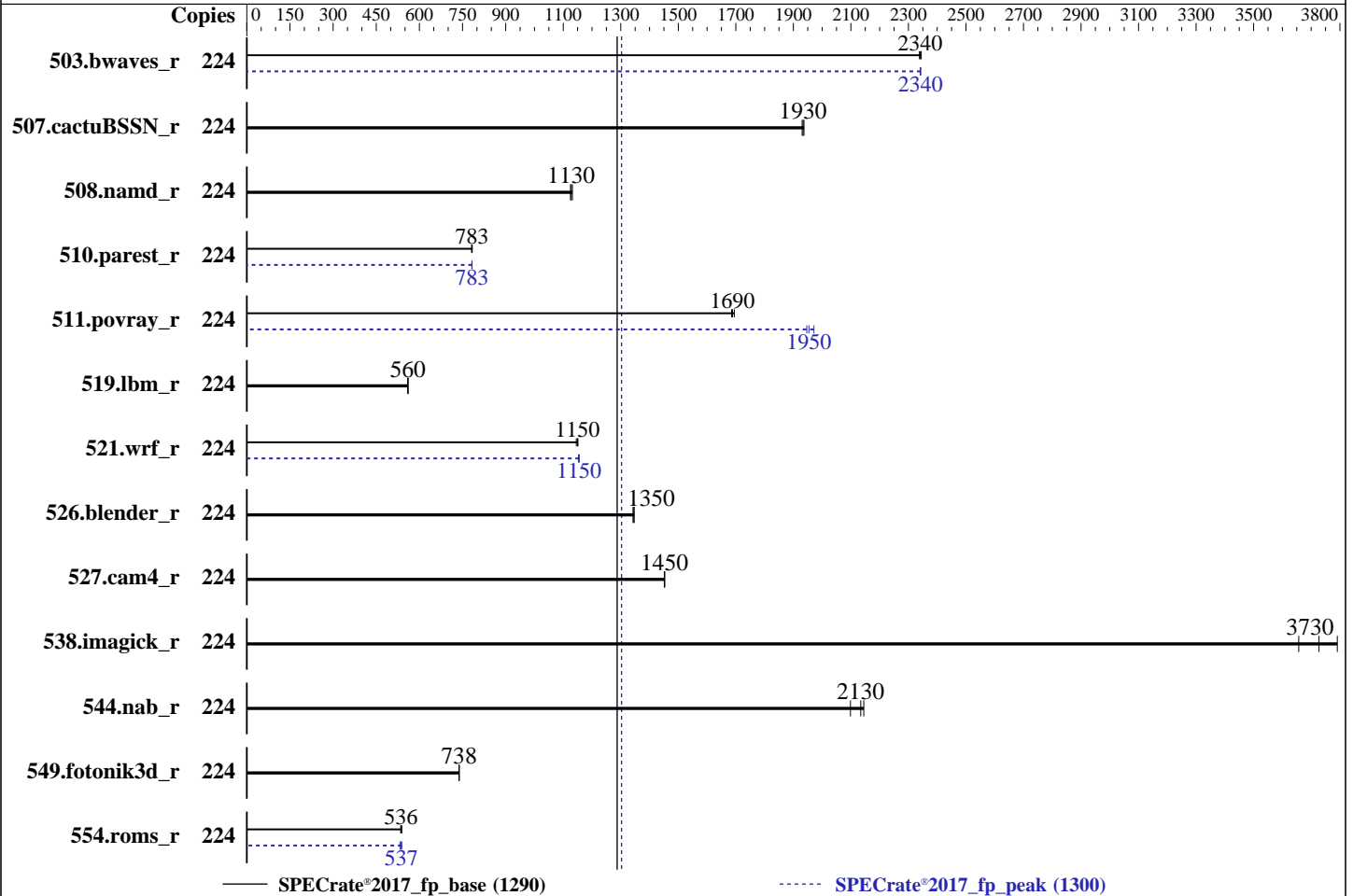SPECrate®2017_fp_peak = 1300

CPU2017 License: 3		**Test Date:** Jan-2021
Test Sponsor: HPE		**Hardware Availability:** Dec-2020
Tested by: HPE		**Software Availability:** Apr-2020

Results Table

Benchmark	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	224	958	2340	**959**	**2340**	961	2340	224	959	2340	959	2340	**959**	**2340**
507.cactuBSSN_r	224	146	1940	**147**	**1930**	147	1930	224	146	1940	**147**	**1930**	147	1930
508.namd_r	224	189	1130	**189**	**1130**	188	1130	224	189	1130	**189**	**1130**	188	1130
510.parest_r	224	748	784	**749**	**783**	750	781	224	749	782	748	783	**749**	**783**
511.povray_r	224	310	1690	**310**	**1690**	309	1690	224	269	1950	**268**	**1950**	265	1970
519.lbm_r	224	**422**	**560**	422	560	421	560	224	**422**	**560**	422	560	421	560
521.wrf_r	224	**437**	**1150**	438	1150	436	1150	224	435	1150	434	1160	**434**	**1150**
526.blender_r	224	253	1350	254	1340	**254**	**1350**	224	253	1350	254	1340	**254**	**1350**
527.cam4_r	224	**270**	**1450**	270	1450	270	1450	224	**270**	**1450**	270	1450	270	1450
538.imagick_r	224	152	3660	147	3790	**149**	**3730**	224	152	3660	147	3790	**149**	**3730**
544.nab_r	224	**177**	**2130**	180	2100	176	2140	224	**177**	**2130**	180	2100	176	2140
549.fotonik3d_r	224	1182	738	1183	738	**1183**	**738**	224	1182	738	1183	738	**1183**	**738**
554.roms_r	224	661	539	**664**	**536**	665	535	224	**663**	**537**	668	533	661	538
SPECrate®2017_fp_base =	**1290**													
SPECrate®2017_fp_peak =	**1300**													

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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Tested by:	HPE	**Software Availability:**	Apr-2020

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
  Enhanced Processor Power set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on ch-622.fchst.rdlabs.hpecorp.net Fri Jan  8 06:09:50 2021

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 8380H CPU @ 2.90GHz
      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
```

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Test Date: Jan-2021
Hardware Availability: Dec-2020
Software Availability: Apr-2020

Platform Notes (Continued)

```
      28 29 30
     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 8380H CPU @ 2.90GHz
     Stepping:            11
     CPU MHz:             3890.851
     CPU max MHz:         4300.0000
     CPU min MHz:         1000.0000
     BogoMIPS:            5799.84
     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
```

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Platform Notes (Continued)

```
       NUMA node7 CPU(s):     88-90,94-97,102-104,108-111
       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
    aperfmperf 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 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_l1d 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: 385550 MB
    node 0 free: 385365 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: 386963 MB
    node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51
    node 2 size: 387040 MB
    node 2 free: 386891 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: 386973 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: 386975 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: 386975 MB
    node 6 cpus: 84 85 86 87 91 92 93 98 99 100 101 105 106 107
```

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Platform Notes (Continued)

```
     node 6 size: 387068 MB
     node 6 free: 386790 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: 386187 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: 386960 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: 386921 MB
     node 10 cpus: 140 141 142 143 147 148 149 154 155 156 157 161 162 163
     node 10 size: 387068 MB
     node 10 free: 386984 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: 386976 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: 386976 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: 386972 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: 385941 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:       6339089352 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/swapgs 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 Jan 8 06:08

SPEC is set to: /home/cpu2017
   Filesystem          Type  Size  Used Avail Use% Mounted on
```

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Platform Notes (Continued)

```
      /dev/mapper/rhel-home xfs   392G   64G  329G  17% /home

 From /sys/devices/virtual/dmi/id
    BIOS:    HPE Bundle:1.0.176 SFW:008.002.002.000.2012160606 12/16/2020
    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
  NextGen Build 20200304
```

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Compiler Version Notes (Continued)

```
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          | 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
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------------------------------------------------------------------------


==============================================================================
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
```

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SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

Superdome Flex 280
(2.90 GHz, Intel Xeon Platinum 8380H)

SPECrate®2017_fp_base = 1290

SPECrate®2017_fp_peak = 1300

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

Test Date: Jan-2021
Hardware Availability: Dec-2020
Software Availability: Apr-2020

Compiler Version Notes (Continued)

```
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--------------------------------------------------------------------------------


==============================================================================
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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--------------------------------------------------------------------------------


==============================================================================
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
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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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--------------------------------------------------------------------------------


==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
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--------------------------------------------------------------------------------


==============================================================================
Fortran, C      | 521.wrf_r(peak)
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)

Superdome Flex 280
(2.90 GHz, Intel Xeon Platinum 8380H)

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CPU2017 License: 3		**Test Date:**	Jan-2021
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2020
Tested by:	HPE	**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`

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SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

Superdome Flex 280
(2.90 GHz, Intel Xeon Platinum 8380H)

SPECrate®2017_fp_base = 1290

SPECrate®2017_fp_peak = 1300

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

Test Date: Jan-2021
Hardware Availability: Dec-2020
Software Availability: Apr-2020

Base Portability Flags (Continued)

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
```

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
```

(Continued on next page)

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https://www.spec.org/

Hewlett Packard Enterprise
(Test Sponsor: HPE)

Superdome Flex 280
(2.90 GHz, Intel Xeon Platinum 8380H)

SPECrate®2017_fp_base = 1290

SPECrate®2017_fp_peak = 1300

CPU2017 License: 3		**Test Date:**	Jan-2021
Test Sponsor: HPE		**Hardware Availability:**	Dec-2020
Tested by: HPE		**Software Availability:**	Apr-2020

Base Optimization Flags (Continued)

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

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
```

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

Superdome Flex 280
(2.90 GHz, Intel Xeon Platinum 8380H)

SPECrate®2017_fp_base = 1290

SPECrate®2017_fp_peak = 1300

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

Test Date: Jan-2021
Hardware Availability: Dec-2020
Software Availability: Apr-2020

Peak Optimization Flags (Continued)

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

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: Same as 503.bwaves_r

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

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SPEC CPU®2017 Floating Point Rate Result

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SPECrate®2017_fp_peak = 1300

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

Test Date: Jan-2021
Hardware Availability: Dec-2020
Software Availability: Apr-2020

Peak Optimization Flags (Continued)

511.povray_r (continued):
-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

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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-ic19.1u1-official-linux64_revA.xml

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

Tested with SPEC CPU®2017 v1.1.0 on 2021-01-07 19:39:49-0500.
Report generated on 2021-02-02 19:47:52 by CPU2017 PDF formatter v6255.
Originally published on 2021-02-02.