**SPEC CPU®2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.40 GHz, Intel Xeon Platinum 8368)

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Red Hat Enterprise Linux 8.3 (Ootpa)</td>
<td>CPU Name: Intel Xeon Platinum 8368</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Classic Build 20201112 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux</td>
<td>Max MHz: 3400</td>
</tr>
<tr>
<td>Compiler Build 20201113 for Linux;</td>
<td>Nominal: 2400</td>
</tr>
<tr>
<td>Parallel: No</td>
<td>Enabled: 76 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Firmware: HPE BIOS Version I44 v1.54 11/03/2021 released Nov-2021</td>
<td>Orderable: 1, 2 chip(s)</td>
</tr>
<tr>
<td>File System: xfs</td>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>L2: 1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>L3: 57 MB I+D on chip per core</td>
</tr>
<tr>
<td>Peak Pointers: 64-bit</td>
<td>Other: None</td>
</tr>
<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
<td>Memory: 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R)</td>
</tr>
<tr>
<td>(Continued on next page)</td>
<td>Storage: 1 x 800 GB SAS SSD, RAID 0</td>
</tr>
</tbody>
</table>

| SPECrate®2017_fp_base = 449 | SPECrate®2017_fp_peak = 477 |

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_fp_base (449)</th>
<th>SPECrate®2017_fp_peak (477)</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>152</td>
<td>714</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>152</td>
<td>644</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>152</td>
<td>418</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>152</td>
<td>207</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>152</td>
<td>283</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>152</td>
<td>265</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>152</td>
<td>346</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>152</td>
<td>543</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>152</td>
<td>531</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>152</td>
<td>1410</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>152</td>
<td>932</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>152</td>
<td>229</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>152</td>
<td>196</td>
</tr>
</tbody>
</table>

| Test Date: Nov-2021 | Test Sponsor: HPE |
| Hardware Availability: Nov-2021 | Tested by: HPE |
| Software Availability: Dec-2020 | Tested Date: Nov-2021 |
| Test Date: Nov-2021 | Hardware Availability: Nov-2021 |
| Tested by: HPE | Software Availability: Dec-2020 |

(Continued on next page)
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>152</td>
<td>2137</td>
<td>713</td>
<td>2136</td>
<td>714</td>
<td>2136</td>
<td>714</td>
<td>76</td>
<td>1047</td>
<td>728</td>
<td>1048</td>
<td>727</td>
<td>1048</td>
<td>727</td>
<td>1048</td>
<td>727</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>152</td>
<td>299</td>
<td>644</td>
<td>299</td>
<td>644</td>
<td>299</td>
<td>643</td>
<td>152</td>
<td>299</td>
<td>644</td>
<td>299</td>
<td>644</td>
<td>299</td>
<td>643</td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>152</td>
<td>346</td>
<td>418</td>
<td>346</td>
<td>417</td>
<td>346</td>
<td>418</td>
<td>152</td>
<td>346</td>
<td>418</td>
<td>346</td>
<td>417</td>
<td>346</td>
<td>418</td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>152</td>
<td>1915</td>
<td>208</td>
<td>1918</td>
<td>207</td>
<td>1918</td>
<td>207</td>
<td>76</td>
<td>702</td>
<td>283</td>
<td>704</td>
<td>282</td>
<td>702</td>
<td>283</td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>152</td>
<td>581</td>
<td>611</td>
<td>582</td>
<td>610</td>
<td>582</td>
<td>610</td>
<td>152</td>
<td>507</td>
<td>700</td>
<td>510</td>
<td>696</td>
<td>509</td>
<td>697</td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>152</td>
<td>604</td>
<td>265</td>
<td>603</td>
<td>266</td>
<td>604</td>
<td>265</td>
<td>152</td>
<td>604</td>
<td>265</td>
<td>603</td>
<td>266</td>
<td>604</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>152</td>
<td>983</td>
<td>346</td>
<td>982</td>
<td>347</td>
<td>983</td>
<td>346</td>
<td>76</td>
<td>450</td>
<td>378</td>
<td>449</td>
<td>379</td>
<td>450</td>
<td>379</td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>152</td>
<td>426</td>
<td>543</td>
<td>426</td>
<td>543</td>
<td>426</td>
<td>543</td>
<td>152</td>
<td>426</td>
<td>543</td>
<td>426</td>
<td>543</td>
<td>426</td>
<td>543</td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>152</td>
<td>501</td>
<td>531</td>
<td>500</td>
<td>532</td>
<td>506</td>
<td>526</td>
<td>152</td>
<td>501</td>
<td>531</td>
<td>500</td>
<td>532</td>
<td>506</td>
<td>526</td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>152</td>
<td>269</td>
<td>1410</td>
<td>268</td>
<td>1410</td>
<td>269</td>
<td>1410</td>
<td>152</td>
<td>269</td>
<td>1410</td>
<td>268</td>
<td>1410</td>
<td>269</td>
<td>1410</td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>152</td>
<td>275</td>
<td>932</td>
<td>275</td>
<td>929</td>
<td>273</td>
<td>938</td>
<td>152</td>
<td>270</td>
<td>947</td>
<td>270</td>
<td>947</td>
<td>268</td>
<td>954</td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>152</td>
<td>2582</td>
<td>229</td>
<td>2583</td>
<td>229</td>
<td>2583</td>
<td>229</td>
<td>152</td>
<td>2582</td>
<td>229</td>
<td>2583</td>
<td>229</td>
<td>2583</td>
<td>229</td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>152</td>
<td>1535</td>
<td>157</td>
<td>1532</td>
<td>158</td>
<td>1531</td>
<td>158</td>
<td>76</td>
<td>616</td>
<td>196</td>
<td>618</td>
<td>195</td>
<td>617</td>
<td>196</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECrate\textsuperscript{2017\_fp\_base} = 449
SPECrate\textsuperscript{2017\_fp\_peak} = 477

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`

### 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"
MALLO C\_CONF = "retain:true"
General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1 runcpu command invoked through numactl i.e.: numactl --interleave=all runcpu <etc>

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.


Submitted by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Wed Jan 12 10:02:54 EST 2022
Submission: cpu2017-20220103-30731.sub

Platform Notes

BIOS Configuration:
Workload Profile set to General Throughput Compute
Memory Patrol Scrubbing set to Disabled
Advanced Memory Protection set to Advanced ECC
Last Level Cache (LLC) Prefetch set to Enabled
Last Level Cache (LLC) Dead Line Allocation set to Disabled
Enhanced Processor Performance set to Enabled
Thermal Configuration set to Maximum Cooling
Workload Profile set to Custom
DCU Stream Prefetcher set to Disabled
XPT Remote Prefetcher set to Enabled
Energy/Performance Bias set to Balanced Performance

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec915b55891ef0e16acafcc6d4
running on localhost.localdomain Sat Nov 20 06:20:08 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 8368 CPU @ 2.40GHz
  2 "physical id"s (chips)
  152 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following (Continued on next page)
Hewlett Packard Enterprise
Synergy 480 Gen10 Plus
(2.40 GHz, Intel Xeon Platinum 8368)

SPECrate®2017_fp_base = 449
SPECrate®2017_fp_peak = 477

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

Platform Notes (Continued)

excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 38
siblings : 76
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 152
On-line CPU(s) list: 0-151
Thread(s) per core: 2
Core(s) per socket: 38
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8368 CPU @ 2.40GHz
Stepping: 6
CPU MHz: 1164.714
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 58368K
NUMA node0 CPU(s): 0-37,76-113
NUMA node1 CPU(s): 38-75,114-151
Flags: fpu vme de pse tsc msr pae mce 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 xprtt 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 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqmm rtad_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsavesopt xsaveopt xsaveopt xgetbv xsaveopt xsaveopt xsaves cqmm ld ccqmm_occupp llc cqm mbm_total cqm mbm_local split_lock_detect wbinvd dtherm ida arat pln pts avx512v bmi umip pku ospke avx512_vbmi2 gfni vaes vpcm1unbg avx512 vnni avx512 bitalg tme avx512_vpoptvntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data

(Continued on next page)
## Platform Notes (Continued)

From `numactl --hardware`

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
```

```text
95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113
```

From `/proc/meminfo`

```
MemTotal:       2113467236 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From `/sbin/tuned-adm active`

```
Current active profile: throughput-performance
```

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

```
os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.3 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.3"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
    ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
```

```
uname -a:
    Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
    x86_64 x86_64 x86_64 GNU/Linux
```

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.40 GHz, Intel Xeon Platinum 8368)

SPECrate®2017_fp_base = 449
SPECrate®2017_fp_peak = 477

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

Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2018-12207 (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
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Nov 20 06:19

SPEC is set to: /home/cpu2017
    Filesystem  Type Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs  670G  106G  564G  16% /home

From /sys/devices/virtual/dmi/id
    Vendor:          HPE
    Product:        Synergy 480 Gen10 Plus
    Product Family:  Synergy
    Serial:         CN70330Q5F

Additional information from dmi decode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmi decode' 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:
        32x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200

    BIOS:
        BIOS Vendor:     HPE
        BIOS Version:   I44
        BIOS Date:      11/03/2021
        BIOS Revision:  1.54
        Firmware Revision: 2.40

(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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C++, C          | 511.povray_r(peak)

Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C++, C          | 511.povray_r(peak)

Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

(Continued on next page)
Compiler Version Notes (Continued)

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

==============================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base, peak)
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran, C      | 521.wrf_r(peak)
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.

(Continued on next page)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
Synergy 480 Gen10 Plus  
(2.40 GHz, Intel Xeon Platinum 8368)  

SPECrate®2017_fp_base = 449  
SPECrate®2017_fp_peak = 477

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

Test Date: Nov-2021  
Hardware Availability: Nov-2021  
Software Availability: Dec-2020

Compiler Version Notes (Continued)

==============================================================================
Fortran, C | 521.wrf_r(base) 527.cam4_r(base, peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
Fortran, C | 521.wrf_r(peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
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 Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:  
icx

C++ benchmarks:  
icpx

Fortran benchmarks:  
ifort

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.40 GHz, Intel Xeon Platinum 8368)

SPECrate®2017_fp_base = 449
SPECrate®2017_fp_peak = 477

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

Test Date: Nov-2021
Hardware Availability: Nov-2021
Software Availability: Dec-2020

Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx 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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -03 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only

(Continued on next page)
### Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- `-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs -align array32byte -auto`
- `-mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
- `-w -m64 -std=c11 -Wl,-z,muldefs -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`
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using Fortran, C, and C++:
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3`
- `-no-prec-div -qopt-prefetch -ffinite-math-only`
- `-qopt-multiple-gather-scatter-by-shuffles`
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

### Peak Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

Benchmarks using both Fortran and C:
- 521.wrf_r: ifort icc

(Continued on next page)
Peak Compiler Invocation (Continued)

527.cam4_r: ifort icx

Benchmarks using both C and C++:
511.povray_r: icpc icc
526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx 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: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -qopt-mem-layout-trans=4 -fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
508.namd_r: basepeak = yes
510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
503.bwaves_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -03 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only

(Continued on next page)
Peak Optimization Flags (Continued)

503.bwaves_r (continued):
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

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 -L/usr/local/jemalloc64-5.0.1/lib -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-V1.0-ICX-revG.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revG.xml
<table>
<thead>
<tr>
<th>Hewlett Packard Enterprise (Test Sponsor: HPE)</th>
<th>SPECrate®2017_fp_base = 449</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synergy 480 Gen10 Plus (2.40 GHz, Intel Xeon Platinum 8368)</td>
<td>SPECrate®2017_fp_peak = 477</td>
</tr>
</tbody>
</table>

| SPEC CPU®2017 License: 3 | Test Date: Nov-2021 |
| Test Sponsor: HPE | Hardware Availability: Nov-2021 |
| Tested by: HPE | Software Availability: Dec-2020 |

SPEC CPU and SPECrate are registered trademarks 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 CPU®2017 v1.1.8 on 2021-11-19 19:50:07-0500.
Originally published on 2022-01-18.