# SPEC CPU® 2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML110 Gen11  
(1.9 GHz, Intel Xeon Gold 5411N)

**SPECrate® 2017 fp_base = 263**  
**SPECrate® 2017 fp_peak = 271**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong> Intel Xeon Gold 5411N</td>
<td><strong>OS:</strong> Red Hat Enterprise Linux 9.0 (Plow)</td>
</tr>
<tr>
<td><strong>Max MHz:</strong> 3900</td>
<td><strong>Kernel:</strong> 5.14.0-70.13.1.el9_0.x86_64</td>
</tr>
</tbody>
</table>
| **Nominal:** 1900 | **Compiler:**  
| **Enabled:** 24 cores, 1 chip, 2 threads/core | **C/C++:** Version 2023.0 of Intel oneAPI DPC++/C++ |
| **Orderable:** 1 chip | **Compiler for Linux:**  
| **Cache L1:** 32 KB I + 48 KB D on chip per core | **Fortran:** Version 2023.0 of Intel Fortran Compiler for Linux; |
| **L2:** 2 MB I+D on chip per core | **Parallel:** No |
| **L3:** 45 MB I+D on chip per core | **Firmware:** HPE BIOS Version v1.30 03/01/2023 released Mar-2023 |
| **Other:** None | **File System:** xfs |
| **Memory:** 256 GB (8 x 32 GB 2Rx8 PC5-4800B-R, running at 4400) | **System State:** Run level 3 (multi-user) |
| **Storage:** 1 x 240 GB SATA SSD | **Base Pointers:** 64-bit |
| **Other:** None | **Peak Pointers:** 64-bit |
|                          | **Other:** jemalloc memory allocator V5.0.1 |
|                          | **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage |

### SPECrate® 2017 fp_base = 263

<table>
<thead>
<tr>
<th>SPECrate® 2017 fp_base = 263</th>
</tr>
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<tbody>
<tr>
<td>503.bwaves_r 48 321</td>
</tr>
<tr>
<td>507.caactuBSSN_r 24 140</td>
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<tr>
<td>508.namd_r 48 140</td>
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<td>510.parest_r 24 162</td>
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<tr>
<td>511.povray_r 48 224</td>
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<td>519.lbm_r 48 164</td>
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<td>521.wrf_r 48 239</td>
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<td>526.blender_r 48 219</td>
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<tr>
<td>527.cam4_r 48 261</td>
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<tr>
<td>538.imagick_r 48 599</td>
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<tr>
<td>544.nab_r 48 439</td>
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<td>549.fotonik3d_r 48 216</td>
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## Results Table

<table>
<thead>
<tr>
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<th>Ratio</th>
<th>Seconds</th>
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<td>136</td>
</tr>
</tbody>
</table>

### 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
  ```
- tuned-adm profile was set to throughput-performance using "tuned-adm profile throughput-performance"
- perf-bias for all the CPUs is set using "cpupower set -b 0"
- runcpu command invoked through numactl i.e.:
  ```
  numactl --interleave=all runcpu <etc>
  ```

### 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 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
- Memory using Red Hat Enterprise Linux 8.4

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

- **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.


## Platform Notes

The system ROM used for this result contains Intel microcode version 0x2b0001b0 for the Intel Xeon Gold 5418N processor.

**BIOS Configuration:**
- Workload Profile set to General Throughput Compute
- Memory Patrol Scrubbing set to Disabled
- Workload Profile set to Custom
- Minimum Processor Idle Power Package C-State set to Package C6 (non-retention) State
- DCU Stream Prefetcher set to Disabled
- Adjacent Sector Prefetch set to Disabled
- Last Level Cache (LLC) Dead Line Allocation set to Disabled
- Enhanced Processor Performance Profile set to Aggressive
- Thermal Configuration set to Maximum Cooling

**Sysinfo program** /home/cpu2017/bin/sysinfo
**Rev:** r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197 running on localhost.localdomain Fri Apr 28 01:44:41 2023

**SUT (System Under Test) info as seen by some common utilities.**

---

**Table of contents**

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lsopu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-6.el9_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

(Continued on next page)
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CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE

Test Date: Apr-2023  
Hardware Availability: May-2023  
Software Availability: Dec-2022

Platform Notes (Continued)

1. uname -a
   Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux

2. w
   01:44:41 up 2 min, 0 users, load average: 0.01, 0.02, 0.00
   USER   TTY      LOGIN@   IDLE   JCPU   PCPU WHAT

3. Username
   From environment variable $USER: root

4. ulimit -a
   real-time non-blocking time (microseconds, -R) unlimited
   core file size (blocks, -c) 0
   data seg size (kbytes, -d) unlimited
   scheduling priority (-e) 0
   file size (blocks, -f) unlimited
   pending signals (-i) 1029888
   max locked memory (kbytes, -l) 64
   max memory size (kbytes, -m) unlimited
   open files (-n) 1024
   pipe size (512 bytes, -p) 8
   POSIX message queues (bytes, -q) 819200
   real-time priority (-r) 0
   stack size (kbytes, -s) unlimited
   cpu time (seconds, -t) unlimited
   max user processes (-u) 1029888
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 28
   ssqd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   ssqd: root [priv]
   ssqd: root@notty
   bash --cd $SPEC/fprate.sh
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=24 --define physicalfirst
   --define no-numa --define drop_caches fprate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=24 --define physicalfirst
   --define no-numa --define base,peak --output_format all --define drop_caches --nopower --runmode rate --tune
   base:peak --size refrain fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/tempslogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017
   $SPEC = /home/cpu2017

6. /proc/cpuinfo
   model name : Intel(R) Xeon(R) Gold 5411N
   vendor_id : GenuineIntel
   cpu family : 6
   model : 143
   stepping : 8
   microcode : 0x2b0001b0
spec

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7. lscpu

From lscpu from util-linux 2.37.4:
Architecture:                    x86_64
CPU op-mode(s):                  32-bit, 64-bit
Address sizes:                   46 bits physical, 57 bits virtual
Byte Order:                      Little Endian
CPU(s):                          48
On-line CPU(s) list:             0-47
Vendor ID:                       GenuineIntel
BIOS Vendor ID:                  Intel(R) Corporation
Model name:                      Intel(R) Xeon(R) Gold 5411N
BIOS Model name:                 Intel(R) Xeon(R) Gold 5411N
CPU family:                      6
Model:                           143
Thread(s) per core:              2
Core(s) per socket:              24
Socket(s):                       1
Stepping:                        8
BogoMIPS:                        3800.00
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 rdscp
   lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
   nonstop_tsc cpuid aperfperf tsc_known_freq 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 abtm mcm每隔 cpuid_fault eb  cat 13  cat 12  cpd 13
   invpcid_single cpd 12 ssbd mba ibrs ibpb stibp ibrs enhanced tpr_shadow
   vmx flexpriority ept vpid ept_ad fsgsbase tsc_adjust bni avx2 smep bm2
   erms invpcid cmq rdr  a axv1512f axv512d rseed adx amap axv512lma
   clflushopt clwb intel_pt avx1512d sha ni axv512bw axv512lv xsaveopt xsavec
   xgetbv1 xsave cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
   split_lock_detect axv_vnni axv512_bf16 whonoinvd thernlia arat pin pts
   avx512vbmi umip kpu ospk waitpkg avx512_vbmi2 gfnl vaes vpcmldq axv512l_vn
   axv512l_vmbi axv512l_bitsalig tme axv512 vpocntdax lg7 rpdi bus_lock detect
   cldemote movdiri movdir64b enqcmd farm md_clear serialize tsxidtrk pconfi
   arch˨brig axv512_fp16 flush_l1d arch_capabilities

Virtualization:                 VT-x
L1d cache:                      1.1 MiB (24 instances)
L1i cache:                      768 KiB (24 instances)
L2 cache:                       48 MiB (24 instances)
L3 cache:                       45 MiB (1 instance)
NUMA node(s):                   1
NUMA node0 CPU(s):              0-47
Vulnerability Itlb multihit:    Not affected
Vulnerability L1tf:             Not affected
Vulnerability Mds:              Not affected
Vulnerability Meltdown:         Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl

(Continued on next page)
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Tested by: HPE
Test Date: Apr-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

Platform Notes (Continued)

Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

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<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
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<td>L1d</td>
<td>48K</td>
<td>1.1M</td>
<td>12</td>
<td>Data</td>
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<td>64</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L1i</td>
<td>32K</td>
<td>768K</td>
<td>8</td>
<td>Instruction</td>
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<td>64</td>
<td>1</td>
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<tr>
<td>L2</td>
<td>2M</td>
<td>48M</td>
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<td>1</td>
<td>64</td>
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<tr>
<td>L3</td>
<td>45M</td>
<td>45M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>49152</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

8. numactl --hardware
   NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 1 nodes (0)
   node 0 cpus: 0-47
   node 0 size: 257512 MB
   node 0 free: 256581 MB
   node distances:
     node 0
     0: 10

9. /proc/meminfo
   MemTotal: 263692288 kB

10. who -r
    run-level 3 Apr 28 01:42

11. Systemd service manager version: systemd 250 (250-6.e19_0)
    Default Target Status
    multi-user running

12. Services, from systemctl list-unit-files
    STATE UNIT FILES
    enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
    dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
    nis-domainname rhsmcertd syslogd selinux-autorelabel-mark sshd ssd
    systemd-network-generator tuned udisks2
    enabled-runtime systemd-remount-fs
    disabled blk-availability chrony-wait console-getty cpupower debug-shell kvm_stat
    man-db-restart-cache-update nftables powertop rdisc rhsm rhsm-facts rpmdb-rebuild
    serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysext
    indirect
    sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
    root=/dev/mapper/rhel00-root
    ro
    resume=/dev/mapper/rhe100-swap
    rd.lvm.lv=rhe100/root
    rd.lvm.lv=rhe100/swap

14. cpupower frequency-info

(Continued on next page)
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Platform Notes (Continued)

analyzing CPU 0:
   Unable to determine current policy
   boost state support:
      Supported: yes
      Active: yes

15. tuned-adm active
   Current active profile: throughput-performance

16. sysctl
   kernel.numa_balancing 0
   kernel.randomize_va_space 2
   vm.compaction_proactive_bytes 20
   vm.dirty_background_bytes 0
   vm.dirty_background_ratio 10
   vm.dirty_bytes 0
   vm.dirty_expire_centisecs 3000
   vm.dirty_ratio 40
   vm.dirty_writeback_centisecs 500
   vm.dirtytime_expire_seconds 43200
   vm.extravg_threshold 500
   vm.min_unmapped_ratio 1
   vm.nr_hugepages 0
   vm.nr_hugepages_mempolicy 0
   vm.nr_overcommit_hugepages 0
   vm.swappiness 10
   vm.watermark_boost_factor 15000
   vm.watermark_scale_factor 10
   vm.zone_reclaim_mode 0

17. /sys/kernel/mm/transparent_hugepage
   defrag always defer defer+madvise [madvise] never
   enabled [always] madvise never
   hpage_pmd_size 2097152
   shmem_enabled always within_size advise [never] deny force

18. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleep_millisecs 60000
   defrag 1
   max_ptes_none 511
   max_ptes_shared 256
   max_ptes_swap 64
   pages_to_scan 4096
   scan_sleep_millisecs 10000

19. OS release
   From /etc/*-release /etc/*-version
   os-release Red Hat Enterprise Linux 9.0 (Plow)
   redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
   system-release Red Hat Enterprise Linux release 9.0 (Plow)

20. Disk information
   SPEC is set to: /home/cpu2017
   Filesystem Type Size Used Avail Use% Mounted on

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

```
/dev/mapper/rhel00-home xfs 148G 63G 86G 43% /home
```

---

21. /sys/devices/virtual/dmi/id

Vendor: HPE  
Product: ProLiant ML110 Gen11  
Product Family: ProLiant  
Serial: CNX2230TMQ

---

22. dmidecode

Additional information from dmidecode 3.3 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:

- 8x Hynix HMCGB8MIBRA113N 32 GB 2 rank 4800, configured at 4400

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23. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: HPE  
BIOS Version: 1.30  
BIOS Date: 03/01/2023  
BIOS Revision: 1.30  
Firmware Revision: 1.10

---

### 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 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 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 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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### (Continued on next page)
Hewlett Packard Enterprise  
ProLiant ML110 Gen11  
(1.9 GHz, Intel Xeon Gold 5411N)  

<table>
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<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Apr-2023</th>
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<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: May-2023</td>
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<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Dec-2022</td>
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### Compiler Version Notes (Continued)

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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

---

Fortran  | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

---

Fortran, C  | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

---

### Base Compiler Invocation

C benchmarks:
```bash
icx
```

C++ benchmarks:
```bash
icpx
```

Fortran benchmarks:
```bash
ifx
```

Benchmarks using both Fortran and C:
```bash
ifx icx
```

Benchmarks using both C and C++:
```bash
icpx icx
```

Benchmarks using Fortran, C, and C++:
```bash
icpx icx ifx
```

### Base Portability Flags

- 503.bwaves_r: -DSPEC_LP64
- 507.cactuBSSN_r: -DSPEC_LP64
- 508.namd_r: -DSPEC_LP64
- 510.parest_r: -DSPEC_LP64

(Continued on next page)
Hewlett Packard Enterprise

ProLiant ML110 Gen11
(1.9 GHz, Intel Xeon Gold 5411N)

SPECrate®2017_fp_base = 263
SPECrate®2017_fp_peak = 271

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

Base Portability Flags (Continued)

511.povray_r: -DSPEC_LP64
519.libm_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 -xsapphirerapids -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
- w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
- -ffast-math -flto -mfpmath=sse -funroll-loops
- -qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
- w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
- -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs -align array32byte -auto -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
- w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- -Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
- -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
- w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
- -ffast-math -flto -mfpmath=sse -funroll-loops
- -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
- -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
- w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML110 Gen11
(1.9 GHz, Intel Xeon Gold 5411N)

SPECrates®2017_fp_base = 263
SPECrates®2017_fp_peak = 271

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</tbody>
</table>

Test Date: Apr-2023
Hardware Availability: May-2023
Software Availability: Dec-2022

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-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:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

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

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

### C++ benchmarks:

508.namd_r: basepeak = yes  
510.parest_r: -w, -std=c++14, -m64, -Wl,-z, muldefs, -xsapphirerapids, -Ofast, -ffast-math, -flto, -mfpmath=sse, -funroll-loops, -qopt-mem-layout-trans=4, -mprefer-vector-width=512, -ljemalloc, -L/usr/local/jemalloc64-5.0.1/lib

### Fortran benchmarks:

503.bwaves_r: basepeak = yes  
549.fotonik3d_r: basepeak = yes  
554.roms_r: -w, -m64, -Wl,-z, muldefs, -xsapphirerapids, -Ofast, -ffast-math, -flto, -mfpmath=sse, -funroll-loops, -qopt-mem-layout-trans=4, -nostandard-realloc-lhs, -align array32byte, -auto, -ljemalloc, -L/usr/local/jemalloc64-5.0.1/lib

### Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes  
527.cam4_r: basepeak = yes

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

511.povray_r: -w, -std=c++14, -m64, -std=c11, -Wl,-z, muldefs, -fprofile-generate=pass 1, -fprofile-use=default.profdata(pass 2), -xCORE-AVX2(pass 1), -flto, -Ofast, -xCORE-AVX512, -ffast-math, -mfpmath=sse, -funroll-loops, -qopt-mem-layout-trans=4, -Wno-implicit-int, -mprefer-vector-width=512, -ljemalloc, -L/usr/local/jemalloc64-5.0.1/lib

526.blender_r: basepeak = yes

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

-w, -m64, -std=c++14, -std=c11, -Wl,-z, muldefs, -xsapphirerapids, -Ofast, -ffast-math, -flto, -mfpmath=sse, -funroll-loops, -qopt-mem-layout-trans=4, -Wno-implicit-int, -mprefer-vector-width=512, -nostandard-realloc-lhs, -align array32byte, -auto, -ljemalloc, -L/usr/local/jemalloc64-5.0.1/lib
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML110 Gen11
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SPECrate®2017_fp_base = 263
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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-SPR-rev1.2.html
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.2.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.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 v1.1.9 on 2023-04-27 16:14:41-0400.
Originally published on 2023-05-23.