## HW Results

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Platinum 8458P</td>
<td>OS: Red Hat Enterprise Linux release 9.0 (Plow)</td>
</tr>
<tr>
<td>Max MHz: 3800</td>
<td>Kernel 5.14.0-70.13.1.el9_0.x86_64</td>
</tr>
<tr>
<td>Nominal: 2700</td>
<td>Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++</td>
</tr>
<tr>
<td>Enabled: 88 cores, 2 chips, 2 threads/core</td>
<td>Compiler for Linux: Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;</td>
</tr>
<tr>
<td>Orderable: 1, 2 chip(s)</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
<td>Firmware: HPE BIOS Version v1.22 01/18/2023 released Jan-2023</td>
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<tr>
<td>L2: 2 MB I+D on chip per core</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>L3: 82.5 MB I+D on chip per chip</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Other: None</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)</td>
<td>Peak Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x 400 GB SATA SSD</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Other: None</td>
<td>Power Management: BIOS and OS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
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## Results Table

<table>
<thead>
<tr>
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<td>328</td>
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</tr>
</tbody>
</table>

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
  ```
- runcpu command invoked through numactl i.e.:
  ```
  numactl --interleave=all runcpu <etc>
  ```
- IRQ balance service was stopped using "systemctl stop irqbalance.service"
- 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"

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:
```bash
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/jem5.0.1-64"
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
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 0x2b000161 for the Intel Xeon Platinum 8458P processor.

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

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197 running on localhost.localdomain Sat Feb  4 20:36:27 2023

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

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2. w
3. Username
4. ulimit -a
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6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r

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SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.70 GHz, Intel Xeon Platinum 8458P)

SPECrati®2017_fp_base = 854
SPECrati®2017_fp_peak = 904

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

Platform Notes (Continued)

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. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

-----------------------------------------------
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 GNU/Linux

-----------------------------------------------
2. w
20:36:27 up 3 min, 1 user, load average: 0.01, 0.06, 0.02
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root pts/0 20:34 1:15 0.00s 0.00s -bash

-----------------------------------------------
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) 4127081
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) 4127081
virtual memory (kbytes, -v) unlimited

(Continued on next page)
Platform Notes (Continued)

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
bash -c cd $SPEC/ && $SPEC/fprate.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=176 -c
ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=88 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=176 --configfile
ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=88 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
--runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

6. /proc/cpuinfo
model name : Intel(R) Xeon(R) Platinum 8458P
vendor_id : GenuineIntel
cpu family : 6
model : 143
stepping : 6
microcode : 0x2b000161
bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores : 44
siblings : 88
2 physical ids (chips)
176 processors (hardware threads)
physical id 0: core ids 0-43
physical id 1: core ids 0-43
physical id 0: apicids 0-87
physical id 1: apicids 128-215
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
virtualized systems. Use the above data carefully.

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

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.70 GHz, Intel Xeon Platinum 8458P)

SPECrate®2017_fp_base = 854
SPECrate®2017_fp_peak = 904

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

Platform Notes (Continued)

Byte Order: Little Endian

CPU(s): 176
On-line CPU(s) list: 0-175
Vendor ID: GenuineIntel

BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) Platinum 8458P

CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 44
Socket(s): 2
Stepping: 6
BogoMIPS: 5400.00

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 pdemsg rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
ds_cpl vmx smx est tm2 ssse3 sdbg fms xcl64 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_13 cat_12 cdp_13
invpcid_single cdp_12 ssbd mba ibrs ibbp stibp ibrs_enhanced prf_shadow
vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2
erms invpd cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves
xgetbv1 xsavees cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
split_lock_detect avx_vnni avx512_bf16 wboinvvd dtherm ida arat pln pts
avx512vbmib umip pklu ospe waitpkg avx512_vbmib gfn1 vaes vpcmldqd
avx512_vnni avx512_bitalg tme avx512_vpopcndtq la57 rdpid bus_lock_detect
cldemote movdir64b enqcmd ldrd mclear serialize txsltrkr pconfig
arch_irq avx512_fp16 amx_tile flush_l1d arch_capabilities

Virtualization: VT-x

L1d cache: 4.1 MiB (88 instances)
L1i cache: 2.8 MiB (88 instances)
L2 cache: 176 MiB (88 instances)
L3 cache: 165 MiB (2 instances)

NUMA node(s): 8
NUMA node0 CPU(s): 0-10, 88-98
NUMA node1 CPU(s): 11-21, 99-109
NUMA node2 CPU(s): 22-32, 110-120
NUMA node3 CPU(s): 33-43, 121-131
NUMA node4 CPU(s): 44-54, 132-142
NUMA node5 CPU(s): 55-65, 143-153
NUMA node6 CPU(s): 66-76, 154-164
NUMA node7 CPU(s): 77-87, 165-175

Vulnerability Itlb multihit: Not affected
Vulnerability L1tft: Not affected

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.70 GHz, Intel Xeon Platinum 8458P)

SPECrate®2017_fp_base = 854
SPECrate®2017_fp_peak = 904

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
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<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
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<tr>
<td>Tested by:</td>
<td>HPE</td>
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Test Date: Feb-2023
Hardware Availability: Jan-2023
Software Availability: Nov-2022

Platform Notes (Continued)

Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBFB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

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<tr>
<th>NAME ONE-SIZE ALL-SIZE WAYS TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
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<td>L1i</td>
<td>32K</td>
<td>2.8M</td>
<td>8</td>
<td>1</td>
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<td>L2</td>
<td>2M</td>
<td>176M</td>
<td>16</td>
<td>2</td>
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<tr>
<td>L3</td>
<td>82.5M</td>
<td>165M</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

-------------------------------------------------------------------

8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.

available: 8 nodes (0-7)
node 0 cpus: 0-10,88-98
node 0 size: 128732 MB
node 0 free: 128072 MB
node 1 cpus: 11-21,99-109
node 1 size: 128982 MB
node 1 free: 128446 MB
node 2 cpus: 22-32,110-120
node 2 size: 129019 MB
node 2 free: 128340 MB
node 3 cpus: 33-43,121-131
node 3 size: 129019 MB
node 3 free: 128438 MB
node 4 cpus: 44-54,132-142
node 4 size: 129019 MB
node 4 free: 128617 MB
node 5 cpus: 55-65,143-153
node 5 size: 129019 MB
node 5 free: 128623 MB
node 6 cpus: 66-76,154-164
node 6 size: 129019 MB
node 6 free: 128560 MB
node 7 cpus: 77-87,165-175
node 7 size: 128999 MB
node 7 free: 128579 MB
node distances:

0: 10 20 30 30 30 30 30 30
1: 20 10 30 30 30 30 30 30

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.70 GHz, Intel Xeon Platinum 8458P)

SPECrate®2017_fp_base = 854
SPECrate®2017_fp_peak = 904

Platform Notes (Continued)

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9. /proc/meminfo
   MemTotal: 1056573788 kB

10. who -r
    run-level 3 Feb 4 20:32

11. Systemd service manager version: systemd 250 (250-6.el9_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 chrony crond
    dbus-broker firewalld getty@ irqbalance kdmp lvm2-monitor mdmonitor microcode
    nis-domainname rshmcertd rsyslog selinux-autorelabel-mark sshd sssd
    systemd-network-generator udisks2
    enabled-runtime systemd-remount-fs
    disabled blk-availability chrony-wait console-getty cpupower debug-shell kvm_stat
    man-db-restart-cache-update nftables rdisc rshm rshm-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/rhel-root
    ro
    resume=/dev/mapper/rhel-swap
    rd.lvm.lv=rhel/root
    rd.lvm.lv=rhel/swap

14. cpupower frequency-info
    analyzing CPU 0:
    Unable to determine current policy
    boost state support:

(Continued on next page)
Platform Notes (Continued)

Supported: yes  
Active: yes

------------------------------------------------------------
15. sysctl
    kernel.numa_balancing               1
    kernel.randomize_va_space           2
    vm.compaction_proactiveness         20
    vm.dirty_background_bytes           0
    vm.dirty_background_ratio          10
    vm.dirty_bytes                     0
    vm.dirty_expire_centisecs          3000
    vm.dirty_ratio                     20
    vm.dirty_writeback_centisecs       500
    vm.dirtytime_expire_seconds        43200
    vm.extfrag_threshold               500
    vm.min_unmapped_ratio               1
    vm.nr_hugepages                    0
    vm.nr_hugepages_mempolicy          0
    vm.nr_overcommit_hugepages         0
    vm.swappiness                      60
    vm.watermark_boost_factor          15000
    vm.watermark_scale_factor          10
    vm.zone_reclaim_mode               0

------------------------------------------------------------
16. /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

------------------------------------------------------------
17. /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

------------------------------------------------------------
18. 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)

(Continued on next page)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML350 Gen11  
(2.70 GHz, Intel Xeon Platinum 8458P)  

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

SPEC CPU®2017 Floating Point Rate Result

SPECrate®2017_fp_base = 854  
SPECrate®2017_fp_peak = 904

Platform Notes (Continued)

system-release Red Hat Enterprise Linux release 9.0 (Plow)

19. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 372G 94G 279G 26% /home

20. /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant ML350 Gen11
Product Family: ProLiant
Serial: CNX20800P7

21. 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:
16x Hynix HMCG94MEBRA121N 64 GB 2 rank 4800

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: HPE
BIOS Version: 1.22
BIOS Date: 01/18/2023
BIOS Revision: 1.22
Firmware Revision: 1.10

Compiler Version Notes

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

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(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.70 GHz, Intel Xeon Platinum 8458P)

SPECrate®2017_fp_base = 854
SPECrate®2017_fp_peak = 904

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

Test Date: Feb-2023
Hardware Availability: Jan-2023
Software Availability: Nov-2022

Compiler Version Notes (Continued)

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

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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 2022.1.0 Build 20220316
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C++, C, Fortran | 507.cactuBSSN_r(base, peak)

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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
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Fortran, C  | 521.wrf_r(base, peak) 527.cam4_r(base, peak)

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(Continued on next page)
Hewlett Packard Enterprise
[Test Sponsor: HPE]
ProLiant ML350 Gen11
(2.70 GHz, Intel Xeon Platinum 8458P)

SPECrates®2017_fp_base = 854
SPECrates®2017_fp_peak = 904

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

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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Base 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

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
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen11
(2.70 GHz, Intel Xeon Platinum 8458P)

SPECrate®2017_fp_base = 854
SPECrate®2017_fp_peak = 904

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

Fortran benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -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 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 -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 -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/lib`

Peak Compiler Invocation

C benchmarks:
- `icx`

C++ benchmarks:
- `icpx`

Fortran benchmarks:
- `ifx`
Peak Compiler Invocation (Continued)

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: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -qopt-zmm-usage=high -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 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes

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


Benchmarks using both Fortran and C:


527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: basepeak = yes

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-SPR-rev1.1.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-rev1.1.xml

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