SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)
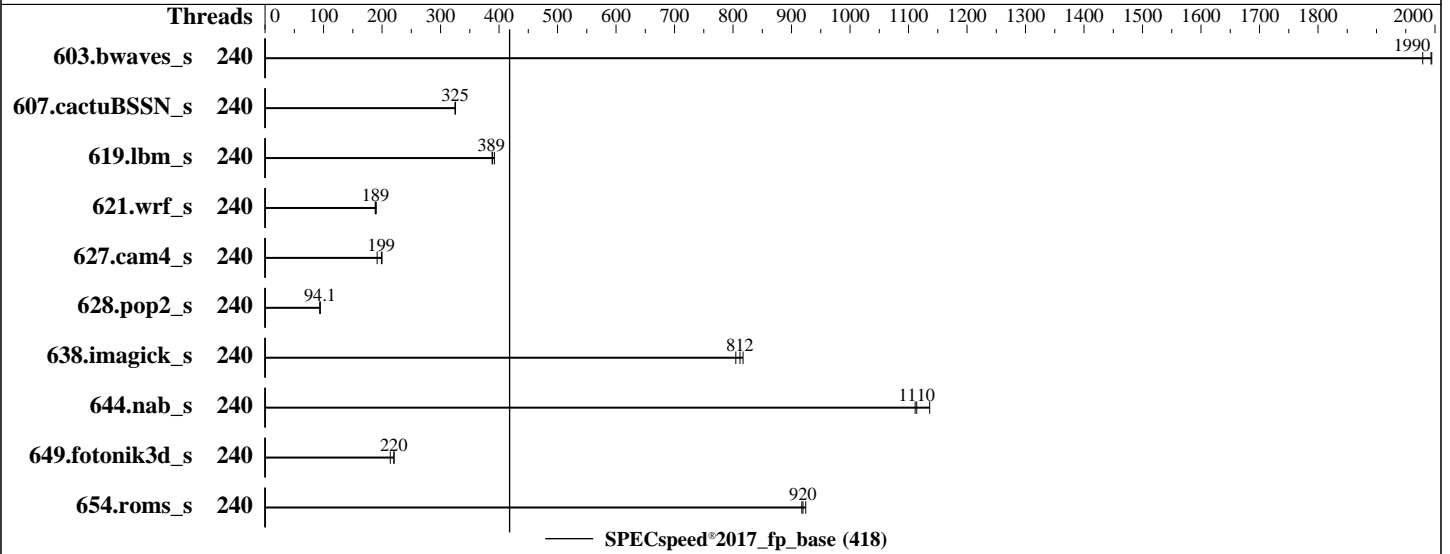
HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed®2017\_fp\_base =$ 418

$SPECspeed®2017\_fp\_peak =$ Not Run

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

Test Date: Jan-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023

Benchmark	Threads	Result
603.bwaves_s	240	1990
607.cactuBSSN_s	240	325
619.lbm_s	240	389
621.wrf_s	240	189
627.cam4_s	240	199
628.pop2_s	240	94.1
638.imagick_s	240	812
644.nab_s	240	1110
649.fotonik3d_s	240	220
654.roms_s	240	920

SPECspeed®2017_fp_base (418)

Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
Enabled: 480 cores, 8 chips
Orderable: 4, 8, 16 chip(s)
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 112.5 MB I+D on chip per chip
 Other: None
Memory: 4 TB (64 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 6.4 TB NVMe SSD
Other: None

Software

OS: Red Hat Enterprise Linux 8.8 (Ootpa)
Kernel 4.18.0-477.10.1.el8_8.x86_64
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++
Compiler for Linux;
Fortran: Version 2023.2.3 of Intel Fortran
Compiler for Linux;
Parallel: Yes
Firmware: HPE Firmware Bundle Version 1.10.342 released
Dec-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
HPE Foundation Software 2.5.0
Power Management: BIOS and OS set to prefer performance at
the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	240	29.8	1980	29.6	1990	**29.6**	**1990**							
607.cactuBSSN_s	240	51.2	326	**51.3**	**325**	51.3	325							
619.lbm_s	240	13.4	392	13.5	388	**13.5**	**389**							
621.wrf_s	240	70.2	188	**70.0**	**189**	69.6	190							
627.cam4_s	240	44.3	200	**44.6**	**199**	46.2	192							
628.pop2_s	240	126	94.1	**126**	**94.1**	127	93.7							
638.imagick_s	240	17.7	817	**17.8**	**812**	17.9	805							
644.nab_s	240	15.7	1110	**15.7**	**1110**	15.4	1140							
649.fotonik3d_s	240	41.3	221	**41.4**	**220**	42.6	214							
654.roms_s	240	17.2	918	**17.1**	**920**	17.0	924							
SPECspeed®2017_fp_base =	**418**													
SPECspeed®2017_fp_peak =	**Not Run**													

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

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.
 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

```
The system ROM used for this result contains Intel microcode version 0x2b0004d0 for
the Intel Xeon Platinum 8490H processor.
```

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Platform Notes (Continued)

```
BIOS Configuration:
 Workload Profile set to Custom
 Power Regulator set to Static High Performance Mode
 Energy Efficient Turbo set to Disabled
 Energy/Performance Bias set to Maximum Performance
 Intel Hyper-Threading set to Disabled
 Adjacent Sector Prefetch set to Disabled
 LLC Prefetch set to Enabled
 Last Level Cache (LLC) Dead Line Allocation set to Disabled
 Enhanced Processor Performance Profile set to Aggressive
 Memory Patrol Scrubbing set to Disabled
 Advanced Memory Protection set to Advanced ECC Support
 SR-IOV set to Disabled
 Intel Virtualization Technology (Intel VT, VT-x) set to Disabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on sph-201 Sat Jan 20 13:40:46 2024

 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. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 239 (239-74.el8_8)
 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. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
 21. Disk information
 22. /sys/devices/virtual/dmi/id
 23. dmidecode
 24. BIOS
 ------------------------------------------------------------


 ------------------------------------------------------------
 1. uname -a
   Linux sph-201 4.18.0-477.10.1.el8_8.x86_64 #1 SMP Wed Apr 5 13:35:01 EDT 2023 x86_64 x86_64 x86_64
   GNU/Linux


 ------------------------------------------------------------
 2. w
   13:40:47 up  1:51,  1 user,  load average: 5.65, 3.79, 2.45
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   test     ttyS0    -                11:50    1:48m  0.95s  0.01s login -- test
```

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Platform Notes (Continued)

```
  ----------------------------------------------------------
  3. Username
    From environment variable $USER:  root
    From the command 'logname':       test

  ----------------------------------------------------------
  4. ulimit -a
    core file size          (blocks, -c) 0
    data seg size           (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size               (blocks, -f) unlimited
    pending signals                 (-i) 16250845
    max locked memory       (kbytes, -l) 64
    max memory size         (kbytes, -m) unlimited
    open files                      (-n) 40000
    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) 16250845
    virtual memory          (kbytes, -v) unlimited
    file locks                      (-x) unlimited

  ----------------------------------------------------------
  5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 18
   login -- test
   -bash
   sudo su
   su
   bash
   bash
   runcpu --nobuild --action validate --define default-platform-flags -c
     ic2023.2.3-lin-sapphirerapids-speed-20231121.cfg --define cores=480 --threads=240 --tune base -o all
     --define drop_caches fpspeed
   runcpu --nobuild --action validate --define default-platform-flags --configfile
     ic2023.2.3-lin-sapphirerapids-speed-20231121.cfg --define cores=480 --threads 240 --tune base
     --output_format all --define drop_caches --nopower --runmode speed --tune base --size refspeed fpspeed
     --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.009/templogs/preenv.fpspeed.009.0.log --lognum 009.0
     --from_runcpu 2
   specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017

  ----------------------------------------------------------
  6. /proc/cpuinfo
     model name      : Intel(R) Xeon(R) Platinum 8490H
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 143
     stepping        : 8
     microcode       : 0x2b0004d0
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
     cpu cores       : 60
     siblings        : 60
     8 physical ids (chips)
     480 processors (hardware threads)
     physical id 0: core ids 0-59
     physical id 1: core ids 0-59
```

(Continued on next page)

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Platform Notes (Continued)

```
    physical id 2: core ids 0-59
    physical id 3: core ids 0-59
    physical id 4: core ids 0-59
    physical id 5: core ids 0-59
    physical id 6: core ids 0-59
    physical id 7: core ids 0-59
    physical id 0: apicids
    0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
    ,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118
    physical id 1: apicids
    128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
    80,182,184,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222,224,226,228,230,23
    2,234,236,238,240,242,244,246
    physical id 2: apicids
    256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,3
    08,310,312,314,316,318,320,322,324,326,328,330,332,334,336,338,340,342,344,346,348,350,352,354,356,358,36
    0,362,364,366,368,370,372,374
    physical id 3: apicids
    384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418,420,422,424,426,428,430,432,434,4
    36,438,440,442,444,446,448,450,452,454,456,458,460,462,464,466,468,470,472,474,476,478,480,482,484,486,48
    8,490,492,494,496,498,500,502
    physical id 4: apicids
    512,514,516,518,520,522,524,526,528,530,532,534,536,538,540,542,544,546,548,550,552,554,556,558,560,562,5
    64,566,568,570,572,574,576,578,580,582,584,586,588,590,592,594,596,598,600,602,604,606,608,610,612,614,61
    6,618,620,622,624,626,628,630
    physical id 5: apicids
    640,642,644,646,648,650,652,654,656,658,660,662,664,666,668,670,672,674,676,678,680,682,684,686,688,690,6
    92,694,696,698,700,702,704,706,708,710,712,714,716,718,720,722,724,726,728,730,732,734,736,738,740,742,74
    4,746,748,750,752,754,756,758
    physical id 6: apicids
    768,770,772,774,776,778,780,782,784,786,788,790,792,794,796,798,800,802,804,806,808,810,812,814,816,818,8
    20,822,824,826,828,830,832,834,836,838,840,842,844,846,848,850,852,854,856,858,860,862,864,866,868,870,87
    2,874,876,878,880,882,884,886
    physical id 7: apicids
    896,898,900,902,904,906,908,910,912,914,916,918,920,922,924,926,928,930,932,934,936,938,940,942,944,946,9
    48,950,952,954,956,958,960,962,964,966,968,970,972,974,976,978,980,982,984,986,988,990,992,994,996,998,10
    00,1002,1004,1006,1008,1010,1012,1014
  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 2.32.1:
    Architecture:        x86_64
    CPU op-mode(s):      32-bit, 64-bit
    Byte Order:          Little Endian
    CPU(s):              480
    On-line CPU(s) list: 0-479
    Thread(s) per core:  1
    Core(s) per socket:  60
    Socket(s):           8
    NUMA node(s):        8
    Vendor ID:           GenuineIntel
    BIOS Vendor ID:      Intel(R) Corporation
    CPU family:          6
    Model:               143
    Model name:          Intel(R) Xeon(R) Platinum 8490H
    BIOS Model name:     Intel(R) Xeon(R) Platinum 8490H
    Stepping:            8
```

(Continued on next page)

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Platform Notes (Continued)

```
  CPU MHz:              3500.000
  CPU max MHz:          3500.0000
  CPU min MHz:          800.0000
  BogoMIPS:             3800.04
  L1d cache:            48K
  L1i cache:            32K
  L2 cache:             2048K
  L3 cache:             115200K
  NUMA node0 CPU(s):    0-59
  NUMA node1 CPU(s):    60-119
  NUMA node2 CPU(s):    120-179
  NUMA node3 CPU(s):    180-239
  NUMA node4 CPU(s):    240-299
  NUMA node5 CPU(s):    300-359
  NUMA node6 CPU(s):    360-419
  NUMA node7 CPU(s):    420-479
  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
                        arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni
                        pclmulqdq dtes64 monitor ds_cpl 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 cat_l2 cdp_l3 invpcid_single intel_ppin
                        cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 avx2 smep bmi2
                        erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
                        intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc
                        cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect avx_vnni avx512_bf16
                        wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni
                        vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid
                        bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk
                        pconfig arch_lbr amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities

  -------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0-59
  node 0 size: 507325 MB
  node 0 free: 503044 MB
  node 1 cpus: 60-119
  node 1 size: 508078 MB
  node 1 free: 507234 MB
  node 2 cpus: 120-179
  node 2 size: 508078 MB
  node 2 free: 507089 MB
  node 3 cpus: 180-239
  node 3 size: 508078 MB
  node 3 free: 506853 MB
  node 4 cpus: 240-299
  node 4 size: 508078 MB
  node 4 free: 507645 MB
  node 5 cpus: 300-359
  node 5 size: 508034 MB
  node 5 free: 507591 MB
  node 6 cpus: 360-419
  node 6 size: 508078 MB
  node 6 free: 507659 MB
  node 7 cpus: 420-479
  node 7 size: 507014 MB
  node 7 free: 506531 MB
  node distances:
```

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Platform Notes (Continued)

```
  node   0   1   2   3   4   5   6   7
    0:  10  16  16  18  40  40  40  40
    1:  16  10  18  16  40  40  40  40
    2:  16  18  10  16  40  40  40  40
    3:  18  16  16  10  40  40  40  40
    4:  40  40  40  40  10  16  16  18
    5:  40  40  40  40  16  10  18  16
    6:  40  40  40  40  16  18  10  16
    7:  40  40  40  40  18  16  16  10


  -----------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       4160275232 kB


  -----------------------------------------------------------
  10. who -r
    run-level 3 Jan 20 11:49


  -----------------------------------------------------------
  11. Systemd service manager version: systemd 239 (239-74.el8_8)
    Default Target  Status
    multi-user      running


  -----------------------------------------------------------
  12. Services, from systemctl list-unit-files
    STATE      UNIT FILES
    enabled    ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
               abrt-journal-core abrt-oops abrt-vmcore abrt-xorg abrtd accounts-daemon atd auditd autovt@
               avahi-daemon chronyd cpuset_cpunodemap cpuset_memory_spread crond dcd dcdchkgracefulshutdown
               dcdshutdown display-manager gdm getty@ hpe-auto-config hpe_irqbalance import-state
               insights-client-boot iscsi iscsi-onboot kdump ksm ksmtuned libstoragemgmt libvirtd lm_sensors
               loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
               nvmefc-boot-connections ostree-remount pmcd pmie pmlogger qemu-guest-agent rpcbind rsyslog
               rtkit-daemon selinux-autorelabel-mark smartd sshd sssd syslog sysstat timedatex tuned udisks2 vdo
               vgauthd vmtoolsd vsftpd
    disabled   abrt-ccpp abrt-pstoreoops arp-ethers autofs blk-availability bluetooth brltty
               canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot cgdcbxd
               chrony-wait cni-dhcp console-getty cpupower cups cups-browsed debug-shell dnf-system-upgrade
               dnsmasq dovecot ebtables fancontrol fcoe firewalld grafana-server gssproxy httpd httpd@ ibacm
               iprdump iprinit iprupdate ipsec irqbalance iscsid iscsiuio kpatch kvm_stat ledmon libvirt-guests
               lldpad man-db-restart-cache-update named named-chroot ndctl-monitor netcf-transaction nfs-blkmap
               nfs-convert nfs-server nftables nmb numad nvmf-autoconnect oddjobd pmfind pmie_farm pmlogger_farm
               pmproxy podman podman-auto-update podman-clean-transient podman-kube@ podman-restart postfix
               powertop psacct ras-mc-ctl rasdaemon rdisc rhcd rrdcached saslauthd sendmail sm-client smb snmpd
               snmptrapd spamassassin speech-dispatcherd srp_daemon srp_daemon_port@ sshd-keygen@
               switcheroo-control systemd-nspawn@ systemd-pstore systemd-resolved target targetclid tcsd
               tog-pegasus trace-cmd upower virtinterfaced virtnetworkd virtnodedevd virtnwfilterd virtproxyd
               virtqemud virtsecretd virtstoraged wpa_supplicant ypbind
    indirect   pcscd serial-getty@ spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh
               sssd-sudo virtlockd virtlogd vsftpd@
    masked     systemd-timedated


  -----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd2,gpt4)/boot/vmlinuz-4.18.0-477.10.1.el8_8.x86_64
    root=UUID=e65a817a-ecea-4172-8f09-b6a7120f7868
    ro
    loglevel=3
    rd.auto=1
    console=ttyS0,115200n8
```

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Platform Notes (Continued)

```
   selinux=0
   security=
   console=ttyS0,115200
   udev.children-max=512
   nmi_watchdog=0
   uv_nmi.action=kdump
   add_efi_memmap
   tsc=nowatchdog
   bau=0
   earlyprintk=ttyS0,115200
   log_buf_len=8M
   numa_balancing=disable
   crashkernel=1G,high


   ----------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 3.50 GHz and 3.50 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
     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_proactiveness        0
   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.extfrag_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
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 418

SPECspeed®2017_fp_peak = Not Run

CPU2017 License:	3	**Test Date:**	Jan-2024
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2023
Tested by:	HPE	**Software Availability:**	Dec-2023

Platform Notes (Continued)

```
  defrag                    1
  max_ptes_none           511
  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 8.8 (Ootpa)
  hpe-foundation-release HPE Foundation Software 2.5.0, Build 750.0880.240110T0100.a.rhel88hpe-240110T0100
  redhat-release         Red Hat Enterprise Linux release 8.8 (Ootpa)
  system-release         Red Hat Enterprise Linux release 8.8 (Ootpa)


  ------------------------------------------------------------
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
  itlb_multihit        Not affected
  l1tf                 Not affected
  mds                  Not affected
  meltdown             Not affected
  mmio_stale_data      Not affected
  retbleed             Not affected
  spec_store_bypass    Mitigation: Speculative Store Bypass disabled via prctl
  spectre_v1           Mitigation: usercopy/swapgs barriers and __user pointer sanitization
  spectre_v2           Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling, PBRSB-eIBRS: SW sequence
  srbds                Not affected
  tsx_async_abort      Not affected
For more information, see the Linux documentation on hardware vulnerabilities, for example
    https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html

  ------------------------------------------------------------
21. Disk information
SPEC is set to: /home/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p4 xfs   2.3T  498G  1.8T  22% /


  ------------------------------------------------------------
22. /sys/devices/virtual/dmi/id
    Vendor:          HPE
    Product:         Compute Scale-up Server 3200
    Product Family: 1590PID03030201
    Serial:          5UF2491412-000


  ------------------------------------------------------------
23. 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:
    64x Samsung M321R8GA0BB0-CQKZH 64 GB 2 rank 4800



  ------------------------------------------------------------
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
  BIOS Vendor:      HPE
  BIOS Version:     Bundle:1.10.342-20231206_161054 SFW:009.010.108.000.2312042027
  BIOS Date:        12/04/2023
```

SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

HPE Compute Scale-up Server 3200
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CPU2017 License:	3	**Test Date:**	Jan-2024
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2023
Tested by:	HPE	**Software Availability:**	Dec-2023

Compiler Version Notes

```
==============================================================================
C              | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran        | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran, C     | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

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

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Base Portability Flags

603.bwaves_s: `-DSPEC_LP64`
607.cactuBSSN_s: `-DSPEC_LP64`
619.lbm_s: `-DSPEC_LP64`
621.wrf_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
627.cam4_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
628.pop2_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
`-assume byterecl`
638.imagick_s: `-DSPEC_LP64`
644.nab_s: `-DSPEC_LP64`
649.fotonik3d_s: `-DSPEC_LP64`
654.roms_s: `-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 -fiopenmp`
`-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512`
`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

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

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 -fiopenmp`
`-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512`
`-nostandard-realloc-lhs -align array32byte -auto`
`-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Benchmarks using Fortran, 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 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int`
`-mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte`
`-auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.0.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.0.xml

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

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