SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed®2017\_fp\_base = 401$

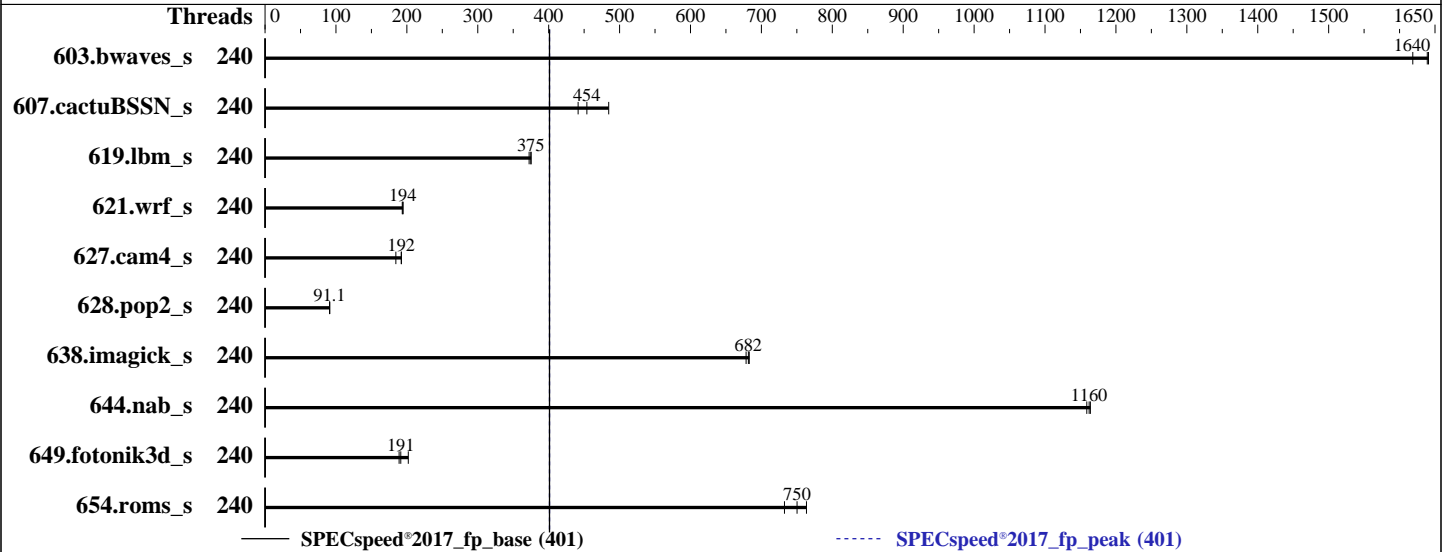$SPECspeed®2017\_fp\_peak = 401$

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

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

Threads		Result
603.bwaves_s	240	1640
607.cactuBSSN_s	240	454
619.lbm_s	240	375
621.wrf_s	240	194
627.cam4_s	240	192
628.pop2_s	240	91.1
638.imagick_s	240	682
644.nab_s	240	1160
649.fotonik3d_s	240	191
654.roms_s	240	750

Scale: 0, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1650

——— SPECspeed®2017_fp_base (401)   ----- SPECspeed®2017_fp_peak (401)

Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
Enabled: 240 cores, 4 chips
Orderable: 1, 2, 4 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: 1 TB (32 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 Kernel 5.14.21-150400.22-default
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2023.0 of Intel Fortran
 Compiler for Linux;
 C/C++: Version 2023.0 of Intel C/C++
 Compiler for Linux
Parallel: Yes
Firmware: HPE BIOS Version v1.30 03/01/2023 released
 Mar-2023
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
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

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 401

SPECspeed®2017_fp_peak = 401

CPU2017 License: 3	**Test Date:** Apr-2023
Test Sponsor: HPE	**Hardware Availability:** May-2023
Tested by: HPE	**Software Availability:** Dec-2022

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	240	36.0	1640	36.4	1620	**36.0**	**1640**	240	36.0	1640	36.4	1620	**36.0**	**1640**
607.cactuBSSN_s	240	**36.7**	**454**	37.8	442	34.4	485	240	**36.7**	**454**	37.8	442	34.4	485
619.lbm_s	240	**14.0**	**375**	14.0	375	14.1	372	240	**14.0**	**375**	14.0	375	14.1	372
621.wrf_s	240	**68.0**	**194**	68.4	193	68.0	194	240	**68.0**	**194**	68.4	193	68.0	194
627.cam4_s	240	46.1	192	**46.1**	**192**	48.0	184	240	46.1	192	**46.1**	**192**	48.0	184
628.pop2_s	240	**130**	**91.1**	131	90.9	130	91.2	240	**130**	**91.1**	131	90.9	130	91.2
638.imagick_s	240	21.3	678	**21.2**	**682**	21.1	683	240	21.3	678	**21.2**	**682**	21.1	683
644.nab_s	240	15.1	1160	**15.0**	**1160**	15.0	1160	240	15.1	1160	**15.0**	**1160**	15.0	1160
649.fotonik3d_s	240	45.1	202	48.2	189	**47.6**	**191**	240	45.1	202	48.2	189	**47.6**	**191**
654.roms_s	240	20.6	764	**21.0**	**750**	21.5	733	240	20.6	764	**21.0**	**750**	21.5	733
SPECspeed®2017_fp_base =	**401**													
SPECspeed®2017_fp_peak =	**401**													

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
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:
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 Redhat Enterprise Linux 8.0
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 401

SPECspeed®2017_fp_peak = 401

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Apr-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

Platform Notes

```
 The system ROM used for this result contains Intel microcode version 0x2b0001b0 for
 the Intel Xeon Platinum 8490H processor.
 BIOS Configuration:
  Workload Profile set to General Peak Frequency Compute
  Thermal Configuration set to Maximum Cooling
  Intel Hyper-Threading set to Disabled
  Memory Patrol Scrubbing set to Disabled
  Last Level Cache (LLC) Prefetch set to Enabled
  Last Level Cache (LLC) Dead Line Allocation set to Disabled
  Enhanced Processor Performance Profile set to Aggressive
  Dead Block Predictor set to Enabled
  Workload Profile set to Custom
   Intel DMI Link Frequency set to Gen2 Speed
   Adjacent Sector Prefetch set to Disabled
   Minimum Processor Idle Power Package C-State set to Package C6 (non-retention) State
   Minimum Processor Idle Power Core C-State set to C1E State

  Sysinfo program /home/cpu2017/bin/sysinfo
  Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
  running on localhost Tue May 17 23:50:40 2022

  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 249 (249.11+suse.124.g2bc0b2c447)
  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
  ------------------------------------------------------------


  ------------------------------------------------------------
  1. uname -a
    Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
    x86_64 x86_64 x86_64 GNU/Linux


  ------------------------------------------------------------
  2. w
     23:50:41 up 8 min,  2 users,  load average: 0.06, 2.60, 2.66
     USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed®2017\_fp\_base = 401$

$SPECspeed®2017\_fp\_peak = 401$

CPU2017 License:	3	**Test Date:**	Apr-2023
Test Sponsor:	HPE	**Hardware Availability:**	May-2023
Tested by:	HPE	**Software Availability:**	Dec-2022

Platform Notes (Continued)

```
  root     tty1       -                23:46    4:17   0.00s  0.00s -bash
  root     pts/0    172.16.0.100       23:46    9.00s  1.04s  0.00s -bash


  -------------------------------------------------------------
  3. Username
    From environment variable $USER:  root


  -------------------------------------------------------------
  4. ulimit -a
    core file size          (blocks, -c) unlimited
    data seg size           (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size               (blocks, -f) unlimited
    pending signals                 (-i) 4126460
    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) 4126460
    virtual memory          (kbytes, -v) unlimited
    file locks                      (-x) unlimited


  -------------------------------------------------------------
  5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 29
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: root@pts/0
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags -c
     ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=240 --tune base,peak -o all --define
     drop_caches fpspeed
   runcpu --nobuild --action validate --define default-platform-flags --configfile
     ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=240 --tune base,peak --output_format all
     --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed fpspeed --nopreenv
     --note-preenv --logfile $SPEC/tmp/CPU2017.007/templogs/preenv.fpspeed.007.0.log --lognum 007.0
     --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        : 6
    microcode       : 0x2b0001b0
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 60
    siblings        : 60
    4 physical ids (chips)
    240 processors (hardware threads)
    physical id 0: core ids 0-59
    physical id 1: core ids 0-59
    physical id 2: core ids 0-59
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed^{®}2017\_fp\_base = 401$

$SPECspeed^{®}2017\_fp\_peak = 401$

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

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

Platform Notes (Continued)

```
      physical id 3: 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
   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 2.37.2:
   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):                    240
   On-line CPU(s) list:       0-239
   Vendor ID:                 GenuineIntel
   Model name:                Intel(R) Xeon(R) Platinum 8490H
   CPU family:                6
   Model:                     143
   Thread(s) per core:        1
   Core(s) per socket:        60
   Socket(s):                 4
   Stepping:                  6
   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 rdtscp
                              lm constant_tsc art 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 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 cdp_l2 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 rtm 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 avx512_fp16 amx_tile flush_l1d arch_capabilities
   Virtualization:            VT-x
   L1d cache:                 11.3 MiB (240 instances)
   L1i cache:                 7.5 MiB (240 instances)
   L2 cache:                  480 MiB (240 instances)
   L3 cache:                  450 MiB (4 instances)
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed®2017\_fp\_base = 401$

$SPECspeed®2017\_fp\_peak = 401$

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

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

Platform Notes (Continued)

```
  NUMA node(s):               4
  NUMA node0 CPU(s):          0-29,120-149
  NUMA node1 CPU(s):          30-59,150-179
  NUMA node2 CPU(s):          60-89,180-209
  NUMA node3 CPU(s):          90-119,210-239
  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 and seccomp
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs 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:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL    SETS PHY-LINE COHERENCY-SIZE
      L1d       48K    11.3M   12 Data             1      64        1             64
      L1i       32K     7.5M    8 Instruction      1      64        1             64
      L2         2M     480M   16 Unified          2    2048        1             64
      L3     112.5M     450M   15 Unified          3  122880        1             64

  --------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0-29,120-149
  node 0 size: 257619 MB
  node 0 free: 255795 MB
  node 1 cpus: 30-59,150-179
  node 1 size: 258032 MB
  node 1 free: 257508 MB
  node 2 cpus: 60-89,180-209
  node 2 size: 258032 MB
  node 2 free: 257621 MB
  node 3 cpus: 90-119,210-239
  node 3 size: 257951 MB
  node 3 free: 257600 MB
  node distances:
  node   0   1   2   3
    0:  10  20  20  20
    1:  20  10  20  20
    2:  20  20  10  20
    3:  20  20  20  10

  --------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1056396372 kB

  --------------------------------------------------------------
10. who -r
   run-level 3 May 17 23:42

  --------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
   Default Target  Status
   multi-user      running

  --------------------------------------------------------------
12. Services, from systemctl list-unit-files
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed^{®}2017\_fp\_base = 401$

$SPECspeed^{®}2017\_fp\_peak = 401$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Apr-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

Platform Notes (Continued)

```
   STATE            UNIT FILES
   enabled          apparmor auditd cron firewalld getty@ haveged irqbalance issue-generator kbdsettings
                    postfix purge-kernels rollback sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
                    wickedd-nanny
   enabled-runtime  systemd-remount-fs
   disabled         boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell ebtables
                    grub2-once haveged-switch-root issue-add-ssh-keys kexec-load lunmask rpmconfigcheck
                    serial-getty@ systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                    systemd-time-wait-sync systemd-timesyncd tuned
   indirect         wickedd

   ----------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=1cd4f3cb-461d-45d3-9458-dbcb1beaaea7
    splash=silent
    mitigations=auto
    quiet
    security=apparmor

   ----------------------------------------------------------
14. cpupower frequency-info
    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             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                    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
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed^{®}2017\_fp\_base = 401$

$SPECspeed^{®}2017\_fp\_peak = 401$

CPU2017 License:	3	**Test Date:**	Apr-2023
Test Sponsor:	HPE	**Hardware Availability:**	May-2023
Tested by:	HPE	**Software Availability:**	Dec-2022

Platform Notes (Continued)

```
    ----------------------------------------------------------------
    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 SUSE Linux Enterprise Server 15 SP4


    ----------------------------------------------------------------
    20. Disk information
    SPEC is set to: /home/cpu2017
      Filesystem      Type   Size  Used Avail Use% Mounted on
      /dev/sda3       btrfs  444G  138G  306G  32% /home


    ----------------------------------------------------------------
    21. /sys/devices/virtual/dmi/id
        Vendor:         HPE
        Product:        ProLiant DL560 Gen11
        Product Family: ProLiant
        Serial:         CNX2250G5V


    ----------------------------------------------------------------
    22. dmidecode
      Additional information from dmidecode 3.2 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:
        3x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
        29x Samsung M321R4GA3BB6-CQKDG 32 GB 2 rank 4800



    ----------------------------------------------------------------
    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: 1.30
```

Compiler Version Notes

```
==============================================================================================
C                 | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(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.
----------------------------------------------------------------------------------------------


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

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 401

SPECspeed®2017_fp_peak = 401

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

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

Compiler Version Notes (Continued)

```
C++, C, Fortran | 607.cactuBSSN_s(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.
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.
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        | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(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     | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(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.
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.
-------------------------------------------------------------------------------
```

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`

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`

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed^®2017\_fp\_base = 401$

$SPECspeed^®2017\_fp\_peak = 401$

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

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

Base Portability Flags (Continued)

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

Fortran benchmarks:
```
-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:
```
-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++:
```
-m64 -std=c++14 -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
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

Fortran benchmarks:
```
ifx
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed®2017\_fp\_base = 401$

$SPECspeed®2017\_fp\_peak = 401$

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

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

Peak Compiler Invocation (Continued)

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

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

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL560 Gen11
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed^{®}2017\_fp\_base = 401$

$SPECspeed^{®}2017\_fp\_peak = 401$

CPU2017 License: 3		**Test Date:**	Apr-2023
Test Sponsor:	HPE	**Hardware Availability:**	May-2023
Tested by:	HPE	**Software Availability:**	Dec-2022

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`
`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-rev1.1.xml`
`http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml`

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 2022-05-17 14:20:40-0400.
Report generated on 2023-05-09 15:55:37 by CPU2017 PDF formatter v6716.
Originally published on 2023-05-09.