SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

$SPECrate®2017\_fp\_base = 205$

ProLiant DL320 Gen11
(2.00 GHz, Intel Xeon Silver 4514Y)

$SPECrate®2017\_fp\_peak = 210$

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

Test Date: Mar-2024
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Benchmark	Copies	Result
503.bwaves_r	32	964
507.cactuBSSN_r	32	261
507.cactuBSSN_r	16	279
508.namd_r	32	99.4
510.parest_r	32	113
510.parest_r	16	122
511.povray_r	32	163
511.povray_r	16	169
519.lbm_r	32	149
521.wrf_r	32	203
526.blender_r	32	156
527.cam4_r	32	190
538.imagick_r	32	438
544.nab_r	32	314
549.fotonik3d_r	32	196
554.roms_r	32	104
554.roms_r	16	115

SPECrate®2017_fp_base (205)   SPECrate®2017_fp_peak (210)

Hardware

CPU Name: Intel Xeon Silver 4514Y
 Max MHz: 3400
 Nominal: 2000
Enabled: 16 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 30 MB I+D on chip per chip
 Other: None
Memory: 256 GB (8 x 32 GB 2Rx8 PC5-5600B-R, running at 4400)
Storage: 1 x 480 GB SATA SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 Kernel 5.14.21-150500.53-default
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: No
Firmware: HPE BIOS Version v2.12 12/13/2023 released Dec-2023
File System: xfs
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

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

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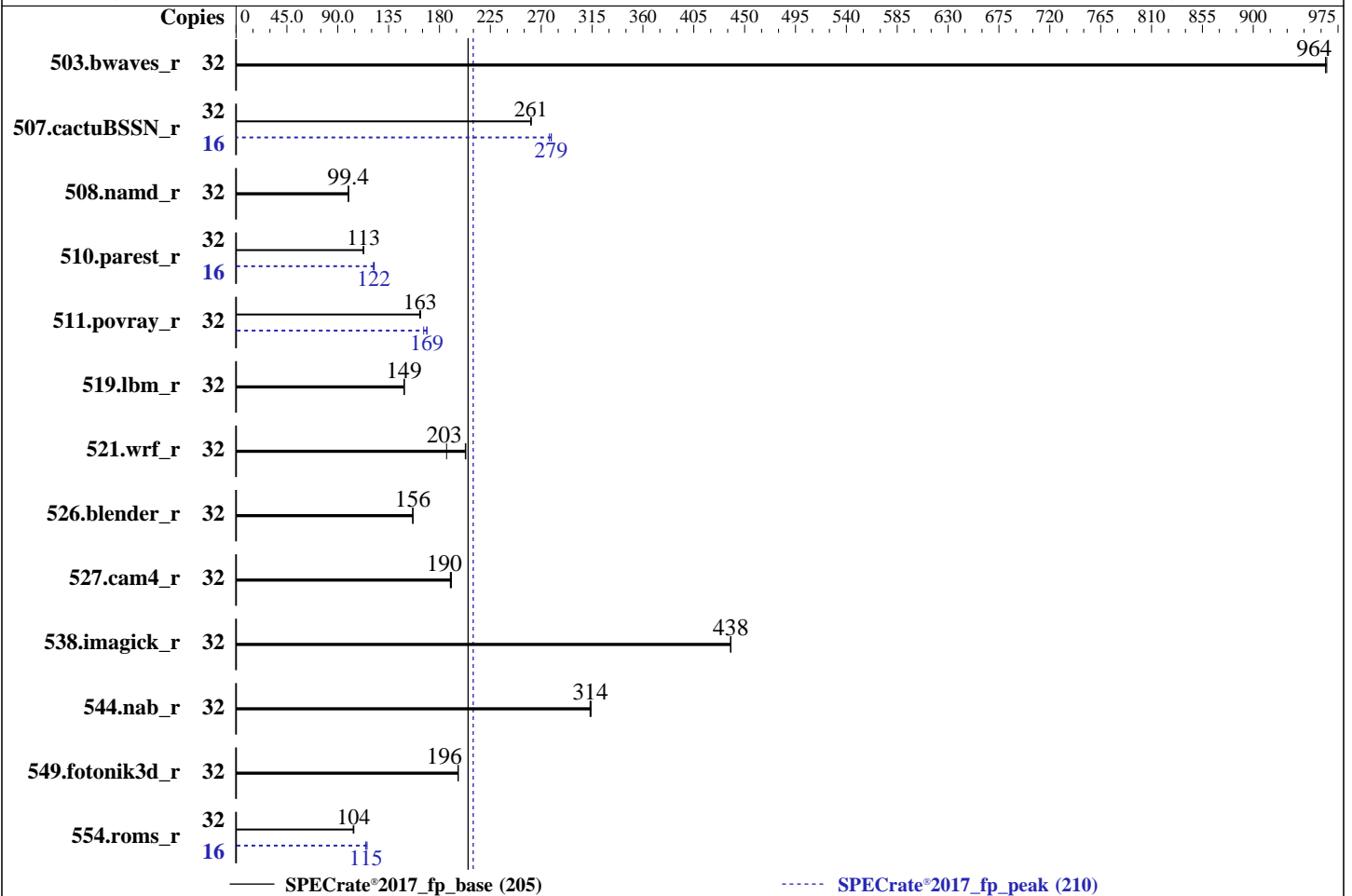SPECrate®2017_fp_base = 205

SPECrate®2017_fp_peak = 210

CPU2017 License: 3	**Test Date:** Mar-2024
Test Sponsor: HPE	**Hardware Availability:** Feb-2024
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Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	32	333	965	**333**	**964**	333	964	32	333	965	**333**	**964**	333	964
507.cactuBSSN_r	32	**155**	**261**	155	261	155	261	16	73.1	277	72.6	279	**72.7**	**279**
508.namd_r	32	306	99.3	305	99.6	**306**	**99.4**	32	306	99.3	305	99.6	**306**	**99.4**
510.parest_r	32	744	112	**742**	**113**	740	113	16	342	122	**343**	**122**	344	122
511.povray_r	32	457	163	460	162	**459**	**163**	32	**443**	**169**	450	166	442	169
519.lbm_r	32	227	149	226	149	**227**	**149**	32	227	149	226	149	**227**	**149**
521.wrf_r	32	385	186	**353**	**203**	353	203	32	385	186	**353**	**203**	353	203
526.blender_r	32	312	156	311	156	**312**	**156**	32	312	156	311	156	**312**	**156**
527.cam4_r	32	**295**	**190**	294	191	295	190	32	**295**	**190**	294	191	295	190
538.imagick_r	32	182	438	**182**	**438**	182	438	32	182	438	**182**	**438**	182	438
544.nab_r	32	171	314	172	313	**172**	**314**	32	171	314	172	313	**172**	**314**
549.fotonik3d_r	32	634	197	635	196	**635**	**196**	32	634	197	635	196	**635**	**196**
554.roms_r	32	**489**	**104**	488	104	491	104	16	219	116	**221**	**115**	222	115
SPECrate®2017_fp_base =	**205**												
SPECrate®2017_fp_peak =	**210**												

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>
tuned-adm profile was set to throughput-performance using "tuned-adm profile throughput-performance"

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
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.

(Continued on next page)

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General Notes (Continued)

```
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

```
BIOS Configuration:
Workload Profile set to General Throughput Compute
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 Fri Mar  8 00:03:48 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 249 (249.16+suse.171.gdad0071f15)
 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 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
   x86_64 x86_64 x86_64 GNU/Linux


 ------------------------------------------------------------
 2. w
    00:03:48 up 1 min,  0 users,  load average: 0.17, 0.09, 0.03
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

(Continued on next page)

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Platform Notes (Continued)

```
          ----------------------------------------------------------
          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) 1030659
            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) 1030659
            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@notty
           bash -c cd $SPEC/ && $SPEC/fprate.sh
           runcpu --nobuild --action validate --define default-platform-flags --define numcopies=32 -c
             ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=16 --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=32 --configfile
             ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=16 --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) SILVER 4514Y
              vendor_id         : GenuineIntel
              cpu family        : 6
              model             : 207
              stepping          : 2
              microcode         : 0x21000200
              bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
              cpu cores         : 16
              siblings          : 32
              1 physical ids (chips)
              32 processors (hardware threads)
              physical id 0: core ids 0-15
              physical id 0: apicids 0-31
            Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
            virtualized systems.  Use the above data carefully.


          ----------------------------------------------------------
          7. lscpu
```

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Test Date: Mar-2024

Hardware Availability: Feb-2024

Software Availability: Dec-2023

Platform Notes (Continued)

```
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):                    32
  On-line CPU(s) list:       0-31
  Vendor ID:                 GenuineIntel
  Model name:                INTEL(R) XEON(R) SILVER 4514Y
  CPU family:                6
  Model:                     207
  Thread(s) per core:        2
  Core(s) per socket:        16
  Socket(s):                 1
  Stepping:                  2
  BogoMIPS:                  4000.00
  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 avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hfi
                             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:                 768 KiB (16 instances)
  L1i cache:                 512 KiB (16 instances)
  L2 cache:                  32 MiB (16 instances)
  L3 cache:                  30 MiB (1 instance)
  NUMA node(s):              2
  NUMA node0 CPU(s):         0-7,16-23
  NUMA node1 CPU(s):         8-15,24-31
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Mmio stale data:  Not affected
  Vulnerability Retbleed:         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, PBRSB-eIBRS SW
                                  sequence
  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     768K   12 Data            1    64        1             64
     L1i       32K     512K    8 Instruction     1    64        1             64
     L2         2M      32M   16 Unified         2  2048        1             64
```

(Continued on next page)

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Platform Notes (Continued)

```
     L3        30M      30M    15 Unified         3 32768       1            64


        -----------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-7,16-23
  node 0 size: 128679 MB
  node 0 free: 128113 MB
  node 1 cpus: 8-15,24-31
  node 1 size: 129008 MB
  node 1 free: 128282 MB
  node distances:
  node   0   1
    0:  10  20
    1:  20  10


        -----------------------------------------------------------
9. /proc/meminfo
   MemTotal:       263872192 kB


        -----------------------------------------------------------
10. who -r
  run-level 3 Mar 8 00:02


        -----------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
   Default Target  Status
   multi-user      running


        -----------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          apparmor auditd cron getty@ irqbalance issue-generator kbdsettings lvm2-monitor postfix
                    purge-kernels rollback sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4
                    wickedd-dhcp6 wickedd-nanny
   enabled-runtime  systemd-remount-fs
   disabled         blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
                    grub2-once haveged haveged-switch-root hwloc-dump-hwdata issue-add-ssh-keys kexec-load ksm
                    kvm_stat lunmask multipathd rpmconfigcheck serial-getty@ systemd-boot-check-no-failures
                    systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd
                    target-isns targetcli targetclid tuned
   indirect         wickedd


        -----------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
   root=UUID=c791a00c-0ac0-437c-a123-380d9ca9a82f
   splash=silent
   resume=/dev/disk/by-uuid/2045128c-8306-498f-ba9c-cef6051d72af
   mitigations=auto
   quiet
   security=apparmor


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

(Continued on next page)

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Platform Notes (Continued)

```
        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


    -------------------------------------------------------------
    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 SP5


    -------------------------------------------------------------
    20. Disk information
    SPEC is set to: /home/cpu2017
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sdc4       xfs   155G  143G   12G  93% /home


    -------------------------------------------------------------
    21. /sys/devices/virtual/dmi/id
        Vendor:         HPE
        Product:        ProLiant DL320 Gen11
```

(Continued on next page)

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Platform Notes (Continued)

```
     Product Family: ProLiant
     Serial:         CNX2210H28


    ------------------------------------------------------------
 22. dmidecode
   Additional information from dmidecode 3.4 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 HMCG88AGBRA193N 32 GB 2 rank 5600, configured at 4400



    ------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       HPE
    BIOS Version:      2.12
    BIOS Date:         12/13/2023
    BIOS Revision:     2.12
    Firmware Revision: 1.55
```

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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 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.
----------------------------------------------------------------------------------------------------------


==========================================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
----------------------------------------------------------------------------------------------------------
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.
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```

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Compiler Version Notes (Continued)

```
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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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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`

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SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL320 Gen11
(2.00 GHz, Intel Xeon Silver 4514Y)

SPECrate®2017_fp_base = 205

SPECrate®2017_fp_peak = 210

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

Base Portability Flags (Continued)

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
-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
```

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

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`

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`

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Standard Performance Evaluation Corporation (info@spec.org)

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Hewlett Packard Enterprise

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ProLiant DL320 Gen11

(2.00 GHz, Intel Xeon Silver 4514Y)

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

Peak Optimization Flags (Continued)

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-EMR-rev1.0.html
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-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-EMR-rev1.0.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-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 2024-03-07 13:33:47-0500.
Report generated on 2024-04-09 15:50:27 by CPU2017 PDF formatter v6716.
Originally published on 2024-04-09.