SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

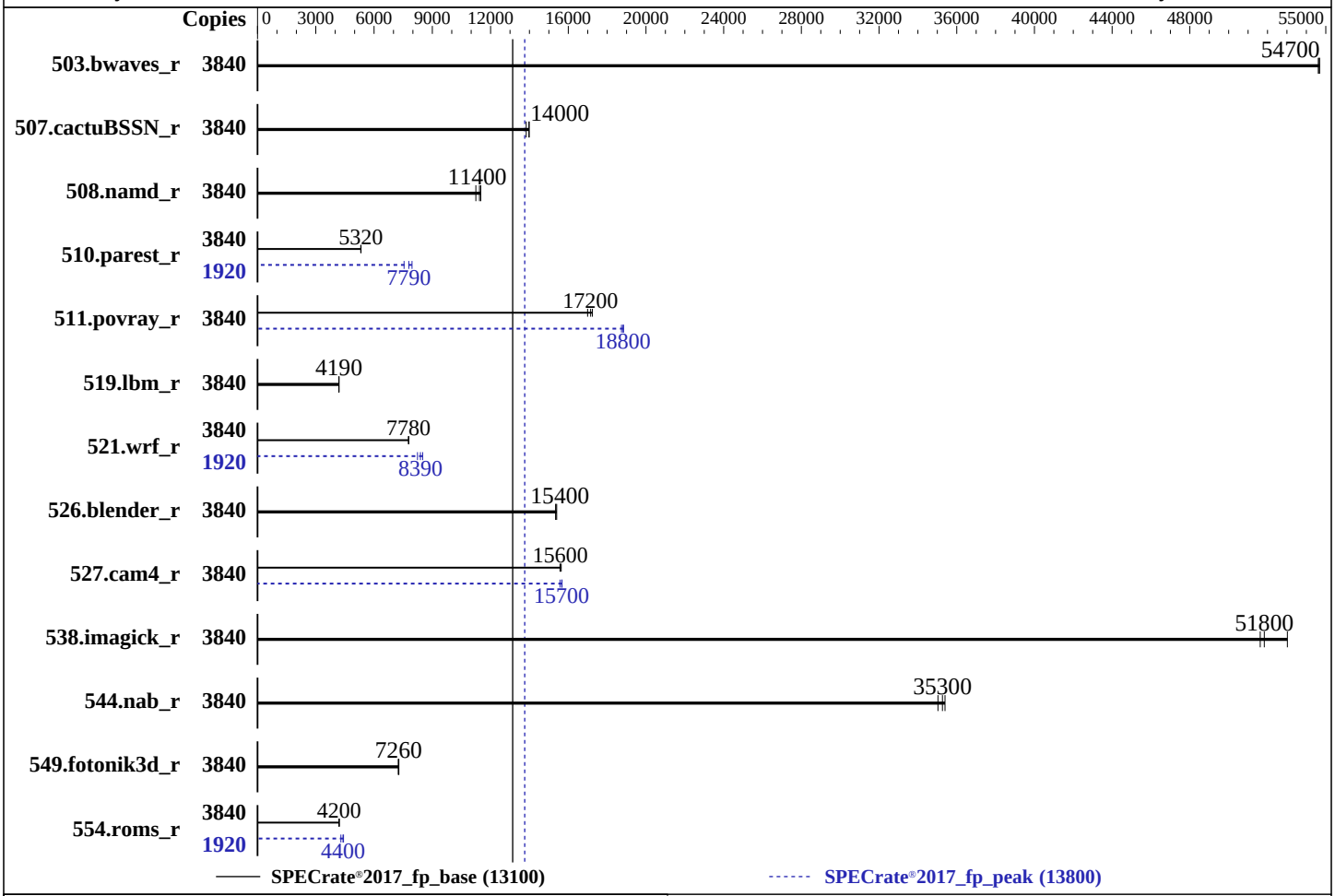
HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 13100

SPECrate®2017_fp_peak = 13800

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

Test Date: May-2026
Hardware Availability: Dec-2023
Software Availability: Jun-2025



Hardware

CPU Name:	Intel Xeon Platinum 8490H
Max MHz:	3500
Nominal:	1900
Enabled:	1920 cores, 32 chips, 2 threads/core
Orderable:	4, 8, 16, 32 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:	32 TB (512 x 64 GB 2Rx4 PC5-4800B-R, running at 4400)
Storage:	1 x 14 TB NVMe SSD
Other:	CPU Cooling: Air

Software

OS:	SUSE Linux Enterprise Server 15 SP7 Kernel 6.4.0-150700.51-default
Compiler:	C/C++: Version 2025.2 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2025.2 of Intel Fortran Compiler for Linux;
Parallel:	No
Firmware:	HPE Firmware Bundle Version 1.76.15 04/27/2026 released Apr-2026
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 is set to prefer performance at the cost of additional power usage

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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	3840	705	54600	**704**	**54700**	704	54700	3840	705	54600	**704**	**54700**	704	54700
507.cactuBSSN_r	3840	348	14000	**348**	**14000**	351	13800	3840	348	14000	**348**	**14000**	351	13800
508.namd_r	3840	317	11500	**319**	**11400**	325	11200	3840	317	11500	**319**	**11400**	325	11200
510.parest_r	3840	**1888**	**5320**	1885	5330	1889	5320	1920	666	7540	631	7950	**645**	**7790**
511.povray_r	3840	**523**	**17200**	520	17200	528	17000	3840	478	18700	**477**	**18800**	476	18800
519.lbm_r	3840	966	4190	**966**	**4190**	965	4190	3840	966	4190	**966**	**4190**	965	4190
521.wrf_r	3840	1105	7790	**1105**	**7780**	1107	7770	1920	506	8500	**513**	**8390**	522	8230
526.blender_r	3840	381	15400	**381**	**15400**	380	15400	3840	381	15400	**381**	**15400**	380	15400
527.cam4_r	3840	**431**	**15600**	430	15600	431	15600	3840	428	15700	**429**	**15700**	431	15600
538.imagick_r	3840	180	53000	**184**	**51800**	185	51600	3840	180	53000	**184**	**51800**	185	51600
544.nab_r	3840	184	35000	**183**	**35300**	183	35400	3840	184	35000	**183**	**35300**	183	35400
549.fotonik3d_r	3840	2065	7250	2056	7280	**2060**	**7260**	3840	2065	7250	2056	7280	**2060**	**7260**
554.roms_r	3840	**1453**	**4200**	1450	4210	1454	4200	1920	689	4430	711	4290	**693**	**4400**

SPECrate®2017_fp_base = 13100

SPECrate®2017_fp_peak = 13800

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>
```

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
```

(Continued on next page)

General Notes (Continued)

```
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: Parameters are selected in the order shown below
 Workload Profile set to Custom
  Energy/Performance Bias set to Maximum Performance
  Energy Efficient Turbo 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
  Adjacent Sector Prefetch set to Disabled
  DCU Stream Prefetcher set to Disabled
  Last Level Cache (LLC) Dead Line Allocation set to Disabled
  Enhanced Processor Performance Profile set to Aggressive
  Memory Patrol Scrubbing set to Disabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on sph-679 Sun May 10 07:44:29 2026

 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 254 (254.24+suse.148.g83b9060b6e)
 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 sph-679 6.4.0-150700.51-default #1 SMP PREEMPT_DYNAMIC Wed Apr 30 21:35:43 UTC 2025 (6930611/lp)
```

(Continued on next page)

Platform Notes (Continued)

```
  x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   07:44:30 up 1 day, 21:50,  1 user,  load average: 0.99, 1.04, 1.01
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  test     ttyS0    -                Fri16   14.00s  0.64s  0.25s login -- test
  test     pts/0    -                Fri16   14.00s  2.98s  0.60s sudo su

------------------------------------------------------------
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) 130066176
  max locked memory       (kbytes, -l) 8192
  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) 130066176
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=42
 login -- test
 -bash
 sudo su
 sudo su
 su
 bash
 bash
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=3840 -c
   ic2025.2-lin-sapphirerapids-rate-20250605.cfg --define smt-on --define cores=1920 --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=3840 --configfile
   ic2025.2-lin-sapphirerapids-rate-20250605.cfg --define smt-on --define cores=1920 --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/CPU2017.007/templogs/preenv.fprate.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
```

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Platform Notes (Continued)

```
stepping        : 6
microcode       : 0x2b000670
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores       : 60
siblings        : 120
32 physical ids (chips)
3840 processors (hardware threads)
physical id 0: core ids 0-59
physical id 1: core ids 0-59
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 8: core ids 0-59
physical id 9: core ids 0-59
physical id 10: core ids 0-59
physical id 11: core ids 0-59
physical id 12: core ids 0-59
physical id 13: core ids 0-59
physical id 14: core ids 0-59
physical id 15: core ids 0-59
physical id 16: core ids 0-59
physical id 17: core ids 0-59
physical id 18: core ids 0-59
physical id 19: core ids 0-59
physical id 20: core ids 0-59
physical id 21: core ids 0-59
physical id 22: core ids 0-59
physical id 23: core ids 0-59
physical id 24: core ids 0-59
physical id 25: core ids 0-59
physical id 26: core ids 0-59
physical id 27: core ids 0-59
physical id 28: core ids 0-59
physical id 29: core ids 0-59
physical id 30: core ids 0-59
physical id 31: core ids 0-59
physical id 0: apicids 0-119
physical id 1: apicids 128-247
physical id 2: apicids 256-375
physical id 3: apicids 384-503
physical id 4: apicids 512-631
physical id 5: apicids 640-759
physical id 6: apicids 768-887
physical id 7: apicids 896-1015
physical id 8: apicids 1024-1143
physical id 9: apicids 1152-1271
physical id 10: apicids 1280-1399
physical id 11: apicids 1408-1527
physical id 12: apicids 1536-1655
physical id 13: apicids 1664-1783
physical id 14: apicids 1792-1911
physical id 15: apicids 1920-2039
physical id 16: apicids 2048-2167
physical id 17: apicids 2176-2295
physical id 18: apicids 2304-2423
physical id 19: apicids 2432-2551
physical id 20: apicids 2560-2679
```

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Platform Notes (Continued)

```
     physical id 21: apicids 2688-2807
     physical id 22: apicids 2816-2935
     physical id 23: apicids 2944-3063
     physical id 24: apicids 3072-3191
     physical id 25: apicids 3200-3319
     physical id 26: apicids 3328-3447
     physical id 27: apicids 3456-3575
     physical id 28: apicids 3584-3703
     physical id 29: apicids 3712-3831
     physical id 30: apicids 3840-3959
     physical id 31: apicids 3968-4087
   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 2.40.4:
   Architecture:                         x86_64
   CPU op-mode(s):                       32-bit, 64-bit
   Address sizes:                        52 bits physical, 57 bits virtual
   Byte Order:                           Little Endian
   CPU(s):                               3840
   On-line CPU(s) list:                  0-3839
   Vendor ID:                            GenuineIntel
   Model name:                           Intel(R) Xeon(R) Platinum 8490H
   CPU family:                           6
   Model:                                143
   Thread(s) per core:                   2
   Core(s) per socket:                   60
   Socket(s):                            32
   Stepping:                             6
   CPU(s) scaling MHz:                   23%
   CPU max MHz:                          3500.0000
   CPU min MHz:                          800.0000
   BogoMIPS:                             3800.01
   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
                                         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
                                         user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
                                         hwp_act_window hwp_pkg_req 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
                                         ibt amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
                                         arch_capabilities
   L1d cache:                            90 MiB (1920 instances)
   L1i cache:                            60 MiB (1920 instances)
   L2 cache:                             3.8 GiB (1920 instances)
   L3 cache:                             3.5 GiB (32 instances)
   NUMA node(s):                         32
```

(Continued on next page)

Platform Notes (Continued)

```
   NUMA node0 CPU(s):                    0-59,1920-1979
   NUMA node1 CPU(s):                    60-119,1980-2039
   NUMA node2 CPU(s):                    120-179,2040-2099
   NUMA node3 CPU(s):                    180-239,2100-2159
   NUMA node4 CPU(s):                    240-299,2160-2219
   NUMA node5 CPU(s):                    300-359,2220-2279
   NUMA node6 CPU(s):                    360-419,2280-2339
   NUMA node7 CPU(s):                    420-479,2340-2399
   NUMA node8 CPU(s):                    480-539,2400-2459
   NUMA node9 CPU(s):                    540-599,2460-2519
   NUMA node10 CPU(s):                   600-659,2520-2579
   NUMA node11 CPU(s):                   660-719,2580-2639
   NUMA node12 CPU(s):                   720-779,2640-2699
   NUMA node13 CPU(s):                   780-839,2700-2759
   NUMA node14 CPU(s):                   840-899,2760-2819
   NUMA node15 CPU(s):                   900-959,2820-2879
   NUMA node16 CPU(s):                   960-1019,2880-2939
   NUMA node17 CPU(s):                   1020-1079,2940-2999
   NUMA node18 CPU(s):                   1080-1139,3000-3059
   NUMA node19 CPU(s):                   1140-1199,3060-3119
   NUMA node20 CPU(s):                   1200-1259,3120-3179
   NUMA node21 CPU(s):                   1260-1319,3180-3239
   NUMA node22 CPU(s):                   1320-1379,3240-3299
   NUMA node23 CPU(s):                   1380-1439,3300-3359
   NUMA node24 CPU(s):                   1440-1499,3360-3419
   NUMA node25 CPU(s):                   1500-1559,3420-3479
   NUMA node26 CPU(s):                   1560-1619,3480-3539
   NUMA node27 CPU(s):                   1620-1679,3540-3599
   NUMA node28 CPU(s):                   1680-1739,3600-3659
   NUMA node29 CPU(s):                   1740-1799,3660-3719
   NUMA node30 CPU(s):                   1800-1859,3720-3779
   NUMA node31 CPU(s):                   1860-1919,3780-3839
   Vulnerability Gather data sampling:   Not affected
   Vulnerability Itlb multihit:          Not affected
   Vulnerability L1tf:                   Not affected
   Vulnerability Mds:                    Not affected
   Vulnerability Meltdown:               Not affected
   Vulnerability Mmio stale data:        Not affected
   Vulnerability Reg file data sampling: Not affected
   Vulnerability Retbleed:               Not affected
   Vulnerability Spec rstack overflow:   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 / Automatic IBRS; IBPB conditional; RSB filling;
                                         PBRSB-eIBRS SW sequence; BHI BHI_DIS_S
   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      90M   12 Data            1     64        1             64
      L1i       32K      60M    8 Instruction     1     64        1             64
      L2         2M     3.8G   16 Unified         2   2048        1             64
      L3     112.5M     3.5G   15 Unified         3 122880        1             64

 ------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 32 nodes (0-31)
   node 0 cpus: 0-59,1920-1979
```

(Continued on next page)

Platform Notes (Continued)

```
node 0 size: 1014749 MB
node 0 free: 972659 MB
node 1 cpus: 60-119,1980-2039
node 1 size: 1016219 MB
node 1 free: 978159 MB
node 2 cpus: 120-179,2040-2099
node 2 size: 1016219 MB
node 2 free: 977968 MB
node 3 cpus: 180-239,2100-2159
node 3 size: 1016181 MB
node 3 free: 978231 MB
node 4 cpus: 240-299,2160-2219
node 4 size: 1016219 MB
node 4 free: 978536 MB
node 5 cpus: 300-359,2220-2279
node 5 size: 1016219 MB
node 5 free: 978509 MB
node 6 cpus: 360-419,2280-2339
node 6 size: 1016219 MB
node 6 free: 978452 MB
node 7 cpus: 420-479,2340-2399
node 7 size: 1016219 MB
node 7 free: 978550 MB
node 8 cpus: 480-539,2400-2459
node 8 size: 1016219 MB
node 8 free: 978447 MB
node 9 cpus: 540-599,2460-2519
node 9 size: 1016219 MB
node 9 free: 978474 MB
node 10 cpus: 600-659,2520-2579
node 10 size: 1016219 MB
node 10 free: 978540 MB
node 11 cpus: 660-719,2580-2639
node 11 size: 1016219 MB
node 11 free: 978506 MB
node 12 cpus: 720-779,2640-2699
node 12 size: 1016219 MB
node 12 free: 978253 MB
node 13 cpus: 780-839,2700-2759
node 13 size: 1016219 MB
node 13 free: 978361 MB
node 14 cpus: 840-899,2760-2819
node 14 size: 1016219 MB
node 14 free: 978335 MB
node 15 cpus: 900-959,2820-2879
node 15 size: 1016219 MB
node 15 free: 978257 MB
node 16 cpus: 960-1019,2880-2939
node 16 size: 1016219 MB
node 16 free: 978204 MB
node 17 cpus: 1020-1079,2940-2999
node 17 size: 1016219 MB
node 17 free: 978500 MB
node 18 cpus: 1080-1139,3000-3059
node 18 size: 1016219 MB
node 18 free: 978159 MB
node 19 cpus: 1140-1199,3060-3119
node 19 size: 1016219 MB
node 19 free: 978671 MB
node 20 cpus: 1200-1259,3120-3179
```

(Continued on next page)

Platform Notes (Continued)

```
node 20 size: 1016219 MB
node 20 free: 978499 MB
node 21 cpus: 1260-1319,3180-3239
node 21 size: 1016219 MB
node 21 free: 978513 MB
node 22 cpus: 1320-1379,3240-3299
node 22 size: 1016219 MB
node 22 free: 978456 MB
node 23 cpus: 1380-1439,3300-3359
node 23 size: 1016219 MB
node 23 free: 978404 MB
node 24 cpus: 1440-1499,3360-3419
node 24 size: 1016219 MB
node 24 free: 978430 MB
node 25 cpus: 1500-1559,3420-3479
node 25 size: 1016219 MB
node 25 free: 978503 MB
node 26 cpus: 1560-1619,3480-3539
node 26 size: 1016219 MB
node 26 free: 978636 MB
node 27 cpus: 1620-1679,3540-3599
node 27 size: 1016219 MB
node 27 free: 978481 MB
node 28 cpus: 1680-1739,3600-3659
node 28 size: 1016219 MB
node 28 free: 978603 MB
node 29 cpus: 1740-1799,3660-3719
node 29 size: 1016219 MB
node 29 free: 978580 MB
node 30 cpus: 1800-1859,3720-3779
node 30 size: 1016219 MB
node 30 free: 978434 MB
node 31 cpus: 1860-1919,3780-3839
node 31 size: 1015276 MB
node 31 free: 977607 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24
25  26  27  28  29  30  31
  0:  10  16  16  18  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  1:  16  10  18  16  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  2:  16  18  10  16  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  3:  18  16  16  10  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  4:  40  40  40  40  10  16  16  18  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  5:  40  40  40  40  16  10  18  16  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  6:  40  40  40  40  16  18  10  16  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  7:  40  40  40  40  18  16  16  10  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  8:  40  40  40  40  40  40  40  40  10  16  16  18  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
  9:  40  40  40  40  40  40  40  40  16  10  18  16  40  40  40  40  40  40  40  40  40  40  40  40  40
  40  40  40  40  40  40  40
 10:  40  40  40  40  40  40  40  40  16  18  10  16  40  40  40  40  40  40  40  40  40  40  40  40  40
 40  40  40  40  40  40  40
```

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Platform Notes (Continued)

```
   11:  40  40  40  40  40  40  40  40  18  16  16  10  40  40  40  40  40  40  40  40  40  40  40  40  40
   40  40  40  40  40  40  40
   12:  40  40  40  40  40  40  40  40  40  40  40  40  10  16  16  18  40  40  40  40  40  40  40  40  40
   40  40  40  40  40  40  40
   13:  40  40  40  40  40  40  40  40  40  40  40  40  16  10  18  16  40  40  40  40  40  40  40  40  40
   40  40  40  40  40  40  40
   14:  40  40  40  40  40  40  40  40  40  40  40  40  16  18  10  16  40  40  40  40  40  40  40  40  40
   40  40  40  40  40  40  40
   15:  40  40  40  40  40  40  40  40  40  40  40  40  18  16  16  10  40  40  40  40  40  40  40  40  40
   40  40  40  40  40  40  40
   16:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  10  16  16  18  40  40  40  40  40
   40  40  40  40  40  40  40
   17:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  16  10  18  16  40  40  40  40  40
   40  40  40  40  40  40  40
   18:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  16  18  10  16  40  40  40  40  40
   40  40  40  40  40  40  40
   19:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  18  16  16  10  40  40  40  40  40
   40  40  40  40  40  40  40
   20:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  10  16  16  18  40
   40  40  40  40  40  40  40
   21:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  16  10  18  16  40
   40  40  40  40  40  40  40
   22:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  16  18  10  16  40
   40  40  40  40  40  40  40
   23:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  18  16  16  10  40
   40  40  40  40  40  40  40
   24:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  10
   16  16  18  40  40  40  40
   25:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  16
   10  18  16  40  40  40  40
   26:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  16
   18  10  16  40  40  40  40
   27:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  18
   16  16  10  40  40  40  40
   28:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
   40  40  40  10  16  16  18
   29:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
   40  40  40  16  10  18  16
   30:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
   40  40  40  16  18  10  16
   31:  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40  40
   40  40  40  18  16  16  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       33296975564 kB

------------------------------------------------------------
10. who -r
  run-level 3 May 8 10:05

------------------------------------------------------------
11. Systemd service manager version: systemd 254 (254.24+suse.148.g83b9060b6e)
  Default Target  Status
  multi-user      running

------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth chronyd
```

(Continued on next page)

Platform Notes (Continued)

```
                  cron display-manager getty@ irqbalance issue-generator kbdsettings kdump kdump-early
                  kdump-notify klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd
                  systemd-pstore vgauthd vmblock-fuse vmtoolsd vsftpd wicked wickedd-auto4 wickedd-dhcp4
                  wickedd-dhcp6 wickedd-nanny
  enabled-runtime systemd-fsck-root systemd-remount-fs
  disabled        accounts-daemon amavis apache2 apache2@ autofs autoyast-initscripts blk-availability
                  bluetooth-mesh boot-sysctl ca-certificates certmonger chrony-wait clamd clamonacc
                  console-getty cxl-monitor debug-shell ebtables exchange-bmc-os-info firewalld fsidd gpm
                  grub2-once haveged ipmi ipmievd issue-add-ssh-keys kexec-load lunmask man-db-create
                  mariadb mariadb@ multipathd named ndctl-monitor nfs nfs-blkmap nfs-server nfsserver nmb
                  ostree-remount ostree-state-overlay@ rpcbind rpmconfigcheck rsyncd rtkit-daemon samba-bgqd
                  smartd_generate_opts smb snmpd snmptrapd spamd spampd speech-dispatcherd srp_daemon
                  srp_daemon_port@ sysstat systemd-boot-check-no-failures systemd-confext
                  systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd tuned
                  udisks2 update-system-flatpaks upower vncserver@ winbind ypbind
  indirect        pcscd serial-getty@ systemd-userdbd tftp wickedd

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.4.0-150700.51-default
  root=UUID=81117a1a-7606-46e3-b31a-2f9229da6989
  rd.auto=1
  console=ttyS0,115200n8
  selinux=0
  security=
  splash=silent
  mitigations=auto
  crashkernel=334M,high
  crashkernel=72M,low

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 124:
    current policy: frequency should be within 800 MHz and 3.50 GHz.
                    The governor "powersave" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

------------------------------------------------------------
15. tuned-adm active
  No current active profile.

------------------------------------------------------------
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
```

(Continued on next page)

Platform Notes (Continued)

```
  vm.nr_overcommit_hugepages          0
  vm.swappiness                      60
  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 SP7

------------------------------------------------------------
20. Disk information
SPEC is set to: /home/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda2      xfs    14T  1.2T   13T   9% /

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        Compute Scale-up Server 3200
    Product Family: 1590PID03030201
    Serial:         5UF2432328-000

------------------------------------------------------------
22. dmidecode
  Additional information from dmidecode 3.6 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:
    32x Hynix HMCG94AEBRA102N 64 GB 2 rank 4800, configured at 4400
    34x Hynix HMCG94AEBRA103N 64 GB 2 rank 4800, configured at 4400
    34x Hynix HMCG94AEBRA109N 64 GB 2 rank 4800, configured at 4400
    32x Hynix HMCG94AEBRA123N 64 GB 2 rank 4800, configured at 4400
    49x Hynix HMCG94MEBRA109N 64 GB 2 rank 4800, configured at 4400
    18x Hynix HMCG94MEBRA121N 64 GB 2 rank 4800, configured at 4400
    4x Hynix HMCG94MEBRA123N 64 GB 2 rank 4800, configured at 4400
    128x Micron MTC40F2046S1RC48BA1 64 GB 2 rank 4800, configured at 4400
    112x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800, configured at 4400
    69x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800, configured at 4400
```

(Continued on next page)

Platform Notes (Continued)

```
 ------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       HPE
    BIOS Version:      Bundle:1.76.15-20260429_074928 SFW:009.056.003.000.2604270453
    BIOS Date:         04/27/2026
```

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 2025.2.0 Build 20250605
Copyright (C) 1985-2025 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 2025.2.0 Build 20250605
Copyright (C) 1985-2025 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 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 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 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
--------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 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 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
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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

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

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Base Optimization Flags (Continued)

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

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

(Continued on next page)

Peak Compiler Invocation (Continued)

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

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

(Continued on next page)

Peak Optimization Flags (Continued)

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++:

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++:

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/Intel-ic2025-official-linux64.html
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-CSS-GNR-rev1.3.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2025-official-linux64.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-CSS-GNR-rev1.3.xml

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