



SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

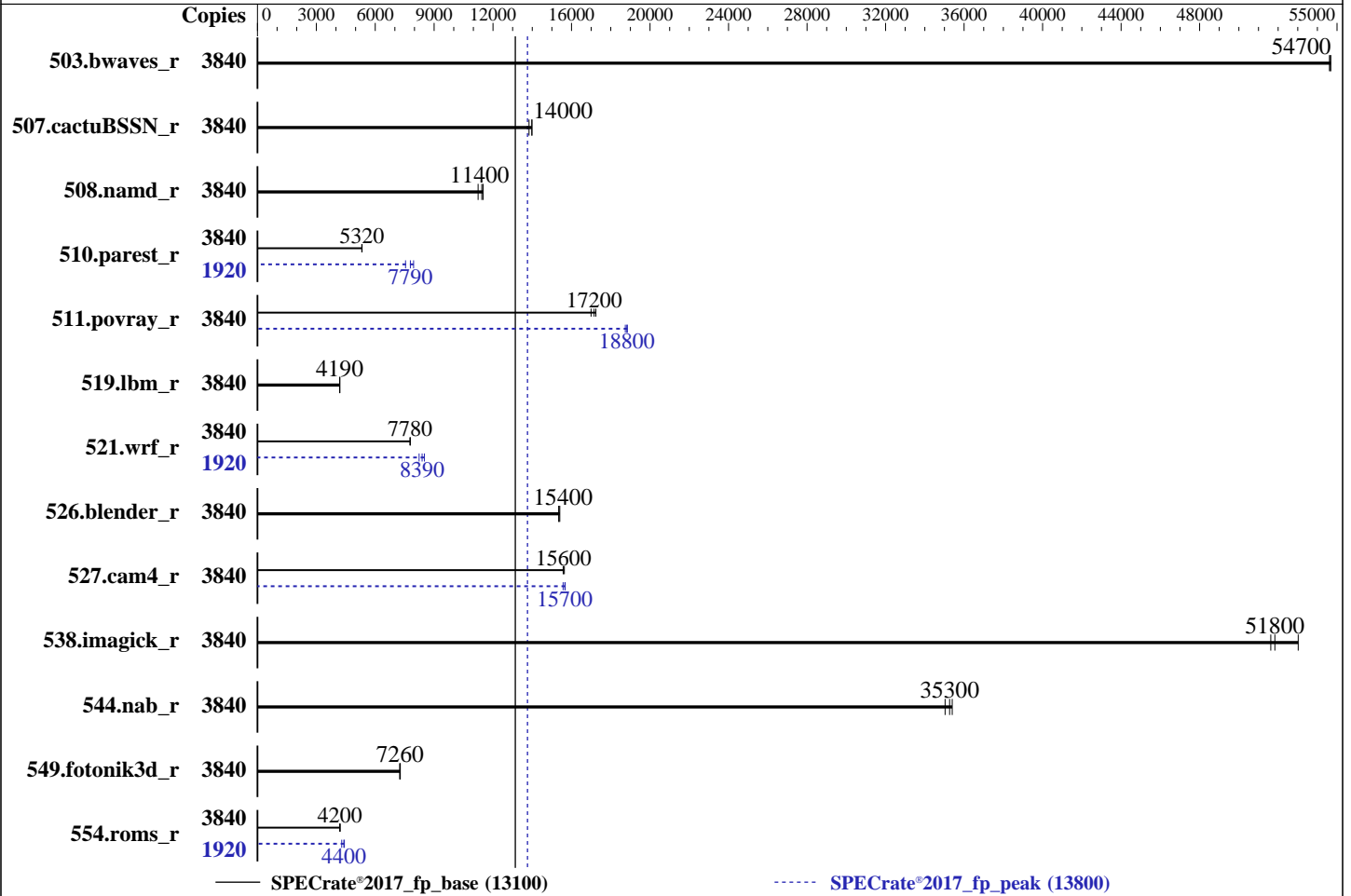
HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

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		
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

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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"
MALLOCONF = "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)

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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)

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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
pdpelgb 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 bmil 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_lli
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
```

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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 Lltf:                 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;
PBRSEB-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

```

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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

```

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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
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
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
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
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
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
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
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
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
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
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

```

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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

Platform Notes (Continued)

```

11: 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 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
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
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
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
16: 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 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 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 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 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 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 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 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 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 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 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 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)



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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 vgaauthd 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 ebttables exchange-bmc-os-info firewallld 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-bggd
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-sysextd systemd-time-wait-sync systemd-timesyncd tuned
udisks2 update-system-flatpaks upower vncserver@ winbind ypbind
indirect pcsd 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=81117ala-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)



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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 HMC94AEBRA102N 64 GB 2 rank 4800, configured at 4400
34x Hynix HMC94AEBRA103N 64 GB 2 rank 4800, configured at 4400
34x Hynix HMC94AEBRA109N 64 GB 2 rank 4800, configured at 4400
32x Hynix HMC94AEBRA123N 64 GB 2 rank 4800, configured at 4400
49x Hynix HMC94MEBRA109N 64 GB 2 rank 4800, configured at 4400
18x Hynix HMC94MEBRA121N 64 GB 2 rank 4800, configured at 4400
4x Hynix HMC94MEBRA123N 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

```

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CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: May-2026

Hardware Availability: Dec-2023

Software Availability: Jun-2025

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
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=====
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
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=====
C++, C | 511.povray_r(base, peak) 526.blender_r(base, peak)
=====

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
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=====
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
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SPEC CPU®2017 Floating Point Rate Result

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(Test Sponsor: HPE)

HPE Compute Scale-up Server 3200

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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

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

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

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)



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Software Availability: Jun-2025

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

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Software Availability: Jun-2025

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.profddata(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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