SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

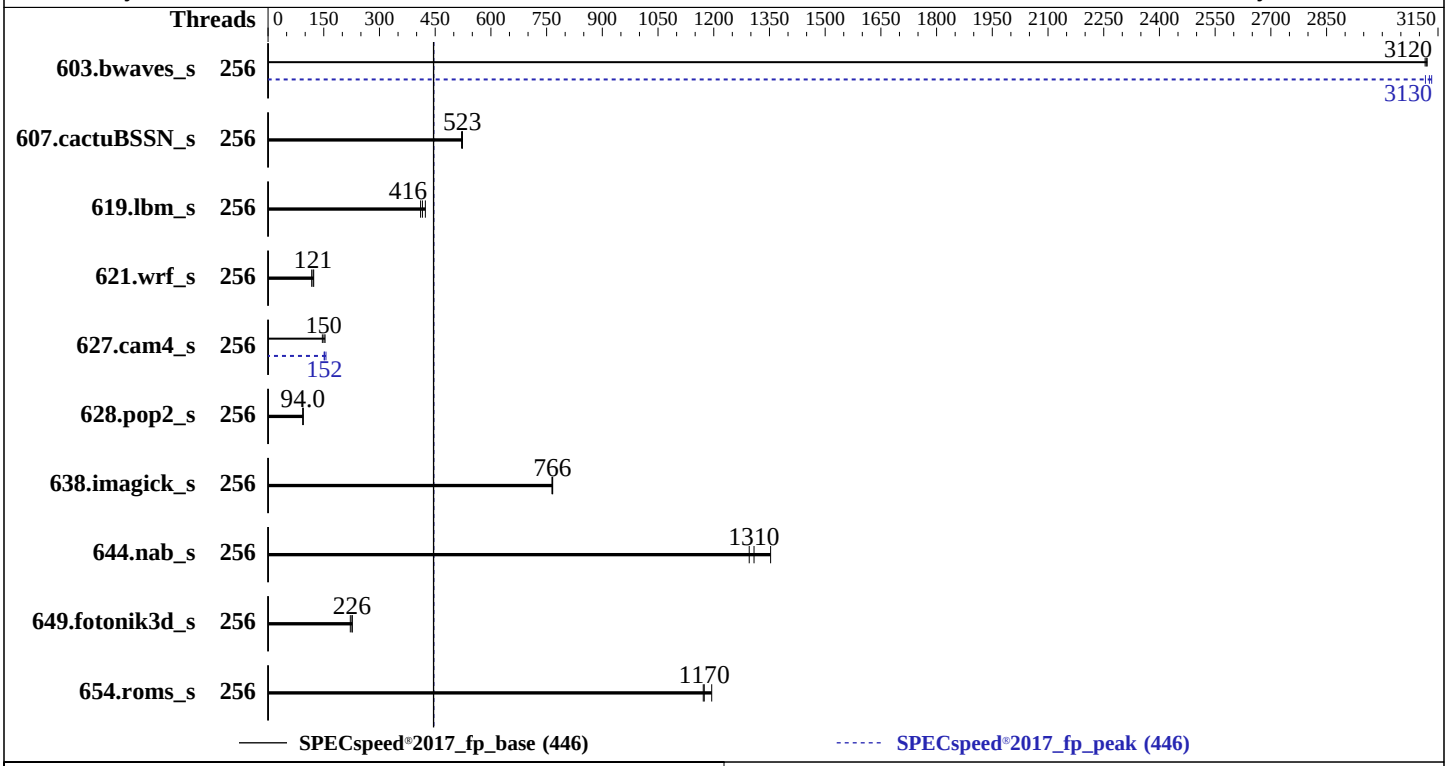
Compute Scale-up Server 3250
(2.00 GHz, Intel Xeon 6788P)

SPECspeed®2017_fp_base = 446

SPECspeed®2017_fp_peak = 446

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

Test Date: Feb-2026
Hardware Availability: Apr-2026
Software Availability: Feb-2026



Hardware

CPU Name:	Intel Xeon 6788P
Max MHz:	3800
Nominal:	2000
Enabled:	1376 cores, 16 chips
Orderable:	4, 8, 12, 16 chip(s)
Cache L1:	64 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	336 MB I+D on chip per chip
Other:	None
Memory:	8 TB (128 x 64 GB 2Rx4 PC5-6400B-R)
Storage:	1 x 1.5 TB NVMe SSD
Other:	CPU Cooling: Air

Software

OS:	SUSE Linux Enterprise Server 15 SP7 Kernel 6.4.0-150700.53.31-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:	Yes
Firmware:	HPE Firmware Bundle Version 1.0.308 01/21/2026 released Jan-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 and OS set to prefer performance at the cost of additional power usage

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	256	18.9	3120	**18.9**	**3120**	18.9	3120	256	**18.9**	**3130**	18.8	3130	18.9	3120
607.cactuBSSN_s	256	**31.9**	**523**	31.9	523	32.0	521	256	**31.9**	**523**	31.9	523	32.0	521
619.lbm_s	256	12.4	424	**12.6**	**416**	12.8	411	256	12.4	424	**12.6**	**416**	12.8	411
621.wrf_s	256	113	117	**109**	**121**	108	123	256	113	117	**109**	**121**	108	123
627.cam4_s	256	57.8	153	60.6	146	**58.9**	**150**	256	**58.4**	**152**	58.7	151	56.8	156
628.pop2_s	256	**126**	**94.0**	126	94.6	127	93.8	256	**126**	**94.0**	126	94.6	127	93.8
638.imagick_s	256	18.9	764	**18.8**	**766**	18.8	766	256	18.9	764	**18.8**	**766**	18.8	766
644.nab_s	256	**13.4**	**1310**	12.9	1350	13.5	1300	256	**13.4**	**1310**	12.9	1350	13.5	1300
649.fotonik3d_s	256	40.2	227	41.2	221	**40.3**	**226**	256	40.2	227	41.2	221	**40.3**	**226**
654.roms_s	256	13.4	1170	13.2	1190	**13.4**	**1170**	256	13.4	1170	13.2	1190	**13.4**	**1170**

SPECspeed®2017_fp_base = 446

SPECspeed®2017_fp_peak = 446

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

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>       /proc/sys/vm/drop_caches
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
 Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
 memory using Redhat Enterprise Linux 8.0
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS Configuration:
Workload Profile set to HPC
 Workload Profile set to Custom
```

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Platform Notes (Continued)

```
Power Regulator set to OS Control
Energy Efficient Turbo set to Disabled
Energy/Performance Bias set to Maximum Performance
Intel Hyper-Threading set to Disabled
Adjacent Sector Prefetch set to Disabled
LLC Prefetch set to Enabled
Last Level Cache (LLC) Dead Line Allocation set to Disabled
Enhanced Processor Performance Profile set to Aggressive
Memory Patrol Scrubbing set to Disabled
Advanced Memory Protection set to Advanced ECC Support
SR-IOV set to Disabled
Intel Virtualization Technology (Intel VT, VT-x) set to Disabled
Dynamic Prefetch Throttling set to Disabled
Enabled Cores per Processor set to 64
Page Policy set to Open Adaptive
Sub-NUMA Clustering set to Auto

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on gnh-108 Mon Feb 23 07:38:32 2026

SUT (System Under Test) info as seen by some common utilities.

------------------------------------------------------------
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------------------------------------------------------------
 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 (254.27+suse.179.g75eab961ea)
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 gnh-108 6.4.0-150700.53.31-default #1 SMP PREEMPT_DYNAMIC Tue Feb  3 14:18:17 UTC 2026 (73f3a11)
  x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   07:38:32 up  1:47,  2 users,  load average: 0.05, 39.84, 127.48
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

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Platform Notes (Continued)

```
  test     ttyS0    -                06:01    8.00s  0.10s  0.04s login -- test
  test     pts/0    -                06:02    8.00s  0.10s  0.07s sudo -i
  root     pts/1    -                07:38    1.00s  0.00s  0.00s sudo ./lin_gnr_fpspeed_test.sh
  root     pts/2    -                07:38    1.00s  1.16s  0.00s sudo ./lin_gnr_fpspeed_test.sh

------------------------------------------------------------
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) 32508050
  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) 32508050
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=39
 login -- test
 -bash
 sudo -i
 sudo -i
 -bash
 sudo ./run_fpspeed.sh
 sudo ./run_fpspeed.sh
 /bin/bash ./run_fpspeed.sh
 sudo ./lin_gnr_fpspeed_test.sh
 sudo ./lin_gnr_fpspeed_test.sh
 sh ./lin_gnr_fpspeed_test.sh
 runcpu --nobuild --action validate --define default-platform-flags -c
   ic2025.2-lin-graniterapids-speed-20250605.cfg --define cores=256 -n=3 --tune base,peak -o all --define
   drop_caches fpspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2025.2-lin-graniterapids-speed-20250605.cfg --define cores=256 --iterations 3 --tune base,peak
   --output_format all --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed
   fpspeed --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.001/templogs/preenv.fpspeed.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) 6788P
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 173
```

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Platform Notes (Continued)

```
stepping        : 1
microcode       : 0x1000405
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi vmscape
cpu cores       : 64
siblings        : 64
16 physical ids (chips)
1024 processors (hardware threads)
physical id 0: core ids 0-31,64-95
physical id 1: core ids 0-31,64-95
physical id 2: core ids 0-31,64-95
physical id 3: core ids 0-31,64-95
physical id 4: core ids 0-31,64-95
physical id 5: core ids 0-31,64-95
physical id 6: core ids 0-31,64-95
physical id 7: core ids 0-31,64-95
physical id 8: core ids 0-31,64-95
physical id 9: core ids 0-31,64-95
physical id 10: core ids 0-31,64-95
physical id 11: core ids 0-31,64-95
physical id 12: core ids 0-31,64-95
physical id 13: core ids 0-31,64-95
physical id 14: core ids 0-31,64-95
physical id 15: core ids 0-31,64-95
physical id 0: apicids
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,128,130,132,13
4,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,180,182,184,186
,188,190
physical id 1: apicids
256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,3
08,310,312,314,316,318,384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418,420,422,42
4,426,428,430,432,434,436,438,440,442,444,446
physical id 2: apicids
512,514,516,518,520,522,524,526,528,530,532,534,536,538,540,542,544,546,548,550,552,554,556,558,560,562,5
64,566,568,570,572,574,640,642,644,646,648,650,652,654,656,658,660,662,664,666,668,670,672,674,676,678,68
0,682,684,686,688,690,692,694,696,698,700,702
physical id 3: apicids
768,770,772,774,776,778,780,782,784,786,788,790,792,794,796,798,800,802,804,806,808,810,812,814,816,818,8
20,822,824,826,828,830,896,898,900,902,904,906,908,910,912,914,916,918,920,922,924,926,928,930,932,934,93
6,938,940,942,944,946,948,950,952,954,956,958
physical id 4: apicids
1024,1026,1028,1030,1032,1034,1036,1038,1040,1042,1044,1046,1048,1050,1052,1054,1056,1058,1060,1062,1064,
1066,1068,1070,1072,1074,1076,1078,1080,1082,1084,1086,1152,1154,1156,1158,1160,1162,1164,1166,1168,1170,
1172,1174,1176,1178,1180,1182,1184,1186,1188,1190,1192,1194,1196,1198,1200,1202,1204,1206,1208,1210,1212,
1214
physical id 5: apicids
1280,1282,1284,1286,1288,1290,1292,1294,1296,1298,1300,1302,1304,1306,1308,1310,1312,1314,1316,1318,1320,
1322,1324,1326,1328,1330,1332,1334,1336,1338,1340,1342,1408,1410,1412,1414,1416,1418,1420,1422,1424,1426,
1428,1430,1432,1434,1436,1438,1440,1442,1444,1446,1448,1450,1452,1454,1456,1458,1460,1462,1464,1466,1468,
1470
physical id 6: apicids
1536,1538,1540,1542,1544,1546,1548,1550,1552,1554,1556,1558,1560,1562,1564,1566,1568,1570,1572,1574,1576,
1578,1580,1582,1584,1586,1588,1590,1592,1594,1596,1598,1664,1666,1668,1670,1672,1674,1676,1678,1680,1682,
1684,1686,1688,1690,1692,1694,1696,1698,1700,1702,1704,1706,1708,1710,1712,1714,1716,1718,1720,1722,1724,
1726
physical id 7: apicids
1792,1794,1796,1798,1800,1802,1804,1806,1808,1810,1812,1814,1816,1818,1820,1822,1824,1826,1828,1830,1832,
1834,1836,1838,1840,1842,1844,1846,1848,1850,1852,1854,1920,1922,1924,1926,1928,1930,1932,1934,1936,1938,
1940,1942,1944,1946,1948,1950,1952,1954,1956,1958,1960,1962,1964,1966,1968,1970,1972,1974,1976,1978,1980,
1982
physical id 8: apicids
```

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Platform Notes (Continued)

```
     2048,2050,2052,2054,2056,2058,2060,2062,2064,2066,2068,2070,2072,2074,2076,2078,2080,2082,2084,2086,2088,
     2090,2092,2094,2096,2098,2100,2102,2104,2106,2108,2110,2176,2178,2180,2182,2184,2186,2188,2190,2192,2194,
     2196,2198,2200,2202,2204,2206,2208,2210,2212,2214,2216,2218,2220,2222,2224,2226,2228,2230,2232,2234,2236,
     2238
     physical id 9: apicids
     2304,2306,2308,2310,2312,2314,2316,2318,2320,2322,2324,2326,2328,2330,2332,2334,2336,2338,2340,2342,2344,
     2346,2348,2350,2352,2354,2356,2358,2360,2362,2364,2366,2432,2434,2436,2438,2440,2442,2444,2446,2448,2450,
     2452,2454,2456,2458,2460,2462,2464,2466,2468,2470,2472,2474,2476,2478,2480,2482,2484,2486,2488,2490,2492,
     2494
     physical id 10: apicids
     2560,2562,2564,2566,2568,2570,2572,2574,2576,2578,2580,2582,2584,2586,2588,2590,2592,2594,2596,2598,2600,
     2602,2604,2606,2608,2610,2612,2614,2616,2618,2620,2622,2688,2690,2692,2694,2696,2698,2700,2702,2704,2706,
     2708,2710,2712,2714,2716,2718,2720,2722,2724,2726,2728,2730,2732,2734,2736,2738,2740,2742,2744,2746,2748,
     2750
     physical id 11: apicids
     2816,2818,2820,2822,2824,2826,2828,2830,2832,2834,2836,2838,2840,2842,2844,2846,2848,2850,2852,2854,2856,
     2858,2860,2862,2864,2866,2868,2870,2872,2874,2876,2878,2944,2946,2948,2950,2952,2954,2956,2958,2960,2962,
     2964,2966,2968,2970,2972,2974,2976,2978,2980,2982,2984,2986,2988,2990,2992,2994,2996,2998,3000,3002,3004,
     3006
     physical id 12: apicids
     3072,3074,3076,3078,3080,3082,3084,3086,3088,3090,3092,3094,3096,3098,3100,3102,3104,3106,3108,3110,3112,
     3114,3116,3118,3120,3122,3124,3126,3128,3130,3132,3134,3200,3202,3204,3206,3208,3210,3212,3214,3216,3218,
     3220,3222,3224,3226,3228,3230,3232,3234,3236,3238,3240,3242,3244,3246,3248,3250,3252,3254,3256,3258,3260,
     3262
     physical id 13: apicids
     3328,3330,3332,3334,3336,3338,3340,3342,3344,3346,3348,3350,3352,3354,3356,3358,3360,3362,3364,3366,3368,
     3370,3372,3374,3376,3378,3380,3382,3384,3386,3388,3390,3456,3458,3460,3462,3464,3466,3468,3470,3472,3474,
     3476,3478,3480,3482,3484,3486,3488,3490,3492,3494,3496,3498,3500,3502,3504,3506,3508,3510,3512,3514,3516,
     3518
     physical id 14: apicids
     3584,3586,3588,3590,3592,3594,3596,3598,3600,3602,3604,3606,3608,3610,3612,3614,3616,3618,3620,3622,3624,
     3626,3628,3630,3632,3634,3636,3638,3640,3642,3644,3646,3712,3714,3716,3718,3720,3722,3724,3726,3728,3730,
     3732,3734,3736,3738,3740,3742,3744,3746,3748,3750,3752,3754,3756,3758,3760,3762,3764,3766,3768,3770,3772,
     3774
     physical id 15: apicids
     3840,3842,3844,3846,3848,3850,3852,3854,3856,3858,3860,3862,3864,3866,3868,3870,3872,3874,3876,3878,3880,
     3882,3884,3886,3888,3890,3892,3894,3896,3898,3900,3902,3968,3970,3972,3974,3976,3978,3980,3982,3984,3986,
     3988,3990,3992,3994,3996,3998,4000,4002,4004,4006,4008,4010,4012,4014,4016,4018,4020,4022,4024,4026,4028,
     4030
   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):                                  1024
   On-line CPU(s) list:                     0-1023
   Vendor ID:                               GenuineIntel
   Model name:                              Intel(R) Xeon(R) 6788P
   CPU family:                              6
   Model:                                   173
   Thread(s) per core:                      1
   Core(s) per socket:                      64
   Socket(s):                               16
   Stepping:                                1
```

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Platform Notes (Continued)

```
CPU(s) scaling MHz:                  21%
CPU max MHz:                         3800.0000
CPU min MHz:                         800.0000
BogoMIPS:                            3999.52
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 hle avx2 smep bmi2 erms
                                     invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
                                     clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
                                     xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                                     cqm_mbm_local split_lock_detect user_shstk avx_vnni avx512_bf16
                                     wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp
                                     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
                                     ibpb_exit_to_user
L1d cache:                           48 MiB (1024 instances)
L1i cache:                           64 MiB (1024 instances)
L2 cache:                            2 GiB (1024 instances)
L3 cache:                            5.3 GiB (16 instances)
NUMA node(s):                        32
NUMA node0 CPU(s):                   0-31
NUMA node1 CPU(s):                   32-63
NUMA node2 CPU(s):                   64-95
NUMA node3 CPU(s):                   96-127
NUMA node4 CPU(s):                   128-159
NUMA node5 CPU(s):                   160-191
NUMA node6 CPU(s):                   192-223
NUMA node7 CPU(s):                   224-255
NUMA node8 CPU(s):                   256-287
NUMA node9 CPU(s):                   288-319
NUMA node10 CPU(s):                  320-351
NUMA node11 CPU(s):                  352-383
NUMA node12 CPU(s):                  384-415
NUMA node13 CPU(s):                  416-447
NUMA node14 CPU(s):                  448-479
NUMA node15 CPU(s):                  480-511
NUMA node16 CPU(s):                  512-543
NUMA node17 CPU(s):                  544-575
NUMA node18 CPU(s):                  576-607
NUMA node19 CPU(s):                  608-639
NUMA node20 CPU(s):                  640-671
NUMA node21 CPU(s):                  672-703
NUMA node22 CPU(s):                  704-735
NUMA node23 CPU(s):                  736-767
NUMA node24 CPU(s):                  768-799
NUMA node25 CPU(s):                  800-831
NUMA node26 CPU(s):                  832-863
NUMA node27 CPU(s):                  864-895
NUMA node28 CPU(s):                  896-927
NUMA node29 CPU(s):                  928-959
NUMA node30 CPU(s):                  960-991
```

(Continued on next page)

Platform Notes (Continued)

```
  NUMA node31 CPU(s):                   992-1023
  Vulnerability Gather data sampling:   Not affected
  Vulnerability Indirect target selection: 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;
                                        PBRSB-eIBRS Not affected; BHI BHI_DIS_S
  Vulnerability Srbds:                  Not affected
  Vulnerability Tsa:                    Not affected
  Vulnerability Tsx async abort:        Not affected
  Vulnerability Vmscape:                Mitigation; IBPB before exit to userspace

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL   SETS PHY-LINE COHERENCY-SIZE
     L1d       48K      48M   12 Data            1     64        1             64
     L1i       64K      64M   16 Instruction     1     64        1             64
     L2         2M       2G   16 Unified         2   2048        1             64
     L3       336M     5.3G   16 Unified         3 344064        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: 0-31
  node 0 size: 256990 MB
  node 0 free: 255407 MB
  node 1 cpus: 32-63
  node 1 size: 250021 MB
  node 1 free: 245208 MB
  node 2 cpus: 64-95
  node 2 size: 258039 MB
  node 2 free: 257542 MB
  node 3 cpus: 96-127
  node 3 size: 250037 MB
  node 3 free: 248354 MB
  node 4 cpus: 128-159
  node 4 size: 258039 MB
  node 4 free: 257572 MB
  node 5 cpus: 160-191
  node 5 size: 250037 MB
  node 5 free: 248936 MB
  node 6 cpus: 192-223
  node 6 size: 258039 MB
  node 6 free: 256568 MB
  node 7 cpus: 224-255
  node 7 size: 250037 MB
  node 7 free: 249482 MB
  node 8 cpus: 256-287
  node 8 size: 258039 MB
  node 8 free: 257861 MB
  node 9 cpus: 288-319
```

(Continued on next page)

Platform Notes (Continued)

```
node 9 size: 250037 MB
node 9 free: 249829 MB
node 10 cpus: 320-351
node 10 size: 258039 MB
node 10 free: 257865 MB
node 11 cpus: 352-383
node 11 size: 250037 MB
node 11 free: 249817 MB
node 12 cpus: 384-415
node 12 size: 258039 MB
node 12 free: 257811 MB
node 13 cpus: 416-447
node 13 size: 250037 MB
node 13 free: 249856 MB
node 14 cpus: 448-479
node 14 size: 258039 MB
node 14 free: 257807 MB
node 15 cpus: 480-511
node 15 size: 250037 MB
node 15 free: 249865 MB
node 16 cpus: 512-543
node 16 size: 258039 MB
node 16 free: 257832 MB
node 17 cpus: 544-575
node 17 size: 250037 MB
node 17 free: 249881 MB
node 18 cpus: 576-607
node 18 size: 258039 MB
node 18 free: 257841 MB
node 19 cpus: 608-639
node 19 size: 250037 MB
node 19 free: 249833 MB
node 20 cpus: 640-671
node 20 size: 258039 MB
node 20 free: 257885 MB
node 21 cpus: 672-703
node 21 size: 250037 MB
node 21 free: 249885 MB
node 22 cpus: 704-735
node 22 size: 258039 MB
node 22 free: 257881 MB
node 23 cpus: 736-767
node 23 size: 250037 MB
node 23 free: 249872 MB
node 24 cpus: 768-799
node 24 size: 258039 MB
node 24 free: 257773 MB
node 25 cpus: 800-831
node 25 size: 250037 MB
node 25 free: 249847 MB
node 26 cpus: 832-863
node 26 size: 258039 MB
node 26 free: 257821 MB
node 27 cpus: 864-895
node 27 size: 250037 MB
node 27 free: 249790 MB
node 28 cpus: 896-927
node 28 size: 258039 MB
node 28 free: 257830 MB
node 29 cpus: 928-959
```

(Continued on next page)

Platform Notes (Continued)

```
node 29 size: 250037 MB
node 29 free: 249734 MB
node 30 cpus: 960-991
node 30 size: 258000 MB
node 30 free: 257620 MB
node 31 cpus: 992-1023
node 31 size: 248965 MB
node 31 free: 248750 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  12  16  16  16  16  18  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
  1:  12  10  16  16  16  16  18  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
  2:  16  16  10  12  18  18  16  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
  3:  16  16  12  10  18  18  16  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
  4:  16  16  18  18  10  12  16  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
  5:  16  16  18  18  12  10  16  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:  18  18  16  16  16  16  10  12  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:  18  18  16  16  16  16  12  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  12  16  16  16  16  18  18  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  12  10  16  16  16  16  18  18  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  16  10  12  18  18  16  16  40  40  40  40  40  40  40  40  40
40  40  40  40  40  40  40
 11:  40  40  40  40  40  40  40  40  16  16  12  10  18  18  16  16  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  16  16  18  18  10  12  16  16  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  16  16  18  18  12  10  16  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  18  18  16  16  16  16  10  12  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  18  18  16  16  16  16  12  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  40  40  10  12  16  16  16  16  18  18  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  40  40  12  10  16  16  16  16  18  18  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  40  40  16  16  10  12  18  18  16  16  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  40  40  16  16  12  10  18  18  16  16  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  16  16  18  18  10  12  16  16  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  16  16  18  18  12  10  16  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  18  18  16  16  16  16  10  12  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  18  18  16  16  16  16  12  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  40  40  10
```

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Platform Notes (Continued)

```
   12  16  16  16  16  18  18
   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  12
   10  16  16  16  16  18  18
   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
   16  10  12  18  18  16  16
   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  16
   16  12  10  18  18  16  16
   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  16
   16  18  18  10  12  16  16
   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  16
   16  18  18  12  10  16  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  18
   18  16  16  16  16  10  12
   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  18
   18  16  16  16  16  12  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       8322098644 kB

------------------------------------------------------------
10. who -r
  run-level 3 Feb 23 05:55

------------------------------------------------------------
11. Systemd service manager version: systemd 254 (254.27+suse.179.g75eab961ea)
  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
                   cpuset_cpunodemap cpuset_memory_spread cron dcd dcdchkgracefulshutdown dcdshutdown
                   display-manager getty@ hpe-auto-config hpe_irqbalance iscsi 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 cups cups-browsed cxl-monitor debug-shell ebtables exchange-bmc-os-info
                   firewalld fsidd gpm grub2-once haveged ipmi ipmievd irqbalance iscsi-init iscsid
                   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
                   sysstat_collect sysstat_summary 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 wsdd ypbind
  indirect         serial-getty@ systemd-userdbd tftp wickedd

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.4.0-150700.53.31-default
  root=UUID=8f7dbb2d-77d8-40d9-b606-6b60ffd4e6ad
  rd.auto=1
  console=ttyS0,115200n8
  selinux=0
  security=
```

(Continued on next page)

Platform Notes (Continued)

```
  splash=silent
  mitigations=auto
  console=ttyS0,115200
  udev.children-max=512
  nmi_watchdog=0
  uv_nmi.action=kdump
  add_efi_memmap
  tsc=nowatchdog
  earlyprintk=ttyS0,115200
  log_buf_len=8M
  numa_balancing=disable
  crashkernel=1G,high
  watchdog_thresh=60
  workqueue.watchdog_thresh=120

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 186:
    current policy: frequency should be within 800 MHz and 3.80 GHz.
                    The governor "performance" 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               0
  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                      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
```

(Continued on next page)

Platform Notes (Continued)

```
  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
  hpe-foundation-release HPE Foundation Software 2.5.9, Build 757.1570.260209T0200.a.sles15sp7hpe-260209T0200

------------------------------------------------------------
20. Disk information
SPEC is set to: /home/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/nvme1n1p2 xfs   1.5T   39G  1.5T   3% /

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        Compute Scale-up Server 3250
    Product Family: 1590PID03030202
    Serial:         5UFD3H1626-000

------------------------------------------------------------
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:
    46x Samsung M321R8GA0EB2-CCPKC 64 GB 2 rank 6400
    82x Samsung M321R8GA0EB2-CCPWC 64 GB 2 rank 6400


------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       HPE
   BIOS Version:      Bundle:1.0.308-20260123_101935 SFW:010.001.004.000.2601210240
   BIOS Date:         01/21/2026
```

Compiler Version Notes

```
==============================================================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
--------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++, C, Fortran | 607.cactuBSSN_s(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.
```

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Compiler Version Notes (Continued)

```
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         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------------

============================================================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 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.
------------------------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64

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Base Portability Flags (Continued)

649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xgraniterapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xgraniterapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xgraniterapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int
-mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte
-auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

(Continued on next page)

Peak Compiler Invocation (Continued)

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

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

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: -w -m64 -std=c11 -Wl,-z,muldefs -xgraniterapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

628.pop2_s: basepeak = yes

(Continued on next page)

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-CSS-GNR-rev1.3.html`
`http://www.spec.org/cpu2017/flags/Intel-ic2025-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-CSS-GNR-rev1.3.xml`
`http://www.spec.org/cpu2017/flags/Intel-ic2025-official-linux64.xml`

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

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