SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

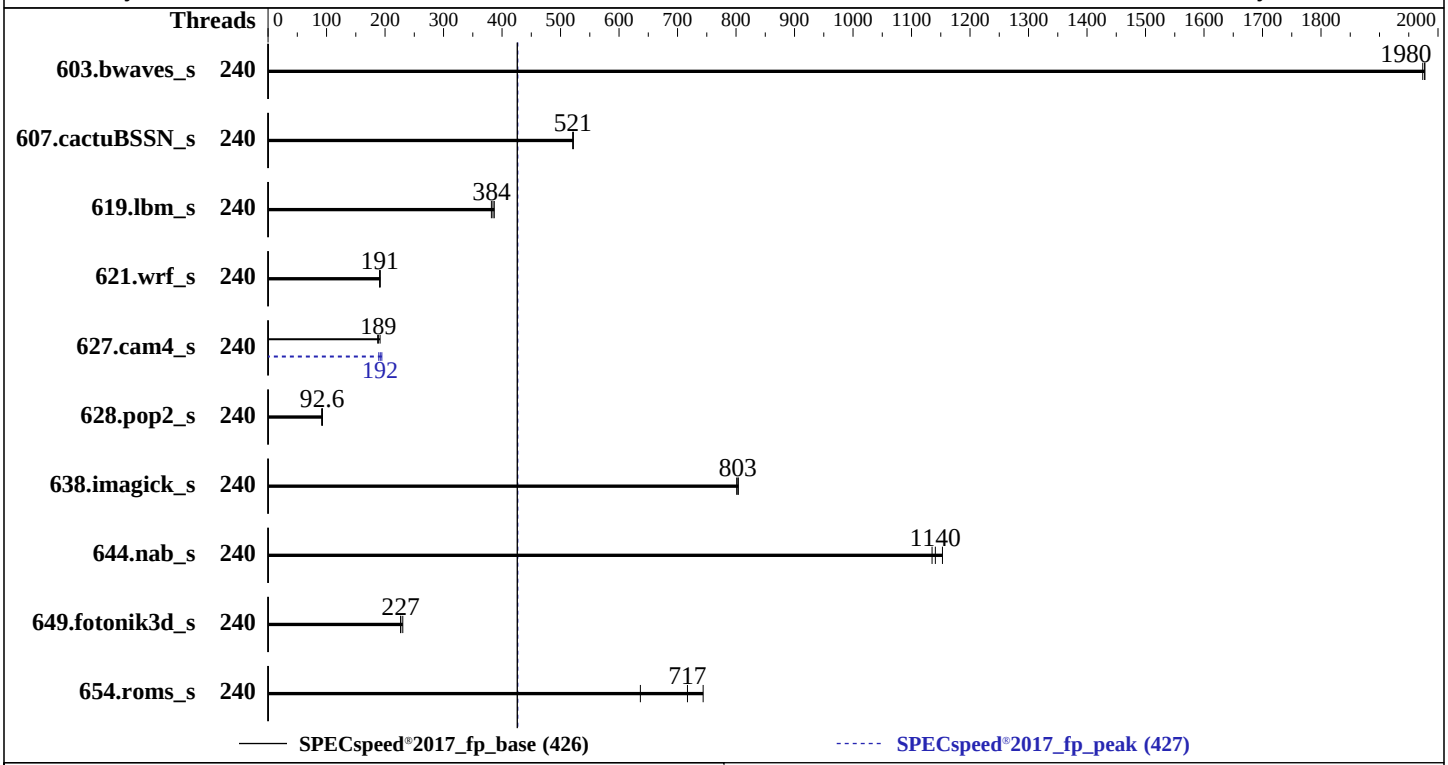
HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 426

SPECspeed®2017_fp_peak = 427

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

Test Date: Feb-2025
Hardware Availability: Sep-2023
Software Availability: Jan-2025



Hardware

CPU Name:	Intel Xeon Platinum 8490H
Max MHz:	3500
Nominal:	1900
Enabled:	960 cores, 16 chips
Orderable:	4, 8, 16 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:	8 TB (128 x 64 GB 2Rx4 PC5-4800B-R)
Storage:	1 x 1.5 TB NVMe SSD
Other:	CPU Cooling: Air

Software

OS:	SUSE Linux Enterprise Server 15 SP6 Kernel 6.4.0-150600.23.33-default
Compiler:	C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;
Parallel:	Yes
Firmware:	HPE Firmware Bundle Version 1.55.40 01/27/2025 released Jan-2025
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

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	240	**29.8**	**1980**	29.9	1970	29.8	1980	240	**29.8**	**1980**	29.9	1970	29.8	1980
607.cactuBSSN_s	240	**32.0**	**521**	32.0	521	31.9	522	240	**32.0**	**521**	32.0	521	31.9	522
619.lbm_s	240	13.7	382	13.5	387	**13.6**	**384**	240	13.7	382	13.5	387	**13.6**	**384**
621.wrf_s	240	69.0	192	**69.2**	**191**	69.4	191	240	69.0	192	**69.2**	**191**	69.4	191
627.cam4_s	240	46.3	191	47.3	187	**47.0**	**189**	240	45.6	195	46.8	189	**46.2**	**192**
628.pop2_s	240	**128**	**92.6**	130	91.7	128	93.0	240	**128**	**92.6**	130	91.7	128	93.0
638.imagick_s	240	17.9	804	18.0	801	**18.0**	**803**	240	17.9	804	18.0	801	**18.0**	**803**
644.nab_s	240	**15.3**	**1140**	15.2	1150	15.4	1140	240	**15.3**	**1140**	15.2	1150	15.4	1140
649.fotonik3d_s	240	40.2	227	39.6	230	**40.2**	**227**	240	40.2	227	39.6	230	**40.2**	**227**
654.roms_s	240	21.2	744	24.7	636	**22.0**	**717**	240	21.2	744	24.7	636	**22.0**	**717**

SPECspeed®2017_fp_base = 426

SPECspeed®2017_fp_peak = 427

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

Submit Notes

```
The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.
```

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>       /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
tuned-adm profile was set to throughput-performance using "tuned-adm profile throughput-performance"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
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.
```

(Continued on next page)

General Notes (Continued)

```
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

```
Workload Profile set to Custom
Power Regulator set to Static High Performance Mode
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

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on sph-187 Fri Feb 28 08:30:01 2025

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 (254.21+suse.135.geddf52fb14)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
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-187 6.4.0-150600.23.33-default #1 SMP PREEMPT_DYNAMIC Thu Jan  9 14:10:22 UTC 2025 (ba46628)
  x86_64 x86_64 x86_64 GNU/Linux
```

(Continued on next page)

Platform Notes (Continued)

```
------------------------------------------------------------
2. w
   08:30:01 up  1:37,  1 user,  load average: 162.28, 196.78, 206.13
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  test     ttyS0    -                06:56    1:33m  0.05s  0.03s login -- test
  test     pts/0    -                06:56    1:31m  1.03s  0.04s 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) 32508887
  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) 32508887
  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
 bash
 runcpu --nobuild --action validate --define default-platform-flags -c
   ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=240 --tune base,peak -o all --define
   drop_caches fpspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=240 --tune base,peak --output_format all
   --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed fpspeed --nopreenv
   --note-preenv --logfile $SPEC/tmp/CPU2017.029/templogs/preenv.fpspeed.029.0.log --lognum 029.0
   --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Platinum 8490H
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 6
```

(Continued on next page)

Platform Notes (Continued)

```
microcode       : 0x2b000620
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores       : 60
siblings        : 60
16 physical ids (chips)
960 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 0: apicids
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118
physical id 1: apicids
128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
80,182,184,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222,224,226,228,230,23
2,234,236,238,240,242,244,246
physical id 2: apicids
256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,3
08,310,312,314,316,318,320,322,324,326,328,330,332,334,336,338,340,342,344,346,348,350,352,354,356,358,36
0,362,364,366,368,370,372,374
physical id 3: apicids
384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418,420,422,424,426,428,430,432,434,4
36,438,440,442,444,446,448,450,452,454,456,458,460,462,464,466,468,470,472,474,476,478,480,482,484,486,48
8,490,492,494,496,498,500,502
physical id 4: 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
64,566,568,570,572,574,576,578,580,582,584,586,588,590,592,594,596,598,600,602,604,606,608,610,612,614,61
6,618,620,622,624,626,628,630
physical id 5: apicids
640,642,644,646,648,650,652,654,656,658,660,662,664,666,668,670,672,674,676,678,680,682,684,686,688,690,6
92,694,696,698,700,702,704,706,708,710,712,714,716,718,720,722,724,726,728,730,732,734,736,738,740,742,74
4,746,748,750,752,754,756,758
physical id 6: 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
20,822,824,826,828,830,832,834,836,838,840,842,844,846,848,850,852,854,856,858,860,862,864,866,868,870,87
2,874,876,878,880,882,884,886
physical id 7: apicids
896,898,900,902,904,906,908,910,912,914,916,918,920,922,924,926,928,930,932,934,936,938,940,942,944,946,9
48,950,952,954,956,958,960,962,964,966,968,970,972,974,976,978,980,982,984,986,988,990,992,994,996,998,10
00,1002,1004,1006,1008,1010,1012,1014
physical id 8: apicids
1024,1026,1028,1030,1032,1034,1036,1038,1040,1042,1044,1046,1048,1050,1052,1054,1056,1058,1060,1062,1064,
1066,1068,1070,1072,1074,1076,1078,1080,1082,1084,1086,1088,1090,1092,1094,1096,1098,1100,1102,1104,1106,
1108,1110,1112,1114,1116,1118,1120,1122,1124,1126,1128,1130,1132,1134,1136,1138,1140,1142
physical id 9: apicids
1152,1154,1156,1158,1160,1162,1164,1166,1168,1170,1172,1174,1176,1178,1180,1182,1184,1186,1188,1190,1192,
1194,1196,1198,1200,1202,1204,1206,1208,1210,1212,1214,1216,1218,1220,1222,1224,1226,1228,1230,1232,1234,
```

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Platform Notes (Continued)

```
    1236,1238,1240,1242,1244,1246,1248,1250,1252,1254,1256,1258,1260,1262,1264,1266,1268,1270
    physical id 10: apicids
    1280,1282,1284,1286,1288,1290,1292,1294,1296,1298,1300,1302,1304,1306,1308,1310,1312,1314,1316,1318,1320,
    1322,1324,1326,1328,1330,1332,1334,1336,1338,1340,1342,1344,1346,1348,1350,1352,1354,1356,1358,1360,1362,
    1364,1366,1368,1370,1372,1374,1376,1378,1380,1382,1384,1386,1388,1390,1392,1394,1396,1398
    physical id 11: apicids
    1408,1410,1412,1414,1416,1418,1420,1422,1424,1426,1428,1430,1432,1434,1436,1438,1440,1442,1444,1446,1448,
    1450,1452,1454,1456,1458,1460,1462,1464,1466,1468,1470,1472,1474,1476,1478,1480,1482,1484,1486,1488,1490,
    1492,1494,1496,1498,1500,1502,1504,1506,1508,1510,1512,1514,1516,1518,1520,1522,1524,1526
    physical id 12: apicids
    1536,1538,1540,1542,1544,1546,1548,1550,1552,1554,1556,1558,1560,1562,1564,1566,1568,1570,1572,1574,1576,
    1578,1580,1582,1584,1586,1588,1590,1592,1594,1596,1598,1600,1602,1604,1606,1608,1610,1612,1614,1616,1618,
    1620,1622,1624,1626,1628,1630,1632,1634,1636,1638,1640,1642,1644,1646,1648,1650,1652,1654
    physical id 13: apicids
    1664,1666,1668,1670,1672,1674,1676,1678,1680,1682,1684,1686,1688,1690,1692,1694,1696,1698,1700,1702,1704,
    1706,1708,1710,1712,1714,1716,1718,1720,1722,1724,1726,1728,1730,1732,1734,1736,1738,1740,1742,1744,1746,
    1748,1750,1752,1754,1756,1758,1760,1762,1764,1766,1768,1770,1772,1774,1776,1778,1780,1782
    physical id 14: apicids
    1792,1794,1796,1798,1800,1802,1804,1806,1808,1810,1812,1814,1816,1818,1820,1822,1824,1826,1828,1830,1832,
    1834,1836,1838,1840,1842,1844,1846,1848,1850,1852,1854,1856,1858,1860,1862,1864,1866,1868,1870,1872,1874,
    1876,1878,1880,1882,1884,1886,1888,1890,1892,1894,1896,1898,1900,1902,1904,1906,1908,1910
    physical id 15: apicids
    1920,1922,1924,1926,1928,1930,1932,1934,1936,1938,1940,1942,1944,1946,1948,1950,1952,1954,1956,1958,1960,
    1962,1964,1966,1968,1970,1972,1974,1976,1978,1980,1982,1984,1986,1988,1990,1992,1994,1996,1998,2000,2002,
    2004,2006,2008,2010,2012,2014,2016,2018,2020,2022,2024,2026,2028,2030,2032,2034,2036,2038
  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 2.39.3:
  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):                               960
  On-line CPU(s) list:                  0-959
  Vendor ID:                            GenuineIntel
  Model name:                           Intel(R) Xeon(R) Platinum 8490H
  CPU family:                           6
  Model:                                143
  Thread(s) per core:                   1
  Core(s) per socket:                   60
  Socket(s):                            16
  Stepping:                             6
  CPU(s) scaling MHz:                   24%
  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 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f
                                        avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd
```

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Platform Notes (Continued)

```
                                  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
                                  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:                      45 MiB (960 instances)
  L1i cache:                      30 MiB (960 instances)
  L2 cache:                       1.9 GiB (960 instances)
  L3 cache:                       1.8 GiB (16 instances)
  NUMA node(s):                   16
  NUMA node0 CPU(s):              0-59
  NUMA node1 CPU(s):              60-119
  NUMA node2 CPU(s):              120-179
  NUMA node3 CPU(s):              180-239
  NUMA node4 CPU(s):              240-299
  NUMA node5 CPU(s):              300-359
  NUMA node6 CPU(s):              360-419
  NUMA node7 CPU(s):              420-479
  NUMA node8 CPU(s):              480-539
  NUMA node9 CPU(s):              540-599
  NUMA node10 CPU(s):             600-659
  NUMA node11 CPU(s):             660-719
  NUMA node12 CPU(s):             720-779
  NUMA node13 CPU(s):             780-839
  NUMA node14 CPU(s):             840-899
  NUMA node15 CPU(s):             900-959
  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      45M   12 Data            1     64        1             64
     L1i       32K      30M    8 Instruction     1     64        1             64
     L2         2M     1.9G   16 Unified         2   2048        1             64
     L3     112.5M     1.8G   15 Unified         3 122880        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 16 nodes (0-15)
  node 0 cpus: 0-59
  node 0 size: 507196 MB
  node 0 free: 499447 MB
  node 1 cpus: 60-119
```

(Continued on next page)

Platform Notes (Continued)

```
node 1 size: 508078 MB
node 1 free: 504050 MB
node 2 cpus: 120-179
node 2 size: 508078 MB
node 2 free: 500467 MB
node 3 cpus: 180-239
node 3 size: 508078 MB
node 3 free: 506924 MB
node 4 cpus: 240-299
node 4 size: 508078 MB
node 4 free: 507590 MB
node 5 cpus: 300-359
node 5 size: 508078 MB
node 5 free: 507743 MB
node 6 cpus: 360-419
node 6 size: 508078 MB
node 6 free: 507779 MB
node 7 cpus: 420-479
node 7 size: 508078 MB
node 7 free: 507779 MB
node 8 cpus: 480-539
node 8 size: 508078 MB
node 8 free: 507724 MB
node 9 cpus: 540-599
node 9 size: 508078 MB
node 9 free: 507720 MB
node 10 cpus: 600-659
node 10 size: 508039 MB
node 10 free: 507615 MB
node 11 cpus: 660-719
node 11 size: 508078 MB
node 11 free: 507723 MB
node 12 cpus: 720-779
node 12 size: 508078 MB
node 12 free: 507438 MB
node 13 cpus: 780-839
node 13 size: 508078 MB
node 13 free: 507308 MB
node 14 cpus: 840-899
node 14 size: 508078 MB
node 14 free: 507499 MB
node 15 cpus: 900-959
node 15 size: 507006 MB
node 15 free: 506197 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
  0:  10  16  16  18  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
  2:  16  18  10  16  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
  4:  40  40  40  40  10  16  16  18  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
  6:  40  40  40  40  16  18  10  16  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
  8:  40  40  40  40  40  40  40  40  10  16  16  18  40  40  40  40
  9:  40  40  40  40  40  40  40  40  16  10  18  16  40  40  40  40
 10:  40  40  40  40  40  40  40  40  16  18  10  16  40  40  40  40
 11:  40  40  40  40  40  40  40  40  18  16  16  10  40  40  40  40
 12:  40  40  40  40  40  40  40  40  40  40  40  40  10  16  16  18
 13:  40  40  40  40  40  40  40  40  40  40  40  40  16  10  18  16
```

(Continued on next page)

Platform Notes (Continued)

```
   14:  40  40  40  40  40  40  40  40  40  40  40  40  16  18  10  16
   15:  40  40  40  40  40  40  40  40  40  40  40  40  18  16  16  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       8322311812 kB

------------------------------------------------------------
10. who -r
  run-level 3 Feb 28 06:55

------------------------------------------------------------
11. Systemd service manager version: systemd 254 (254.21+suse.135.geddf52fb14)
  Default Target  Status
  multi-user      degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                           LOAD   ACTIVE SUB    DESCRIPTION
  * dcdchkgracefulshutdown.service loaded failed failed Check if previous system shutdown was graceful
  * postfix.service                loaded failed failed Postfix Mail Transport Agent

------------------------------------------------------------
13. 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 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 clamav-milter 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
                   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 rpcbind
                   rpmconfigcheck rsyncd rtkit-daemon 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 udisks2 update-system-flatpaks upower vncserver@ winbind ypbind
  indirect         pcscd serial-getty@ systemd-userdbd tftp wickedd

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.23.33-default
  root=UUID=8ce0406a-9f17-47c0-afbc-27e5de11eecb
  rd.auto=1
  console=ttyS0,115200n8
  selinux=0
  security=
  splash=silent
  mitigations=auto
  console=ttyS0,115200
  udev.children-max=512
  nmi_watchdog=0
  uv_nmi.action=kdump
  add_efi_memmap
  tsc=nowatchdog
```

(Continued on next page)

Platform Notes (Continued)

```
  earlyprintk=ttyS0,115200
  log_buf_len=8M
  numa_balancing=disable
  crashkernel=1G,high
  watchdog_thresh=60
  workqueue.watchdog_thresh=120

------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 104:
    current policy: frequency should be within 800 MHz and 3.50 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

------------------------------------------------------------
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
  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 SP6
```

(Continued on next page)

Platform Notes (Continued)

```
  hpe-foundation-release HPE Foundation Software 2.5.4, Build 753.1560.241029T0100.a.sles15sp6hpe-241029T0100

 ------------------------------------------------------------
 20. Disk information
 SPEC is set to: /home/cpu2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p2 xfs   1.5T   62G  1.4T   5% /

 ------------------------------------------------------------
 21. /sys/devices/virtual/dmi/id
     Vendor:          HPE
     Product:         Compute Scale-up Server 3200
     Product Family: 1590PID03030201
     Serial:          5UF2491355-000

 ------------------------------------------------------------
 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:
     128x Samsung M321R8GA0BB0-CQKZH 64 GB 2 rank 4800


 ------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       HPE
    BIOS Version:      Bundle:1.55.40-20250129_060251 SFW:009.036.009.000.2501270505
    BIOS Date:         01/27/2025
```

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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
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--------------------------------------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================================================
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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -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 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512

(Continued on next page)

Base Optimization Flags (Continued)

C benchmarks (continued):
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

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

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

Peak 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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: `basepeak = yes`

638.imagick_s: `basepeak = yes`

644.nab_s: `basepeak = yes`

Fortran benchmarks:

603.bwaves_s: `basepeak = yes`

649.fotonik3d_s: `basepeak = yes`

654.roms_s: `basepeak = yes`

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`

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

628.pop2_s: `basepeak = yes`

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-SDSS-rev1.0.html`
`http://www.spec.org/cpu2017/flags/Intel-ic2024-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-SDSS-rev1.0.xml`
`http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml`

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