



SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

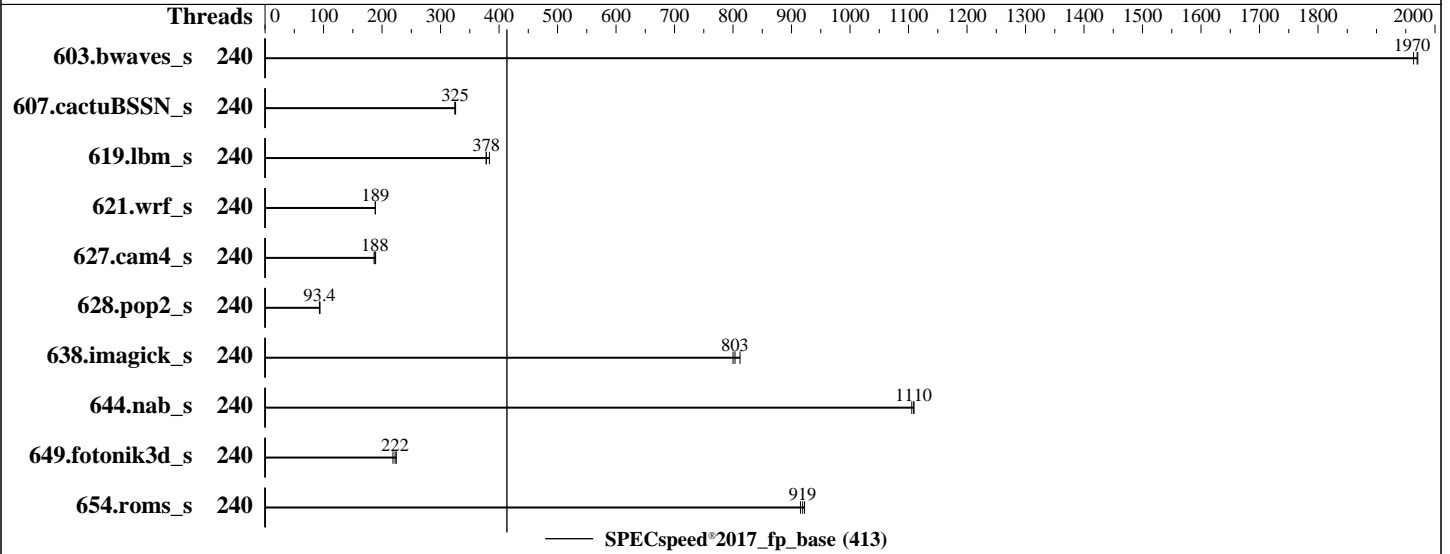
HPE Compute Scale-up Server 3200
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 413

SPECspeed®2017_fp_peak = Not Run

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

Test Date: Jan-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023



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 6.4 TB NVMe SSD
Other: None

Software

OS: Red Hat Enterprise Linux 8.8 (Ootpa)
Kernel 4.18.0-477.10.1.el8_8.x86_64
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
Parallel: Yes
Firmware: HPE Firmware Bundle Version 1.10.342 released Dec-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
HPE Foundation Software 2.5.0
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	<u>30.0</u>	<u>1970</u>	30.0	1960	29.9	1970							
607.cactuBSSN_s	240	51.4	324	<u>51.3</u>	<u>325</u>	51.2	326							
619.lbm_s	240	<u>13.8</u>	<u>378</u>	13.9	378	13.7	383							
621.wrf_s	240	70.1	189	70.2	188	<u>70.1</u>	<u>189</u>							
627.cam4_s	240	47.5	186	46.9	189	<u>47.2</u>	<u>188</u>							
628.pop2_s	240	<u>127</u>	<u>93.4</u>	128	92.9	127	93.8							
638.imagick_s	240	<u>18.0</u>	<u>803</u>	18.0	800	17.8	812							
644.nab_s	240	15.8	1110	15.8	1110	<u>15.8</u>	<u>1110</u>							
649.fotonik3d_s	240	40.6	224	<u>41.0</u>	<u>222</u>	41.7	219							
654.roms_s	240	17.2	915	17.1	922	<u>17.1</u>	<u>919</u>							

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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 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)
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

The system ROM used for this result contains Intel microcode version 0x2b0004d0 for the Intel Xeon Platinum 8490H processor.

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Platform Notes (Continued)

BIOS Configuration:

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-201 Sat Jan 20 08:39:42 2024

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

Table of contents

1. uname -a
Linux sph-201 4.18.0-477.10.1.el8_8.x86_64 #1 SMP Wed Apr 5 13:35:01 EDT 2023 x86_64 x86_64 x86_64 GNU/Linux
2. w
08:39:42 up 2 min, 1 user, load average: 6.37, 6.91, 2.99
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
test ttyS0 - 08:38 5.00s 1.02s 0.01s login -- test
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 239 (239-74.el8_8)
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. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

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Platform Notes (Continued)

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) 32508846
max locked memory      (kbytes, -l) 64
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) 32508846
virtual memory         (kbytes, -v) unlimited
file locks             (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 17
login -- test
-bash
sudo su
su
bash
bash
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2023.2.3-lin-sapphirerapids-speed-20231121.cfg --define cores=960 --threads=240 --tune base -o all
  --define drop_caches fpspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2023.2.3-lin-sapphirerapids-speed-20231121.cfg --define cores=960 --threads 240 --tune base
  --output_format all --define drop_caches --nopower --runmode speed --tune base --size refspeed fpspeed
  --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.006/temlogs/preenv.fpspeed.006.0.log --lognum 006.0
  --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        : 8
microcode       : 0x2b0004d0
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
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
```

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Platform Notes (Continued)

```

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, 180,
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, 232,
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, 308,
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, 360,
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, 436,
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, 488,
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, 564,
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, 616,
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, 692,
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, 744,
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, 820,
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, 872,
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, 948,
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, 1000,
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, 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,

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Platform Notes (Continued)

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 2.32.1:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
CPU(s):                 960
On-line CPU(s) list:   0-959
Thread(s) per core:    1
Core(s) per socket:    60
Socket(s):              16
NUMA node(s):          16
Vendor ID:              GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
CPU family:             6
Model:                  143
Model name:             Intel(R) Xeon(R) Platinum 8490H
BIOS Model name:        Intel(R) Xeon(R) Platinum 8490H
Stepping:               8
CPU MHz:                3500.000
CPU max MHz:            3500.0000
CPU min MHz:            800.0000
BogoMIPS:               3800.00
L1d cache:              48K
L1i cache:              32K
L2 cache:               2048K
L3 cache:               115200K
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

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Platform Notes (Continued)

```

NUMA node12 CPU(s): 720-779
NUMA node13 CPU(s): 780-839
NUMA node14 CPU(s): 840-899
NUMA node15 CPU(s): 900-959
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 invpcid_single intel_ppin
cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 avx2 smep bmi2
erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc
cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect 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 amx_bf16 avx512_fp16 amx_tile amx_int8 flush_lld arch_capabilities

```

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: 507197 MB
node 0 free: 506401 MB
node 1 cpus: 60-119
node 1 size: 508078 MB
node 1 free: 507522 MB
node 2 cpus: 120-179
node 2 size: 508078 MB
node 2 free: 507159 MB
node 3 cpus: 180-239
node 3 size: 508078 MB
node 3 free: 507659 MB
node 4 cpus: 240-299
node 4 size: 508078 MB
node 4 free: 507652 MB
node 5 cpus: 300-359
node 5 size: 508078 MB
node 5 free: 507615 MB
node 6 cpus: 360-419
node 6 size: 508078 MB
node 6 free: 507657 MB
node 7 cpus: 420-479
node 7 size: 508034 MB
node 7 free: 507517 MB
node 8 cpus: 480-539
node 8 size: 508078 MB
node 8 free: 507115 MB
node 9 cpus: 540-599
node 9 size: 508078 MB
node 9 free: 507223 MB
node 10 cpus: 600-659
node 10 size: 508078 MB
node 10 free: 507448 MB
node 11 cpus: 660-719
node 11 size: 508078 MB
node 11 free: 507527 MB
node 12 cpus: 720-779

```

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(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 413

SPECspeed®2017_fp_peak = Not Run

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

Test Date: Jan-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023

Platform Notes (Continued)

```

node 12 size: 508078 MB
node 12 free: 507750 MB
node 13 cpus: 780-839
node 13 size: 508078 MB
node 13 free: 507614 MB
node 14 cpus: 840-899
node 14 size: 508078 MB
node 14 free: 507748 MB
node 15 cpus: 900-959
node 15 size: 507013 MB
node 15 free: 506677 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
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:      8322323468 kB

```

```

-----
10. who -r
run-level 3 Jan 20 08:38

```

```

-----
11. Systemd service manager version: systemd 239 (239-74.el8_8)
Default Target Status
multi-user      running

```

```

-----
12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
abrt-journal-core abrt-oops abrt-vmcore abrt-xorg abrttd accounts-daemon atd auditd autovt@
avahi-daemon chronyd cpuset_cpunodemap cpuset_memory_spread crond dcd dcdchkgracefulshutdown
dcdshutdown display-manager gdm getty@ hpe-auto-config hpe_irqbalance import-state
insights-client-boot iscsi iscsi-onboot kdump ksm ksmtuned libstoragemgmt libvirttd lm_sensors
loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
nvme-fc-boot-connections ostree-remount pmcd pmie pmlogger qemu-guest-agent rpcbind rsyslog
rtkit-daemon selinux-autorelabel-mark smartd sshd sssd syslog sysstat timedatex tuned udisks2 vdo
vgauthd vmtoolsd vsftpd
disabled abrt-ccpp abrt-pstoreoops arp-ethers autofs blk-availability bluetooth brltty
canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot cgdbxbx
chrony-wait cni-dhcp console-getty cpupower cups cups-browsed debug-shell dnf-system-upgrade
dnsmasq dovecot ebttables fancontrol fcoe firewallld grafana-server gssproxy httpd httpd@ ibacm
iprdump iprinit iprupdate ipsec irqbalance iscsid iscsiui kpatch kvm_stat ledmon libvirt-guests

```

(Continued on next page)



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Platform Notes (Continued)

```

lldpad man-db-restart-cache-update named named-chroot ndctl-monitor netcf-transaction nfs-blkmap
nfs-convert nfs-server nftables nmb numad nvme-autoconnect oddjobd pmfind pmie_farm pmlogger_farm
pmpoxy podman podman-auto-update podman-clean-transient podman-kube@ podman-restart postfix
powertop psacct ras-mc-ctl rasdaemon rdisc rhcd rrdcached saslauthd sendmail sm-client smb snmpd
snmptrapd spamassassin speech-dispatcherd srp_daemon srp_daemon_port@ sshd-keygen@
switcheroo-control systemd-nspawn@ systemd-pstore systemd-resolved target targetclid tcsh
tog-pegasus trace-cmd upower virtinterfaced virtnetworkd virtnodedevd virtnwfilterd virtproxyd
virtqemud virtsecretd virtstoraged wpa_supplicant ypbind
indirect pcsd serial-getty@ spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh
masked sssd-sudo virtlockd virtlogd vsftpd@
systemd-timedated

```

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd2,gpt4)/boot/vmlinuz-4.18.0-477.10.1.el8_8.x86_64
root=UUID=e65a817a-ecea-4172-8f09-b6a7120f7868
ro
loglevel=3
rd.auto=1
console=ttyS0,115200n8
selinux=0
security=
console=ttyS0,115200
udev.children-max=512
nmi_watchdog=0
uv_nmi.action=kdump
add_efi_memmap
tsc=nowatchdog
bau=0
earlyprintk=ttyS0,115200
log_buf_len=8M
numa_balancing=disable
crashkernel=1G,high

```

```

-----
14. cpupower frequency-info
analyzing CPU 0:
  current policy: frequency should be within 3.50 GHz and 3.50 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

  boost state support:
    Supported: yes
    Active: yes

```

```

-----
15. tuned-adm active
Current active profile: throughput-performance

```

```

-----
16. sysctl
kernel.numa_balancing          0
kernel.randomize_va_space      2
vm.compaction_proactiveness     0
vm.dirty_background_bytes      0
vm.dirty_background_ratio      10
vm.dirty_bytes                  0
vm.dirty_expire_centisecs      3000
vm.dirty_ratio                  40
vm.dirty_writeback_centisecs    500
vm.dirtytime_expire_seconds    43200

```

(Continued on next page)



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Software Availability: Dec-2023

Platform Notes (Continued)

```

vm.extfrag_threshold      500
vm.min_unmapped_ratio    1
vm.nr_hugepages          0
vm.nr_hugepages_mempolicy 0
vm.nr_overcommit_hugepages 0
vm.swappiness            10
vm.watermark_boost_factor 15000
vm.watermark_scale_factor 10
vm.zone_reclaim_mode     0

```

```

-----
17. /sys/kernel/mm/transparent_hugepage
defrag          always defer defer+madvise [madvise] never
enabled        [always] madvise never
hpage_pmd_size 2097152
shmem_enabled  always within_size advise [never] deny force

```

```

-----
18. /sys/kernel/mm/transparent_hugepage/khugepaged
alloc_sleep_millisecs  60000
defrag                 1
max_ptes_none          511
max_ptes_swap          64
pages_to_scan          4096
scan_sleep_millisecs   10000

```

```

-----
19. OS release
From /etc/*-release /etc/*-version
os-release             Red Hat Enterprise Linux 8.8 (Ootpa)
hpe-foundation-release HPE Foundation Software 2.5.0, Build 750.0880.240110T0100.a.rhel88hpe-240110T0100
redhat-release         Red Hat Enterprise Linux release 8.8 (Ootpa)
system-release        Red Hat Enterprise Linux release 8.8 (Ootpa)

```

```

-----
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
itlb_multihit        Not affected
l1tf                  Not affected
mds                   Not affected
meltdown              Not affected
mmio_stale_data       Not affected
retbleed              Not affected
spec_store_bypass     Mitigation: Speculative Store Bypass disabled via prctl
spectre_v1             Mitigation: usercopy/swapgs barriers and __user pointer sanitization
spectre_v2            Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling, PBRSE-eIBRS: SW sequence
srbds                 Not affected
tsx_async_abort       Not affected

```

For more information, see the Linux documentation on hardware vulnerabilities, for example <https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html>

```

-----
21. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p4 xfs 2.3T 492G 1.8T 22% /

```

```

-----
22. /sys/devices/virtual/dmi/id
Vendor: HPE
Product: Compute Scale-up Server 3200

```

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SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jan-2024

Hardware Availability: Dec-2023

Software Availability: Dec-2023

Platform Notes (Continued)

Product Family: 1590PID03030201
Serial: 5UF2491412-000

23. dmidecode

Additional information from dmidecode 3.3 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:

63x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800
65x Samsung M321R8GA0BB0-CQKZH 64 GB 2 rank 4800

24. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: HPE
BIOS Version: Bundle:1.10.342-20231206_161054 SFW:009.010.108.000.2312042027
BIOS Date: 12/04/2023

Compiler Version Notes

=====
C | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
=====

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

=====
C++, C, Fortran | 607.cactuBSSN_s(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====
Fortran | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====
Fortran, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jan-2024

Hardware Availability: Dec-2023

Software Availability: Dec-2023

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 -xsaphirerapids -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 -xsaphirerapids -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 -xsaphirerapids -Ofast -ffast-math

(Continued on next page)



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SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jan-2024

Hardware Availability: Dec-2023

Software Availability: Dec-2023

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-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
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.0.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SDSS-rev1.0.xml>

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