SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

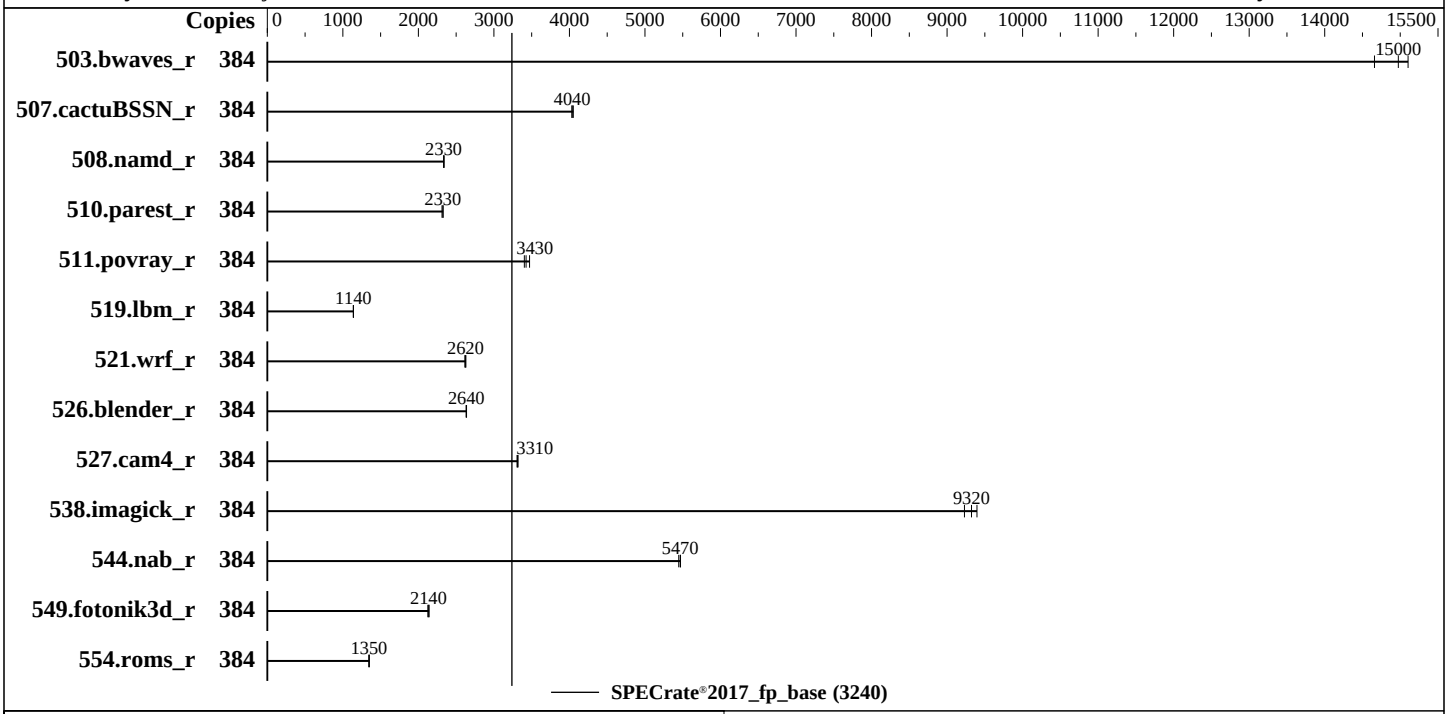
PRIMERGY RX8770 M7, Intel Xeon Platinum 8468H, 2.10GHz

SPECrate®2017_fp_base = 3240

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: May-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022



Hardware

CPU Name:	Intel Xeon Platinum 8468H
Max MHz:	3800
Nominal:	2100
Enabled:	384 cores, 8 chips
Orderable:	8 chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	105 MB I+D on chip per chip
Other:	None
Memory:	4 TB (64 x 64 GB 2Rx4 PC5-4800B-R)
Storage:	1 x SATA SSD, 3.84TB
Other:	1 x Fujitsu PRAID EP740i Raid Card

Software

OS:	SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.22-default
Compiler:	C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;
Parallel:	No
Firmware:	Fujitsu BIOS Version V1.0.0.0 R1.2.0 for D4029-C1x. Released Jun-2023 tested as V1.0.0.0 R0.11.0 for D4029-C1x Feb-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
Power Management:	BIOS set to prefer performance at the cost of additional power usage

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	384	255	15100	**257**	**15000**	263	14700							
507.cactuBSSN_r	384	**120**	**4040**	121	4030	120	4050							
508.namd_r	384	156	2330	**156**	**2330**	156	2340							
510.parest_r	384	**432**	**2330**	432	2330	434	2310							
511.povray_r	384	263	3400	258	3470	**262**	**3430**							
519.lbm_r	384	**355**	**1140**	355	1140	355	1140							
521.wrf_r	384	**328**	**2620**	327	2630	329	2620							
526.blender_r	384	**222**	**2640**	222	2640	222	2630							
527.cam4_r	384	202	3320	203	3310	**203**	**3310**							
538.imagick_r	384	103	9230	**102**	**9320**	102	9400							
544.nab_r	384	**118**	**5470**	118	5470	119	5450							
549.fotonik3d_r	384	704	2130	**701**	**2140**	699	2140							
554.roms_r	384	452	1350	454	1340	**453**	**1350**							

SPECrate®2017_fp_base = 3240

SPECrate®2017_fp_peak = Not Run

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"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/benchmark/speccpu/lib/intel64:/home/benchmark/speccpu/je5.0.1-64"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
```

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General Notes (Continued)

```
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:
Hyper-Threading = Disabled
SNC (Sub NUMA) = Enable SNC4

Sysinfo program /home/benchmark/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Mon May 15 18:30:41 2023

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 249 (249.11+suse.124.g2bc0b2c447)
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 localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
  x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   18:30:41 up 4 min,  2 users,  load average: 0.68, 3.27, 1.84
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                18:27    3:10   0.05s  0.05s -bash
  root     pts/0    192.168.1.114    18:27    9.00s  2.79s  0.26s
```

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Platform Notes (Continued)

```
  /home/benchmark/ptu_v4.0/UNIFIED_SERVER_PTAT_V4.0.0_20230110/ptat -mon -i 5000000 -filter 0x3f -y -ts -csv
  -log

------------------------------------------------------------
3. Username
  From environment variable $USER:  root

------------------------------------------------------------
4. ulimit -a
  core file size          (blocks, -c) unlimited
  data seg size           (kbytes, -d) unlimited
  scheduling priority             (-e) 0
  file size               (blocks, -f) unlimited
  pending signals                 (-i) 16510388
  max locked memory       (kbytes, -l) 64
  max memory size         (kbytes, -m) unlimited
  open files                      (-n) 1024
  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) 16510388
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 30
 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
 sshd: root@pts/0
 -bash
 -bash
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=384 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=192 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=384 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=192 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
   rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/benchmark/speccpu

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Platinum 8468H
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 6
    microcode       : 0x2b000161
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 48
    siblings        : 48
    8 physical ids (chips)
    384 processors (hardware threads)
    physical id 0: core ids 0-47
    physical id 1: core ids 0-47
    physical id 2: core ids 0-47
```

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Platform Notes (Continued)

```
     physical id 3: core ids 0-47
     physical id 4: core ids 0-47
     physical id 5: core ids 0-47
     physical id 6: core ids 0-47
     physical id 7: core ids 0-47
     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
     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
     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
     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
     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
     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
     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
     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
   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 2.37.2:
   Architecture:                    x86_64
   CPU op-mode(s):                  32-bit, 64-bit
   Address sizes:                   46 bits physical, 57 bits virtual
   Byte Order:                      Little Endian
   CPU(s):                          384
   On-line CPU(s) list:             0-383
   Vendor ID:                       GenuineIntel
   Model name:                      Intel(R) Xeon(R) Platinum 8468H
   CPU family:                      6
   Model:                           143
   Thread(s) per core:              1
   Core(s) per socket:              48
   Socket(s):                       8
   Stepping:                        6
   CPU max MHz:                     3800.0000
   CPU min MHz:                     800.0000
   BogoMIPS:                        4200.00
   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 art arch_perfmon pebs bts rep_good nopl xtopology
                                    nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                                    ds_cpl vmx 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
```

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Platform Notes (Continued)

```
                        invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                        tpr_shadow vnmi flexpriority ept vpid ept_ad 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 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 avx512_fp16
                        amx_tile flush_l1d arch_capabilities
  Virtualization:       VT-x
  L1d cache:            18 MiB (384 instances)
  L1i cache:            12 MiB (384 instances)
  L2 cache:             768 MiB (384 instances)
  L3 cache:             840 MiB (8 instances)
  NUMA node(s):         32
  NUMA node0 CPU(s):    0-11
  NUMA node1 CPU(s):    12-23
  NUMA node2 CPU(s):    24-35
  NUMA node3 CPU(s):    36-47
  NUMA node4 CPU(s):    48-59
  NUMA node5 CPU(s):    60-71
  NUMA node6 CPU(s):    72-83
  NUMA node7 CPU(s):    84-95
  NUMA node8 CPU(s):    96-107
  NUMA node9 CPU(s):    108-119
  NUMA node10 CPU(s):   120-131
  NUMA node11 CPU(s):   132-143
  NUMA node12 CPU(s):   144-155
  NUMA node13 CPU(s):   156-167
  NUMA node14 CPU(s):   168-179
  NUMA node15 CPU(s):   180-191
  NUMA node16 CPU(s):   192-203
  NUMA node17 CPU(s):   204-215
  NUMA node18 CPU(s):   216-227
  NUMA node19 CPU(s):   228-239
  NUMA node20 CPU(s):   240-251
  NUMA node21 CPU(s):   252-263
  NUMA node22 CPU(s):   264-275
  NUMA node23 CPU(s):   276-287
  NUMA node24 CPU(s):   288-299
  NUMA node25 CPU(s):   300-311
  NUMA node26 CPU(s):   312-323
  NUMA node27 CPU(s):   324-335
  NUMA node28 CPU(s):   336-347
  NUMA node29 CPU(s):   348-359
  NUMA node30 CPU(s):   360-371
  NUMA node31 CPU(s):   372-383
  Vulnerability Itlb multihit:     Not affected
  Vulnerability L1tf:              Not affected
  Vulnerability Mds:               Not affected
  Vulnerability Meltdown:          Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:        Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
  Vulnerability Srbds:             Not affected
  Vulnerability Tsx async abort:   Not affected

From lscpu --cache:
```

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Platform Notes (Continued)

```
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL   SETS PHY-LINE COHERENCY-SIZE
      L1d       48K      18M   12 Data            1     64        1             64
      L1i       32K      12M    8 Instruction     1     64        1             64
      L2         2M     768M   16 Unified         2   2048        1             64
      L3       105M     840M   15 Unified         3 114688        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: 0-11
   node 0 size: 128469 MB
   node 0 free: 127029 MB
   node 1 cpus: 12-23
   node 1 size: 129020 MB
   node 1 free: 128524 MB
   node 2 cpus: 24-35
   node 2 size: 129020 MB
   node 2 free: 128544 MB
   node 3 cpus: 36-47
   node 3 size: 129020 MB
   node 3 free: 128506 MB
   node 4 cpus: 48-59
   node 4 size: 129020 MB
   node 4 free: 128586 MB
   node 5 cpus: 60-71
   node 5 size: 129020 MB
   node 5 free: 128596 MB
   node 6 cpus: 72-83
   node 6 size: 129020 MB
   node 6 free: 128501 MB
   node 7 cpus: 84-95
   node 7 size: 129020 MB
   node 7 free: 128558 MB
   node 8 cpus: 96-107
   node 8 size: 129020 MB
   node 8 free: 128811 MB
   node 9 cpus: 108-119
   node 9 size: 129020 MB
   node 9 free: 128818 MB
   node 10 cpus: 120-131
   node 10 size: 129020 MB
   node 10 free: 128802 MB
   node 11 cpus: 132-143
   node 11 size: 129020 MB
   node 11 free: 128828 MB
   node 12 cpus: 144-155
   node 12 size: 129020 MB
   node 12 free: 128757 MB
   node 13 cpus: 156-167
   node 13 size: 129020 MB
   node 13 free: 128771 MB
   node 14 cpus: 168-179
   node 14 size: 129020 MB
   node 14 free: 128731 MB
   node 15 cpus: 180-191
   node 15 size: 129020 MB
   node 15 free: 128769 MB
   node 16 cpus: 192-203
   node 16 size: 129020 MB
```

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Platform Notes (Continued)

```
  node 16 free: 128752 MB
  node 17 cpus: 204-215
  node 17 size: 129020 MB
  node 17 free: 128733 MB
  node 18 cpus: 216-227
  node 18 size: 129020 MB
  node 18 free: 128760 MB
  node 19 cpus: 228-239
  node 19 size: 129020 MB
  node 19 free: 128754 MB
  node 20 cpus: 240-251
  node 20 size: 129020 MB
  node 20 free: 128736 MB
  node 21 cpus: 252-263
  node 21 size: 129020 MB
  node 21 free: 128759 MB
  node 22 cpus: 264-275
  node 22 size: 129020 MB
  node 22 free: 128813 MB
  node 23 cpus: 276-287
  node 23 size: 129020 MB
  node 23 free: 128768 MB
  node 24 cpus: 288-299
  node 24 size: 129020 MB
  node 24 free: 128795 MB
  node 25 cpus: 300-311
  node 25 size: 129020 MB
  node 25 free: 128835 MB
  node 26 cpus: 312-323
  node 26 size: 129020 MB
  node 26 free: 128799 MB
  node 27 cpus: 324-335
  node 27 size: 129020 MB
  node 27 free: 128805 MB
  node 28 cpus: 336-347
  node 28 size: 129020 MB
  node 28 free: 128652 MB
  node 29 cpus: 348-359
  node 29 size: 128986 MB
  node 29 free: 128738 MB
  node 30 cpus: 360-371
  node 30 size: 129020 MB
  node 30 free: 128780 MB
  node 31 cpus: 372-383
  node 31 size: 128562 MB
  node 31 free: 128331 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  12  12  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
    21  21  21  31  31  31  31
    1:  12  10  12  12  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
    21  21  21  31  31  31  31
    2:  12  12  10  12  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
    21  21  21  31  31  31  31
    3:  12  12  12  10  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
    21  21  21  31  31  31  31
    4:  21  21  21  21  10  12  12  12  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
    31  31  31  21  21  21  21
    5:  21  21  21  21  12  10  12  12  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
```

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Platform Notes (Continued)

```
     31  31  31  21  21  21  21
      6:  21  21  21  21  12  12  10  12  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
     31  31  31  21  21  21  21
      7:  21  21  21  21  12  12  12  10  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
     31  31  31  21  21  21  21
      8:  21  21  21  21  31  31  31  31  10  12  12  12  21  21  21  21  21  21  21  21  31  31  31  31  31
     31  31  31  21  21  21  21
      9:  21  21  21  21  31  31  31  31  12  10  12  12  21  21  21  21  21  21  21  21  31  31  31  31  31
     31  31  31  21  21  21  21
     10:  21  21  21  21  31  31  31  31  12  12  10  12  21  21  21  21  21  21  21  21  31  31  31  31  31
     31  31  31  21  21  21  21
     11:  21  21  21  21  31  31  31  31  12  12  12  10  21  21  21  21  21  21  21  21  31  31  31  31  31
     31  31  31  21  21  21  21
     12:  31  31  31  31  21  21  21  21  21  21  21  21  21  10  12  12  12  31  31  31  31  21  21  21  21  21
     21  21  21  31  31  31  31
     13:  31  31  31  31  21  21  21  21  21  21  21  21  12  10  12  12  31  31  31  31  21  21  21  21  21
     21  21  21  31  31  31  31
     14:  31  31  31  31  21  21  21  21  21  21  21  21  12  12  10  12  31  31  31  31  21  21  21  21  21
     21  21  21  31  31  31  31
     15:  31  31  31  31  21  21  21  21  21  21  21  21  12  12  12  10  31  31  31  31  21  21  21  21  21
     21  21  21  31  31  31  31
     16:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  10  12  12  12  21  21  21  21  21
     21  21  21  31  31  31  31
     17:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12  10  12  12  21  21  21  21  21
     21  21  21  31  31  31  31
     18:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12  12  10  12  21  21  21  21  21
     21  21  21  31  31  31  31
     19:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12  12  12  10  21  21  21  21  21
     21  21  21  31  31  31  31
     20:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  10  12  12  12  31
     31  31  31  21  21  21  21
     21:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  12  10  12  12  31
     31  31  31  21  21  21  21
     22:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  12  12  10  12  31
     31  31  31  21  21  21  21
     23:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  12  12  12  10  31
     31  31  31  21  21  21  21
     24:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  10
     12  12  12  21  21  21  21
     25:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12
     10  12  12  21  21  21  21
     26:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12
     12  10  12  21  21  21  21
     27:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12
     12  12  10  21  21  21  21
     28:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
     21  21  21  10  12  12  12
     29:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
     21  21  21  12  10  12  12
     30:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
     21  21  21  12  12  10  12
     31:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
     21  21  21  12  12  12  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       4226684976 kB

------------------------------------------------------------
10. who -r
```

(Continued on next page)

Platform Notes (Continued)

```
  run-level 3 May 15 18:27

------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
  Default Target  Status
  multi-user      degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT           LOAD   ACTIVE SUB    DESCRIPTION
  * sep5.service   loaded failed failed systemd script to load sep5 driver at boot time
  * smartd.service loaded failed failed Self Monitoring and Reporting Technology (SMART) Daemon

------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron display-manager getty@
                   haveged irqbalance iscsi issue-generator kbdsettings kdump kdump-early klog lvm2-monitor
                   nscd postfix purge-kernels rollback rsyslog sep5 smartd sshd wicked wickedd-auto4
                   wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
  enabled-runtime  systemd-remount-fs
  disabled         accounts-daemon appstream-sync-cache autofs autoyast-initscripts blk-availability
                   bluetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
                   cups-browsed debug-shell ebtables exchange-bmc-os-info firewalld gpm grub2-once
                   haveged-switch-root ipmi ipmievd iscsi-init iscsid iscsiuio issue-add-ssh-keys kexec-load
                   lunmask man-db-create multipathd nfs nfs-blkmap nmb ostree-remount rdisc rpcbind
                   rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd_generate_opts smb snmpd snmptrapd
                   speech-dispatcherd systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                   systemd-time-wait-sync systemd-timesyncd udisks2 upower
  indirect         wickedd

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
  root=UUID=c13187e0-8b8c-4db9-ba32-defaefe6232c
  splash=silent
  mitigations=auto
  quiet
  security=apparmor
  crashkernel=375M,high
  crashkernel=72M,low

------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 3.80 GHz.
                    The governor "powersave" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

------------------------------------------------------------
16. sysctl
  kernel.numa_balancing               1
  kernel.randomize_va_space           2
  vm.compaction_proactiveness        20
  vm.dirty_background_bytes           0
  vm.dirty_background_ratio          10
  vm.dirty_bytes                      0
```

(Continued on next page)

Platform Notes (Continued)

```
  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 SP4

------------------------------------------------------------
20. Disk information
SPEC is set to: /home/benchmark/speccpu
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sdb2      xfs   3.5T   46G  3.5T   2% /

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         FUJITSU
    Product:        n/a
    Product Family: SERVER
    Serial:         n/a

------------------------------------------------------------
22. dmidecode
  Additional information from dmidecode 3.2 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:
    7x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800
    31x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800
    26x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800
```

(Continued on next page)

Platform Notes (Continued)

```
 ------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       FUJITSU
    BIOS Version:      V1.0.0.0 R0.11.0 for D4029-C1x
    BIOS Date:         02/28/2023
    BIOS Revision:     0.11
    Firmware Revision: 2.0
```

Compiler Version Notes

```
==============================================================================================================
C              | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
--------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++            | 508.namd_r(base) 510.parest_r(base)
--------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++, C         | 511.povray_r(base) 526.blender_r(base)
--------------------------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
--------------------------------------------------------------------------------------------------------------
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran        | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran, C     | 521.wrf_r(base) 527.cam4_r(base)
--------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
```

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Compiler Version Notes (Continued)

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

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

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

C++ benchmarks:
```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

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

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

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

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-SPR-RevB.html
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-SPR-RevB.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

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