



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017_fp_base = 849

PowerEdge C6620 (Intel Xeon Platinum 8458P)

SPECrate®2017_fp_peak = 906

CPU2017 License: 6573

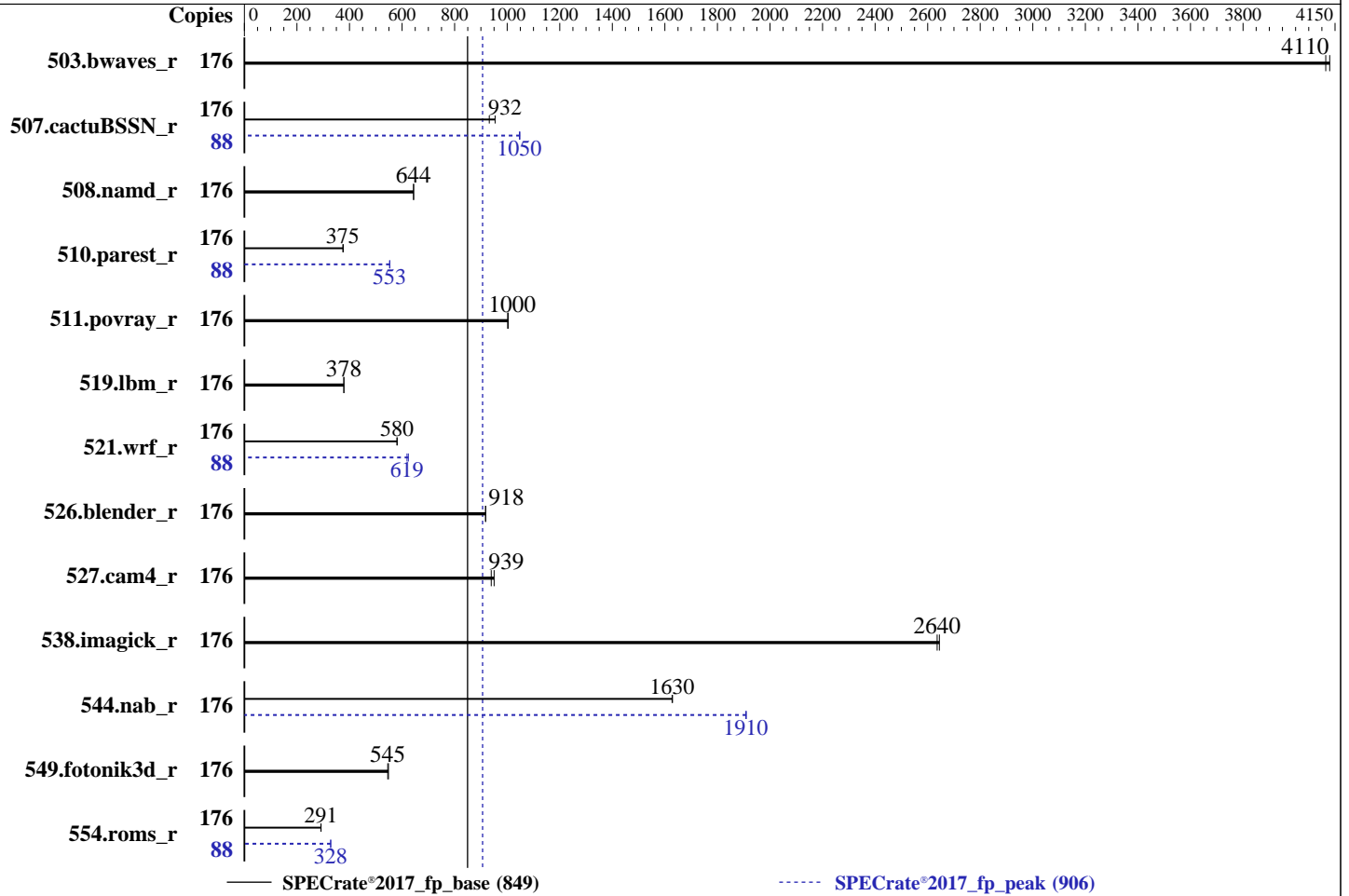
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2023

Hardware Availability: Feb-2023

Software Availability: Jun-2022



Hardware

CPU Name: Intel Xeon Platinum 8458P
 Max MHz: 3800
 Nominal: 2700
 Enabled: 88 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 82.5 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
 Storage: 125 GB on tmpfs
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-default
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2022.1 of Intel Fortran Compiler
 for Linux;
 Parallel: No
 Firmware: Version 0.3.1 released Nov-2022
 File System: tmpfs
 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	176	427	4130	<u>429</u>	<u>4110</u>			176	427	4130	<u>429</u>	<u>4110</u>		
507.cactuBSSN_r	176	234	954	<u>239</u>	<u>932</u>			88	<u>106</u>	<u>1050</u>	106	1050		
508.namd_r	176	<u>260</u>	<u>644</u>	260	644			176	<u>260</u>	<u>644</u>	260	644		
510.parest_r	176	1223	376	<u>1229</u>	<u>375</u>			88	<u>417</u>	<u>553</u>	416	553		
511.povray_r	176	409	1000	<u>410</u>	<u>1000</u>			176	409	1000	<u>410</u>	<u>1000</u>		
519.lbm_r	176	490	379	<u>490</u>	<u>378</u>			176	490	379	<u>490</u>	<u>378</u>		
521.wrf_r	176	<u>679</u>	<u>580</u>	678	582			88	316	624	<u>319</u>	<u>619</u>		
526.blender_r	176	<u>292</u>	<u>918</u>	292	918			176	<u>292</u>	<u>918</u>	292	918		
527.cam4_r	176	<u>328</u>	<u>939</u>	324	950			176	<u>328</u>	<u>939</u>	324	950		
538.imagick_r	176	<u>166</u>	<u>2640</u>	166	2640			176	<u>166</u>	<u>2640</u>	166	2640		
544.nab_r	176	182	1630	<u>182</u>	<u>1630</u>			176	<u>155</u>	<u>1910</u>	155	1910		
549.fotonik3d_r	176	1251	548	<u>1257</u>	<u>545</u>			176	1251	548	<u>1257</u>	<u>545</u>		
554.roms_r	176	958	292	<u>961</u>	<u>291</u>			88	<u>426</u>	<u>328</u>	425	329		

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

Submit Notes

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

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/mnt/ramdisk/cpu2017-1.1.9-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2022.1/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

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General Notes (Continued)

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>`
 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>

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.

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:

```

      ADDDC Setting : Disabled
      DIMM Self Healing on
Uncorrectable Memory Error : Disabled
Virtualization Technology : Disabled
      Sub NUMA Cluster : 4-way Clustering
      DCU Streamer Prefetcher : Disabled
      LLC Prefetch : Disabled
      Dead Line LLC Alloc : Disabled
      Optimizer Mode : Enabled

      System Profile : Custom
      CPU Power Management : Maximum Performance
      C1E : Disabled
      C States : Autonomous
      Memory Patrol Scrub : Disabled
      Energy Efficiency Policy : Performance
      PCI ASPM L1 Link
      Power Management : Disabled

```

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2022.1/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Wed Jan 11 16:45:47 2023

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

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Platform Notes (Continued)

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- 9. /proc/meminfo
- 10. who -r
- 11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
- 12. Services, from systemctl list-unit-files
- 13. Linux kernel boot-time arguments, from /proc/cmdline
- 14. sysctl
- 15. /sys/kernel/mm/transparent_hugepage
- 16. /sys/kernel/mm/transparent_hugepage/khugepaged
- 17. OS release
- 18. Disk information
- 19. /sys/devices/virtual/dmi/id
- 20. dmidecode
- 21. 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
16:45:47 up 4:12, 1 user, load average: 123.96, 163.14, 169.83
USER      TTY      FROM          LOGIN@      IDLE        JCPU   PCPU   WHAT
root     tty1    -             12:35      4:10m  1.36s  0.00s /bin/bash ./dell-norun-specrate.sh
--iterations 2 --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
```

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

```
4. ulimit -a
core file size          (blocks, -c) unlimited
data seg size          (kbytes, -d) unlimited
```

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Platform Notes (Continued)

```

scheduling priority      (-e) 0
file size                (blocks, -f) unlimited
pending signals          (-i) 4124449
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) 4124449
virtual memory           (kbytes, -v) unlimited
file locks               (-x) unlimited

```

5. sysinfo process ancestry

```

-----
/usr/lib/systemd/systemd --switched-root --system --deserialize 29
login -- root
-bash
/bin/bash ./DELL_rate.sh
/bin/bash ./dell-norun-main.sh rate
/bin/bash ./dell-norun-main.sh rate
/bin/bash ./dell-norun-specrate.sh --iterations 2 --output_format csv,html,pdf,txt --define
  Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
/bin/bash ./dell-norun-specrate.sh --iterations 2 --output_format csv,html,pdf,txt --define
  Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=176 -c
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=88 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2
  --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=176 --configfile
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=88 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
  --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc --nopower --runmode rate
  --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-ic2022.1

```

6. /proc/cpuinfo

```

model name      : Intel(R) Xeon(R) Platinum 8458P
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 8

```

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Platform Notes (Continued)

microcode : 0x2b000111
bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores : 44
siblings : 88
2 physical ids (chips)
176 processors (hardware threads)
physical id 0: core ids 0-43
physical id 1: core ids 0-43
physical id 0: apicids 0-87
physical id 1: apicids 128-215

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): 176
On-line CPU(s) list: 0-175
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8458P
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 44
Socket(s): 2
Stepping: 8
BogoMIPS: 5400.00

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 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 cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect 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

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Platform Notes (Continued)

```

tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_llid arch_capabilities
Lld cache: 4.1 MiB (88 instances)
Lli cache: 2.8 MiB (88 instances)
L2 cache: 176 MiB (88 instances)
L3 cache: 165 MiB (2 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,88,92,96,100,104,108,112,116,120,124,128
NUMA node1 CPU(s): 44,48,52,56,60,64,68,72,76,80,84,132,136,140,144,148,152,156,160,164,168,172
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,90,94,98,102,106,110,114,118,122,126,130
NUMA node3 CPU(s): 46,50,54,58,62,66,70,74,78,82,86,134,138,142,146,150,154,158,162,166,170,174
NUMA node4 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,89,93,97,101,105,109,113,117,121,125,129
NUMA node5 CPU(s): 45,49,53,57,61,65,69,73,77,81,85,133,137,141,145,149,153,157,161,165,169,173
NUMA node6 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,91,95,99,103,107,111,115,119,123,127,131
NUMA node7 CPU(s): 47,51,55,59,63,67,71,75,79,83,87,135,139,143,147,151,155,159,163,167,171,175
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:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
Lld	48K	4.1M	12	Data	1	64	1	64
Lli	32K	2.8M	8	Instruction	1	64	1	64
L2	2M	176M	16	Unified	2	2048	1	64
L3	82.5M	165M	15	Unified	3	90112	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```

available: 8 nodes (0-7)
node 0 cpus: 0,4,8,12,16,20,24,28,32,36,40,88,92,96,100,104,108,112,116,120,124,128
node 0 size: 128398 MB
node 0 free: 114789 MB
node 1 cpus: 44,48,52,56,60,64,68,72,76,80,84,132,136,140,144,148,152,156,160,164,168,172
node 1 size: 129018 MB
node 1 free: 112724 MB
node 2 cpus: 2,6,10,14,18,22,26,30,34,38,42,90,94,98,102,106,110,114,118,122,126,130
node 2 size: 129018 MB

```

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Platform Notes (Continued)

```

node 2 free: 119890 MB
node 3 cpus: 46,50,54,58,62,66,70,74,78,82,86,134,138,142,146,150,154,158,162,166,170,174
node 3 size: 129018 MB
node 3 free: 120146 MB
node 4 cpus: 1,5,9,13,17,21,25,29,33,37,41,89,93,97,101,105,109,113,117,121,125,129
node 4 size: 129018 MB
node 4 free: 120198 MB
node 5 cpus: 45,49,53,57,61,65,69,73,77,81,85,133,137,141,145,149,153,157,161,165,169,173
node 5 size: 128983 MB
node 5 free: 120187 MB
node 6 cpus: 3,7,11,15,19,23,27,31,35,39,43,91,95,99,103,107,111,115,119,123,127,131
node 6 size: 129018 MB
node 6 free: 120239 MB
node 7 cpus: 47,51,55,59,63,67,71,75,79,83,87,135,139,143,147,151,155,159,163,167,171,175
node 7 size: 128660 MB
node 7 free: 119853 MB
node distances:
node  0  1  2  3  4  5  6  7
  0: 10 12 12 12 21 21 21 21
  1: 12 10 12 12 21 21 21 21
  2: 12 12 10 12 21 21 21 21
  3: 12 12 12 10 21 21 21 21
  4: 21 21 21 21 10 12 12 12
  5: 21 21 21 21 12 10 12 12
  6: 21 21 21 21 12 12 10 12
  7: 21 21 21 21 12 12 12 10

```

```

-----
9. /proc/meminfo
   MemTotal:          1055881860 kB

```

```

-----
10. who -r
    run-level 3 Jan 11 12:33

```

```

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

```

```

-----
12. Services, from systemctl list-unit-files
    STATE          UNIT FILES
    enabled         apparmor auditd cron firewalld getty@ haveged irqbalance issue-generator kbdsettings kdump
                    kdump-early lvm2-monitor postfix purge-kernels rollback sshd wicked wickedd-auto4
                    wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
    enabled-runtime systemd-remount-fs

```

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```

disabled      blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
              ebttables grub2-once haveged-switch-root issue-add-ssh-keys kexec-load lunmask nfs
              nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd serial-getty@
              systemd-boot-check-no-failures systemd-network-generator systemd-sysext
              systemd-time-wait-sync systemd-timesyncd
indirect      wickedd

```

13. Linux kernel boot-time arguments, from /proc/cmdline

```

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=3b24f3a7-eacd-4a3a-aef5-ee833c654599
splash=silent
mitigations=auto
quiet
security=apparmor
crashkernel=311M,high
crashkernel=72M,low

```

14. sysctl

```

kernel.numa_balancing          1
kernel.randomize_va_space      2
vm.compaction_proactiveness    20
vm.dirty_background_bytes      0
vm.dirty_background_ratio      10
vm.dirty_bytes                  0
vm.dirty_expire_centisecs      3000
vm.dirty_ratio                  20
vm.dirty_writeback_centisecs   500
vm.dirtytime_expire_seconds    43200
vm.extfrag_threshold           500
vm.min_unmapped_ratio          1
vm.nr_hugepages                 0
vm.nr_hugepages_mempolicy      0
vm.nr_overcommit_hugepages     0
vm.swappiness                    60
vm.watermark_boost_factor      15000
vm.watermark_scale_factor      10
vm.zone_reclaim_mode           0

```

15. /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

```

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Platform Notes (Continued)

16. /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

```

17. OS release

```

From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP4

```

18. Disk information

```

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2022.1
Filesystem      Type  Size  Used Avail Use% Mounted on
tmpfs           tmpfs 125G   71G   55G  57% /mnt/ramdisk

```

19. /sys/devices/virtual/dmi/id

```

Vendor:          Dell Inc.
Product:         PowerEdge C6620
Product Family: PowerEdge
Serial:          SL6C201

```

20. 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:
15x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
1x  002C0632002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800

```

21. BIOS

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

```

BIOS Vendor:      Dell Inc.
BIOS Version:     0.3.1
BIOS Date:        11/24/2022
BIOS Revision:    0.3

```



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PowerEdge C6620 (Intel Xeon Platinum 8458P)

SPECrate®2017_fp_peak = 906

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Jan-2023
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Compiler Version Notes

=====
C | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_r(base, peak)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
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=====
C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
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=====
C++, C | 511.povray_r(base, peak) 526.blender_r(base, peak)
=====

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
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=====
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
=====

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Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
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=====
Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
| 554.roms_r(base, peak)
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version

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Software Availability: Jun-2022

Compiler Version Notes (Continued)

2022.1.0 Build 20220316
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=====
Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
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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

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Hardware Availability: Feb-2023

Tested by: Dell Inc.

Software Availability: Jun-2022

Base Portability Flags (Continued)

```
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 -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -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 C and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```



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Software Availability: Jun-2022

Peak 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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -qopt-zmm-usage=high -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -ljemalloc

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Peak Optimization Flags (Continued)

510.parest_r (continued):

```
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

```
554.roms_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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:

```
521.wrf_r: -w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -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
```

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: basepeak = yes

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -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
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64-revB.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64-revB.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.xml>



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