SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8358, 2.60 GHz)

$SPECrate^{®}2017\_fp\_base = 507$

$SPECrate^{®}2017\_fp\_peak = 534$

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Apr-2023

Hardware Availability: May-2021

Software Availability: Dec-2022

Benchmark	Copies	Base	Peak
503.bwaves_r	128	2540	
507.cactuBSSN_r	128	582	
	64		615
508.namd_r	128	351	
510.parest_r	128	212	
	64		274
511.povray_r	128	540	
	128		592
519.lbm_r	128	270	
521.wrf_r	128	356	
	64		374
526.blender_r	128	547	
527.cam4_r	128	537	
538.imagick_r	128	1370	
544.nab_r	128	1000	
	128		1080
549.fotonik3d_r	128	354	
554.roms_r	128	180	
	64		209

—— SPECrate®2017_fp_base (507)   ----- SPECrate®2017_fp_peak (534)

Hardware

CPU Name: Intel Xeon Platinum 8358
 Max MHz: 3400
 Nominal: 2600
Enabled: 64 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1.25 MB I+D on chip per core
 L3: 48 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
Storage: 80 GB on tmpfs
Other: None

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: Version 1.9.2 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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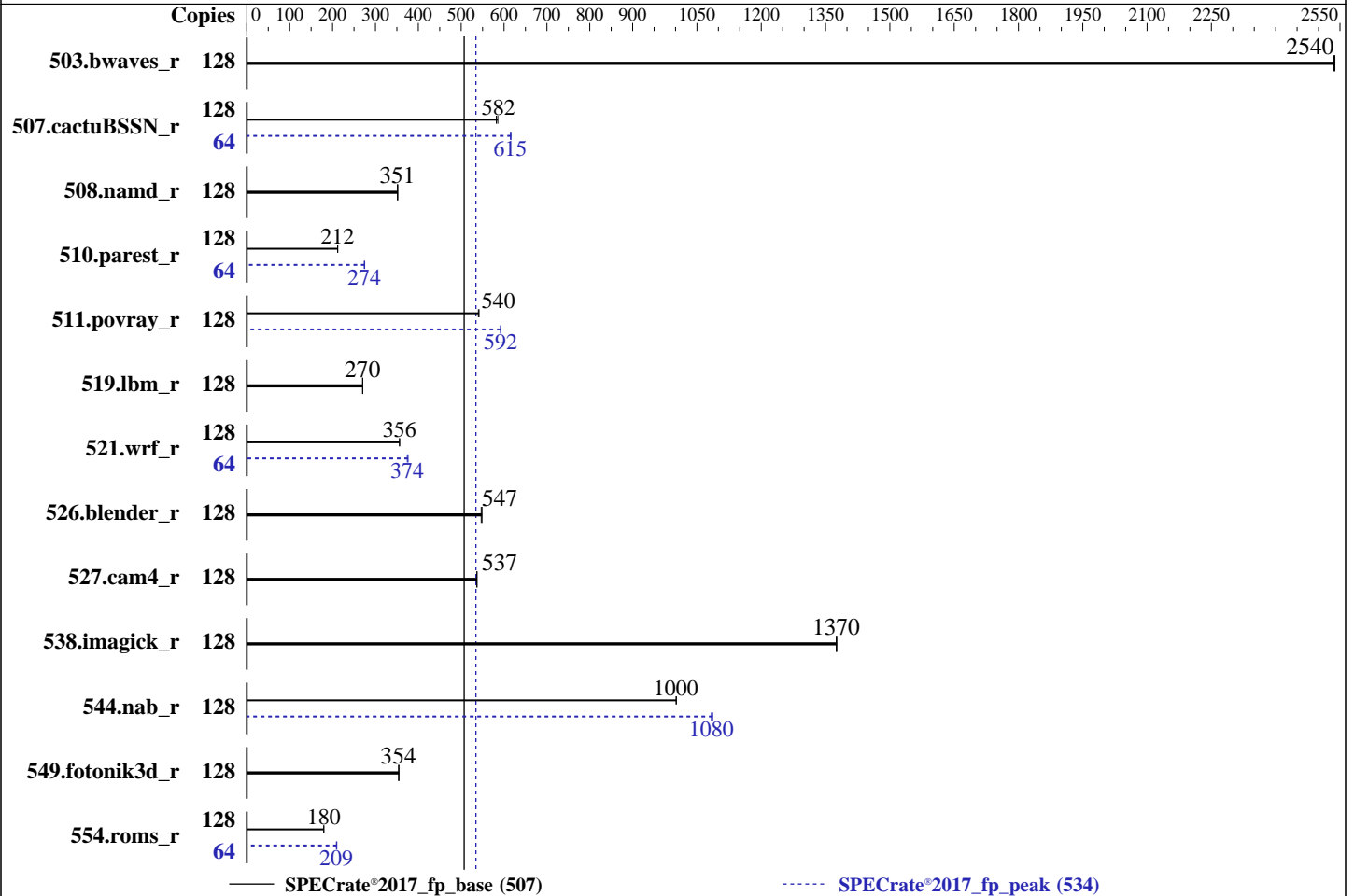
SPECrate®2017_fp_peak = 534

CPU2017 License: 6573	**Test Date:** Apr-2023
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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	128	**506**	**2540**	506	2540			128	**506**	**2540**	506	2540		
507.cactuBSSN_r	128	**278**	**582**	277	585			64	**132**	**615**	131	616		
508.namd_r	128	**346**	**351**	345	352			128	**346**	**351**	345	352		
510.parest_r	128	**1582**	**212**	1578	212			64	**611**	**274**	609	275		
511.povray_r	128	552	542	**553**	**540**			128	505	592	**505**	**592**		
519.lbm_r	128	**499**	**270**	499	270			128	**499**	**270**	499	270		
521.wrf_r	128	**805**	**356**	804	356			64	**383**	**374**	381	376		
526.blender_r	128	**357**	**547**	355	549			128	**357**	**547**	355	549		
527.cam4_r	128	417	537	**417**	**537**			128	417	537	**417**	**537**		
538.imagick_r	128	**232**	**1370**	231	1380			128	**232**	**1370**	231	1380		
544.nab_r	128	**215**	**1000**	215	1000			128	**199**	**1080**	198	1090		
549.fotonik3d_r	128	1405	355	**1410**	**354**			128	1405	355	**1410**	**354**		
554.roms_r	128	1132	180	**1133**	**180**			64	484	210	**487**	**209**		
SPECrate®2017_fp_base =		507												
SPECrate®2017_fp_peak =		534												

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-ic2023.0/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2023.0/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>
jemalloc, a general purpose malloc implementation
```

(Continued on next page)

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General Notes (Continued)

```
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 80 GB ramdisk created with the cmd: "mount -t tmpfs -o size=80G tmpfs /mnt/ramdisk"
```

Platform Notes

```
BIOS settings:
                 ADDDC Setting : Disabled
         DIMM Self Healing on
    Uncorrectable Memory Error : Disabled
     Virtualization Technology : Disabled
       DCU Streamer Prefetcher : Disabled
              Sub NUMA Cluster : 2-way Clustering
                  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-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Apr 26 10:55:23 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. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
```

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Platform Notes (Continued)

```
  16. /sys/kernel/mm/transparent_hugepage
  17. /sys/kernel/mm/transparent_hugepage/khugepaged
  18. OS release
  19. Disk information
  20. /sys/devices/virtual/dmi/id
  21. dmidecode
  22. 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
     10:55:23 up  9:06,  1 user,  load average: 86.92, 117.67, 123.27
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                06:05    4:49m  1.77s  0.00s /bin/bash ./dell-run-speccpu.sh rate
    --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define
    DL-BIOS-SNC=2 --output_format csv,html,pdf,txt


  ------------------------------------------------------------
  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) 4125278
    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) 4125278
    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-run-main.sh rate
   /bin/bash ./dell-run-main.sh rate
   /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1
     --define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=2 --output_format csv,html,pdf,txt
   /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1
     --define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=2 --output_format csv,html,pdf,txt
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 -c
     ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
     --define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2 --define
```

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Platform Notes (Continued)

```
    DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=2
    --output_format csv,html,pdf,txt fprate
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile
    ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
    --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define
    DL-BIOS-SNC=2 --output_format csv,html,pdf,txt --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-ic2023.0


  -------------------------------------------------------------
  6. /proc/cpuinfo
     model name      : Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 106
     stepping        : 6
     microcode       : 0xd000389
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores       : 32
     siblings        : 64
     2 physical ids (chips)
     128 processors (hardware threads)
     physical id 0: core ids 0-31
     physical id 1: core ids 0-31
     physical id 0: apicids 0-63
     physical id 1: apicids 128-191
   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):                   128
    On-line CPU(s) list:      0-127
    Vendor ID:                GenuineIntel
    Model name:               Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz
    CPU family:               6
    Model:                    106
    Thread(s) per core:       2
    Core(s) per socket:       32
    Socket(s):                2
    Stepping:                 6
    CPU max MHz:              3400.0000
    CPU min MHz:              800.0000
    BogoMIPS:                 5200.00
    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 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 invpcid_single intel_ppin ssbd mba
```

(Continued on next page)

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Platform Notes (Continued)

```
                                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 wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku
                                ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
                                avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d
                                arch_capabilities
  L1d cache:                    3 MiB (64 instances)
  L1i cache:                    2 MiB (64 instances)
  L2 cache:                     80 MiB (64 instances)
  L3 cache:                     96 MiB (2 instances)
  NUMA node(s):                 4
  NUMA node0 CPU(s):            0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,10
                                0,104,108,112,116,120,124
  NUMA node1 CPU(s):            2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,1
                                02,106,110,114,118,122,126
  NUMA node2 CPU(s):            1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,10
                                1,105,109,113,117,121,125
  NUMA node3 CPU(s):            3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79,83,87,91,95,99,1
                                03,107,111,115,119,123,127
  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
      L1d      48K       3M   12 Data            1   64      1            64
      L1i      32K       2M    8 Instruction     1   64      1            64
      L2      1.3M      80M   20 Unified         2 1024      1            64
      L3       48M      96M   12 Unified         3 65536     1            64


  -----------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus:
  0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100,104,108,112,116,120,124
  node 0 size: 257304 MB
  node 0 free: 247041 MB
  node 1 cpus:
  2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110,114,118,122,126
  node 1 size: 258005 MB
  node 1 free: 256979 MB
  node 2 cpus:
  1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109,113,117,121,125
  node 2 size: 258039 MB
  node 2 free: 257033 MB
  node 3 cpus:
  3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79,83,87,91,95,99,103,107,111,115,119,123,127
  node 3 size: 257992 MB
  node 3 free: 256972 MB
  node distances:
  node   0   1   2   3
```

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Platform Notes (Continued)

```
      0:  10  11  20  20
      1:  11  10  20  20
      2:  20  20  10  11
      3:  20  20  11  10


  -----------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       1056094440 kB


  -----------------------------------------------------------
  10. who -r
    run-level 3 Apr 26 01:49


  -----------------------------------------------------------
  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
                    postfix purge-kernels rollback sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
                    wickedd-nanny
    enabled-runtime systemd-remount-fs
    disabled        bmc-snmp-proxy boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
                    ebtables exchange-bmc-os-info grub2-once haveged-switch-root ipmievd ipvsadm
                    issue-add-ssh-keys kexec-load lunmask netlabel racoon racoon-setkey rdisc rpmconfigcheck
                    rsyncd serial-getty@ snmpd snmptrapd 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=0b46c224-29bd-4ee7-a1a0-fda5256c0c9a
    splash=silent
    mitigations=auto
    quiet
    security=apparmor


  -----------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 3.40 GHz.
                      The governor "powersave" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes


  -----------------------------------------------------------
  15. 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
```

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Platform Notes (Continued)

```
   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


   ----------------------------------------------------------
16. /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


   ----------------------------------------------------------
17. /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


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


   ----------------------------------------------------------
19. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.0
   Filesystem      Type   Size  Used Avail Use% Mounted on
   tmpfs           tmpfs  80G   4.2G   76G   6% /mnt/ramdisk


   ----------------------------------------------------------
20. /sys/devices/virtual/dmi/id
     Vendor:         Dell Inc.
     Product:        PowerEdge R650
     Product Family: PowerEdge
     Serial:         DFLTSTG


   ----------------------------------------------------------
21. 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:
    1x 002C069D002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200
   12x 00AD063200AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200
    1x 00AD069D00AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200
    2x 00CE063200CE M393A8G40AB2-CWE 64 GB 2 rank 3200
```

Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8358, 2.60 GHz)

SPECrate®2017_fp_base = 507

SPECrate®2017_fp_peak = 534

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

Test Date: Apr-2023
Hardware Availability: May-2021
Software Availability: Dec-2022

Platform Notes (Continued)

```
   --------------------------------------------------------------
   22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:       Dell Inc.
      BIOS Version:      1.9.2
      BIOS Date:         11/17/2022
      BIOS Revision:     1.9
```

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 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
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 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C         | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
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) 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, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
------------------------------------------------------------------------------
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, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
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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```

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SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8358, 2.60 GHz)

$SPECrate^{®}2017\_fp\_base = 507$

$SPECrate^{®}2017\_fp\_peak = 534$

CPU2017 License: 6573		**Test Date:**	Apr-2023
Test Sponsor:	Dell Inc.	**Hardware Availability:**	May-2021
Tested by:	Dell Inc.	**Software Availability:**	Dec-2022

Compiler Version Notes (Continued)

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 -xCORE-AVX512 -Ofast -ffast-math`

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8358, 2.60 GHz)

SPECrate®2017_fp_base = 507

SPECrate®2017_fp_peak = 534

CPU2017 License: 6573		**Test Date:**	Apr-2023
Test Sponsor:	Dell Inc.	**Hardware Availability:**	May-2021
Tested by:	Dell Inc.	**Software Availability:**	Dec-2022

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:
```
-w -std=c++14 -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
-Wno-implicit-int -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 -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:
```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8358, 2.60 GHz)

SPECrate®2017_fp_base = 507

SPECrate®2017_fp_peak = 534

CPU2017 License: 6573		**Test Date:**	Apr-2023
Test Sponsor: Dell Inc.		**Hardware Availability:**	May-2021
Tested by: Dell Inc.		**Software Availability:**	Dec-2022

Peak Compiler Invocation (Continued)

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 -Wno-implicit-int -qopt-zmm-usage=high -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-w -std=c++14 -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:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `basepeak = yes`

(Continued on next page)

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Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8358, 2.60 GHz)

SPECrate®2017_fp_base = 507

SPECrate®2017_fp_peak = 534

CPU2017 License: 6573		**Test Date:**	Apr-2023
Test Sponsor:	Dell Inc.	**Hardware Availability:**	May-2021
Tested by:	Dell Inc.	**Software Availability:**	Dec-2022

Peak Optimization Flags (Continued)

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 -Wno-implicit-int -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: `-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate`(pass 1) `-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2`(pass 1) `-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

526.blender_r: `basepeak = yes`

Benchmarks using Fortran, C, and C++:
`-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -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-ic2023-official-linux64.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.4.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.4.xml

SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R650 (Intel Xeon Platinum 8358, 2.60 GHz)

$SPECrate®2017\_fp\_base = 507$

$SPECrate®2017\_fp\_peak = 534$

CPU2017 License:	6573	**Test Date:**	Apr-2023
Test Sponsor:	Dell Inc.	**Hardware Availability:**	May-2021
Tested by:	Dell Inc.	**Software Availability:**	Dec-2022

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

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