SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge MX760c (Intel Xeon Platinum 8480+)

$SPECrate^{®}2017\_fp\_base = 916$

$SPECrate^{®}2017\_fp\_peak = 984$

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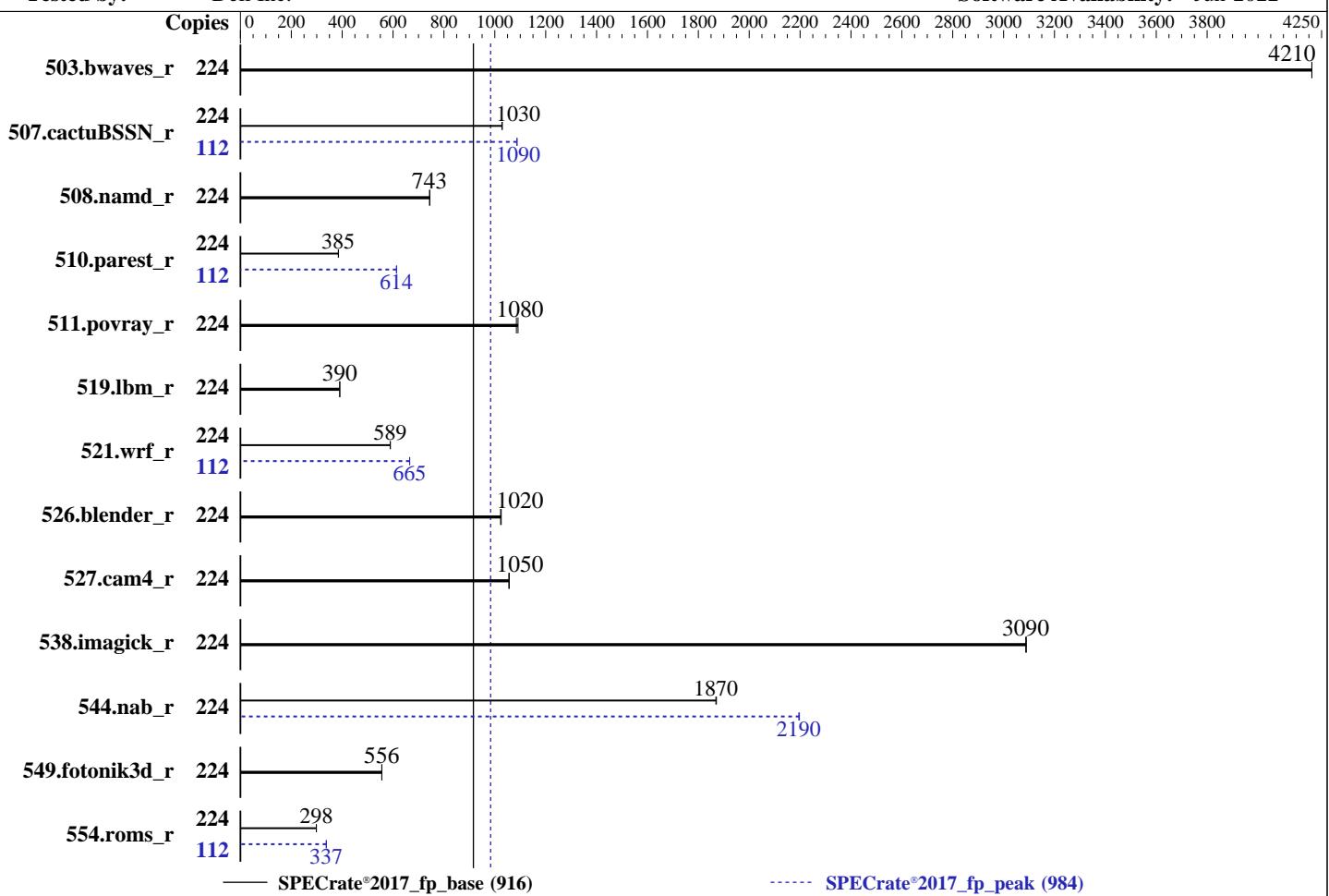**Test Sponsor:** Dell Inc.
Tested by: Dell Inc.

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

Benchmark results chart:

Benchmark	Copies	Base	Peak
503.bwaves_r	224	4210	
507.cactuBSSN_r	224 / 112	1030	1090
508.namd_r	224	743	
510.parest_r	224 / 112	385	614
511.povray_r	224	1080	
519.lbm_r	224	390	
521.wrf_r	224 / 112	589	665
526.blender_r	224	1020	
527.cam4_r	224	1050	
538.imagick_r	224	3090	
544.nab_r	224	1870	2190
549.fotonik3d_r	224	556	
554.roms_r	224 / 112	298	337

SPECrate®2017_fp_base (916) ----- SPECrate®2017_fp_peak (984)

Hardware

CPU Name: Intel Xeon Platinum 8480+
 Max MHz: 3800
 Nominal: 2000
Enabled: 112 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: 105 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 1.0.1 released Dec-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 Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
503.bwaves_r	224	**533**	**4210**	533	4210			224	**533**	**4210**	533	4210		
507.cactuBSSN_r	224	275	1030	**276**	**1030**			112	**130**	**1090**	130	1090		
508.namd_r	224	286	744	**286**	**743**			224	286	744	**286**	**743**		
510.parest_r	224	1520	385	**1523**	**385**			112	478	614	**478**	**614**		
511.povray_r	224	479	1090	**482**	**1080**			224	479	1090	**482**	**1080**		
519.lbm_r	224	**605**	**390**	604	391			224	**605**	**390**	604	391		
521.wrf_r	224	**852**	**589**	851	589			112	377	665	**377**	**665**		
526.blender_r	224	**334**	**1020**	333	1030			224	**334**	**1020**	333	1030		
527.cam4_r	224	371	1060	**371**	**1050**			224	371	1060	**371**	**1050**		
538.imagick_r	224	**180**	**3090**	180	3090			224	**180**	**3090**	180	3090		
544.nab_r	224	201	1870	**202**	**1870**			224	**172**	**2190**	172	2200		
549.fotonik3d_r	224	1570	556	**1571**	**556**			224	1570	556	**1571**	**556**		
554.roms_r	224	**1193**	**298**	1191	299			112	527	338	**527**	**337**		

SPECrate®2017_fp_base =	**916**
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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

(Continued on next page)

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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 21:58:25 2023

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

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Platform Notes (Continued)

```
    ---------------------------------------------------------------
    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. 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
       21:58:25 up  4:42,  1 user,  load average: 158.59, 207.95, 217.17
       USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
       root     tty1     -                17:19   4:38m  1.49s  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
```

(Continued on next page)

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CPU2017 License: 6573　　　　　　　　　　　　　　　**Test Date:**　　　　　　Jan-2023
Test Sponsor:　Dell Inc.　　　　　　　　　　　　**Hardware Availability:** Feb-2023
Tested by:　　　Dell Inc.　　　　　　　　　　　　**Software Availability:**　Jun-2022

Platform Notes (Continued)

```
    scheduling priority             (-e) 0
    file size              (blocks, -f) unlimited
    pending signals                 (-i) 4124342
    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) 4124342
    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=224 -c
      ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=112 --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=224 --configfile
      ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=112 --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 8480+
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
```

(Continued on next page)

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Platform Notes (Continued)

```
    microcode         : 0x2b000161
    bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores         : 56
    siblings          : 112
    2 physical ids (chips)
    224 processors (hardware threads)
    physical id 0: core ids 0-55
    physical id 1: core ids 0-55
    physical id 0: apicids 0-111
    physical id 1: apicids 128-239
  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):                       224
  On-line CPU(s) list:          0-223
  Vendor ID:                    GenuineIntel
  Model name:                   Intel(R) Xeon(R) Platinum 8480+
  CPU family:                   6
  Model:                        143
  Thread(s) per core:           2
  Core(s) per socket:           56
  Socket(s):                    2
  Stepping:                     8
  BogoMIPS:                     4000.00
  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_l1d arch_capabilities
  L1d cache:                 5.3 MiB (112 instances)
  L1i cache:                 3.5 MiB (112 instances)
  L2 cache:                  224 MiB (112 instances)
  L3 cache:                  210 MiB (2 instances)
  NUMA node(s):              8
  NUMA node0 CPU(s):         0,4,8,12,16,20,24,28,32,36,40,44,48,52,112,116,120,124,128,132,136,140,144
                             ,148,152,156,160,164
  NUMA node1 CPU(s):         56,60,64,68,72,76,80,84,88,92,96,100,104,108,168,172,176,180,184,188,192,1
                             96,200,204,208,212,216,220
  NUMA node2 CPU(s):         2,6,10,14,18,22,26,30,34,38,42,46,50,54,114,118,122,126,130,134,138,142,14
                             6,150,154,158,162,166
  NUMA node3 CPU(s):         58,62,66,70,74,78,82,86,90,94,98,102,106,110,170,174,178,182,186,190,194,1
                             98,202,206,210,214,218,222
  NUMA node4 CPU(s):         1,5,9,13,17,21,25,29,33,37,41,45,49,53,113,117,121,125,129,133,137,141,145
                             ,149,153,157,161,165
  NUMA node5 CPU(s):         57,61,65,69,73,77,81,85,89,93,97,101,105,109,169,173,177,181,185,189,193,1
                             97,201,205,209,213,217,221
  NUMA node6 CPU(s):         3,7,11,15,19,23,27,31,35,39,43,47,51,55,115,119,123,127,131,135,139,143,14
                             7,151,155,159,163,167
  NUMA node7 CPU(s):         59,63,67,71,75,79,83,87,91,95,99,103,107,111,171,175,179,183,187,191,195,1
                             99,203,207,211,215,219,223
 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     5.3M   12 Data             1      64        1             64
     L1i       32K     3.5M    8 Instruction      1      64        1             64
     L2         2M     224M   16 Unified          2    2048        1             64
     L3       105M     210M   15 Unified          3  114688        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: 0,4,8,12,16,20,24,28,32,36,40,44,48,52,112,116,120,124,128,132,136,140,144,148,152,156,160,164
  node 0 size: 128397 MB
  node 0 free: 104567 MB
  node 1 cpus:
```

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Platform Notes (Continued)

```
    56,60,64,68,72,76,80,84,88,92,96,100,104,108,168,172,176,180,184,188,192,196,200,204,208,212,216,220
    node 1 size: 129016 MB
    node 1 free: 117906 MB
    node 2 cpus:
    2,6,10,14,18,22,26,30,34,38,42,46,50,54,114,118,122,126,130,134,138,142,146,150,154,158,162,166
    node 2 size: 129016 MB
    node 2 free: 117855 MB
    node 3 cpus:
    58,62,66,70,74,78,82,86,90,94,98,102,106,110,170,174,178,182,186,190,194,198,202,206,210,214,218,222
    node 3 size: 128982 MB
    node 3 free: 117894 MB
   node 4 cpus: 1,5,9,13,17,21,25,29,33,37,41,45,49,53,113,117,121,125,129,133,137,141,145,149,153,157,161,165
    node 4 size: 129016 MB
    node 4 free: 117935 MB
    node 5 cpus:
    57,61,65,69,73,77,81,85,89,93,97,101,105,109,169,173,177,181,185,189,193,197,201,205,209,213,217,221
    node 5 size: 129016 MB
    node 5 free: 117929 MB
    node 6 cpus:
    3,7,11,15,19,23,27,31,35,39,43,47,51,55,115,119,123,127,131,135,139,143,147,151,155,159,163,167
    node 6 size: 129016 MB
    node 6 free: 117941 MB
    node 7 cpus:
    59,63,67,71,75,79,83,87,91,95,99,103,107,111,171,175,179,183,187,191,195,199,203,207,211,215,219,223
    node 7 size: 128642 MB
    node 7 free: 117551 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:       1055854112 kB


  ----------------------------------------------------------------
  10. who -r
    run-level 3 Jan 11 17:17


  ----------------------------------------------------------------
  11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
```

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Platform Notes (Continued)

```
  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 postfix purge-kernels rollback sshd wicked wickedd-auto4 wickedd-dhcp4
                          wickedd-dhcp6 wickedd-nanny
  enabled-runtime   systemd-remount-fs
  disabled          boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell ebtables
                       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=1d1ba11a-5385-4a23-a056-33a765172fa4
   splash=silent
   mitigations=auto
   quiet
   security=apparmor
   crashkernel=327M,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
```

(Continued on next page)

Dell Inc.

PowerEdge MX760c (Intel Xeon Platinum 8480+)

SPECrate®2017_fp_base = 916

SPECrate®2017_fp_peak = 984

CPU2017 License: 6573　　　　　　　　　　　　　　　　　　**Test Date:** Jan-2023
Test Sponsor: Dell Inc.　　　　　　　　　　　　　　　**Hardware Availability:** Feb-2023
Tested by: Dell Inc.　　　　　　　　　　　　　　　　**Software Availability:** Jun-2022

Platform Notes (Continued)

```
   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


   -------------------------------------------------------------
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   88G   38G  70% /mnt/ramdisk


   -------------------------------------------------------------
19. /sys/devices/virtual/dmi/id
     Vendor:         Dell Inc.
     Product:        PowerEdge MX760c
     Product Family: PowerEdge
     Serial:         SL6M702


   -------------------------------------------------------------
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:
     10x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
     5x 002C0632002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
     1x 00AD063200AD HMCG94MEBRA109N 64 GB 2 rank 4800
```

(Continued on next page)

Dell Inc.

SPECrate®2017_fp_base = 916

PowerEdge MX760c (Intel Xeon Platinum 8480+)

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CPU2017 License: 6573
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Test Date: Jan-2023
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Platform Notes (Continued)

```
   ----------------------------------------------------------------
   21. BIOS
   (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:       Dell Inc.
      BIOS Version:      1.0.1
      BIOS Date:         12/27/2022
      BIOS Revision:     1.0
```

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
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 2022.1.0 Build 20220316
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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
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,
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```

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SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge MX760c (Intel Xeon Platinum 8480+)

SPECrate®2017_fp_base = 916

SPECrate®2017_fp_peak = 984

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 (Continued)

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  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
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
  2022.1.0 Build 20220316
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
  2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
-------------------------------------------------------------------------
```

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
```

(Continued on next page)

Dell Inc.

PowerEdge MX760c (Intel Xeon Platinum 8480+)

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Software Availability: Jun-2022

Base Compiler Invocation (Continued)

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
-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
```

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SPEC CPU®2017 Floating Point Rate Result

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PowerEdge MX760c (Intel Xeon Platinum 8480+)

$SPECrate®2017\_fp\_base = 916$

$SPECrate®2017\_fp\_peak = 984$

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

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

Base Optimization Flags (Continued)

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
```

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
```

Standard Performance Evaluation Corporation (info@spec.org)

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SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge MX760c (Intel Xeon Platinum 8480+)

SPECrate®2017_fp_base = 916

SPECrate®2017_fp_peak = 984

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

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

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`
`-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`

(Continued on next page)

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Dell Inc.

PowerEdge MX760c (Intel Xeon Platinum 8480+)

SPECrate®2017_fp_base = 916

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CPU2017 License: 6573		**Test Date:**	Jan-2023
Test Sponsor: Dell Inc.		**Hardware Availability:** Feb-2023
Tested by: Dell Inc.		**Software Availability:** Jun-2022

Peak Optimization Flags (Continued)

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

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

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