SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

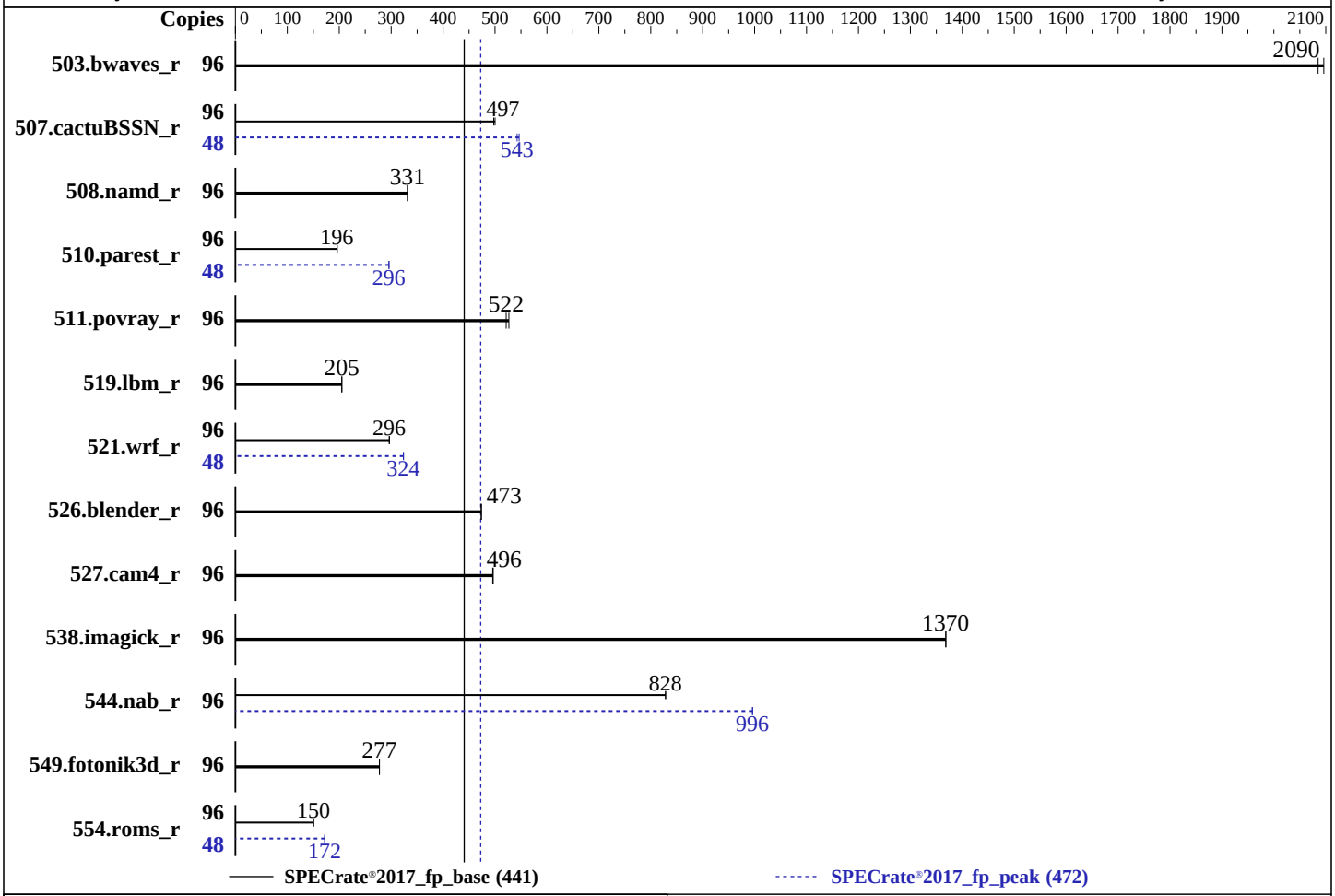
PowerEdge MX760c (Intel Xeon Platinum 8468V)

SPECrate®2017_fp_base = 441

SPECrate®2017_fp_peak = 472

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 8468V
Max MHz:	3800
Nominal:	2400
Enabled:	48 cores, 1 chip, 2 threads/core
Orderable:	1 chip
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	97.5 MB I+D on chip per chip
Other:	None
Memory:	512 GB (8 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							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	96	459	2100	**462**	**2090**			96	459	2100	**462**	**2090**		
507.cactuBSSN_r	96	**244**	**497**	243	500			48	111	546	**112**	**543**		
508.namd_r	96	275	332	**275**	**331**			96	275	332	**275**	**331**		
510.parest_r	96	**1282**	**196**	1281	196			48	**425**	**296**	424	296		
511.povray_r	96	**430**	**522**	426	527			96	**430**	**522**	426	527		
519.lbm_r	96	**494**	**205**	494	205			96	**494**	**205**	494	205		
521.wrf_r	96	725	297	**726**	**296**			48	332	324	**332**	**324**		
526.blender_r	96	309	474	**309**	**473**			96	309	474	**309**	**473**		
527.cam4_r	96	338	497	**339**	**496**			96	338	497	**339**	**496**		
538.imagick_r	96	**175**	**1370**	174	1370			96	**175**	**1370**	174	1370		
544.nab_r	96	**195**	**828**	195	829			96	**162**	**996**	162	996		
549.fotonik3d_r	96	**1349**	**277**	1348	277			96	**1349**	**277**	1348	277		
554.roms_r	96	1013	151	**1014**	**150**			48	**443**	**172**	443	172		

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SPECrate®2017_fp_peak = 472

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)

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 Mon Jan 16 04:24:51 2023

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

(Continued on next page)

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
   04:24:51 up  4:27,  1 user,  load average: 62.57, 87.57, 92.24
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -               23:58    4:26m  1.41s  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)

Platform Notes (Continued)

```
   scheduling priority             (-e) 0
   file size                 (blocks, -f) unlimited
   pending signals                 (-i) 2060208
   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) 2060208
   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=96 -c
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=48 --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=96 --configfile
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=48 --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 8468V
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
```

(Continued on next page)

Platform Notes (Continued)

```
     microcode       : 0x2b000161
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores       : 48
     siblings        : 96
     1 physical ids (chips)
     96 processors (hardware threads)
     physical id 0: core ids 0-47
     physical id 0: apicids 0-95
   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):                          96
    On-line CPU(s) list:             0-95
    Vendor ID:                       GenuineIntel
    Model name:                      Intel(R) Xeon(R) Platinum 8468V
    CPU family:                      6
    Model:                           143
    Thread(s) per core:              2
    Core(s) per socket:              48
    Socket(s):                       1
    Stepping:                        8
    BogoMIPS:                        4800.00
    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
                                    tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities
    L1d cache:                       2.3 MiB (48 instances)
```

(Continued on next page)

Platform Notes (Continued)

```
  L1i cache:                             1.5 MiB (48 instances)
  L2 cache:                              96 MiB (48 instances)
  L3 cache:                              97.5 MiB (1 instance)
  NUMA node(s):                          4
  NUMA node0 CPU(s):                     0,2,4,6,8,10,12,14,16,18,20,22,48,50,52,54,56,58,60,62,64,66,68,70
  NUMA node1 CPU(s):                     24,26,28,30,32,34,36,38,40,42,44,46,72,74,76,78,80,82,84,86,88,90,92,94
  NUMA node2 CPU(s):                     1,3,5,7,9,11,13,15,17,19,21,23,49,51,53,55,57,59,61,63,65,67,69,71
  NUMA node3 CPU(s):                     25,27,29,31,33,35,37,39,41,43,45,47,73,75,77,79,81,83,85,87,89,91,93,95
  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     2.3M   12 Data            1     64        1             64
      L1i       32K     1.5M    8 Instruction     1     64        1             64
      L2         2M      96M   16 Unified         2   2048        1             64
      L3      97.5M    97.5M   15 Unified         3 106496        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: 0,2,4,6,8,10,12,14,16,18,20,22,48,50,52,54,56,58,60,62,64,66,68,70
  node 0 size: 128363 MB
  node 0 free: 106298 MB
  node 1 cpus: 24,26,28,30,32,34,36,38,40,42,44,46,72,74,76,78,80,82,84,86,88,90,92,94
  node 1 size: 129017 MB
  node 1 free: 119362 MB
  node 2 cpus: 1,3,5,7,9,11,13,15,17,19,21,23,49,51,53,55,57,59,61,63,65,67,69,71
  node 2 size: 129017 MB
  node 2 free: 119336 MB
  node 3 cpus: 25,27,29,31,33,35,37,39,41,43,45,47,73,75,77,79,81,83,85,87,89,91,93,95
  node 3 size: 128675 MB
  node 3 free: 119026 MB
  node distances:
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
    2:  12  12  10  12
    3:  12  12  12  10
```

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Platform Notes (Continued)

```
------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       527436044 kB

------------------------------------------------------------
10. who -r
  run-level 3 Jan 15 23:57

------------------------------------------------------------
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
  disabled        blk-availability 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 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=4068cb7a-41a3-4eea-ab49-bc6f15bea24c
  splash=silent
  mitigations=auto
  quiet
  security=apparmor
  crashkernel=314M,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
```

(Continued on next page)

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

------------------------------------------------------------
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   43G   83G  35% /mnt/ramdisk

------------------------------------------------------------
19. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge MX760c
    Product Family: PowerEdge
    Serial:         SL6M701
```

(Continued on next page)

Platform Notes (Continued)

```
 ------------------------------------------------------------
 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:
     5x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
     1x 002C0632002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
     2x 002C069D002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800


 ------------------------------------------------------------
 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.
```

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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.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_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.
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

(Continued on next page)

Base Compiler Invocation (Continued)

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
-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

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Base Optimization Flags (Continued)

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

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
-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

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Peak Optimization Flags (Continued)

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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