



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

## Dell Inc.

### SPECrate®2017\_fp\_base = 839

### PowerEdge MX760c (Intel Xeon Platinum 8470N)

### SPECrate®2017\_fp\_peak = 897

CPU2017 License: 6573

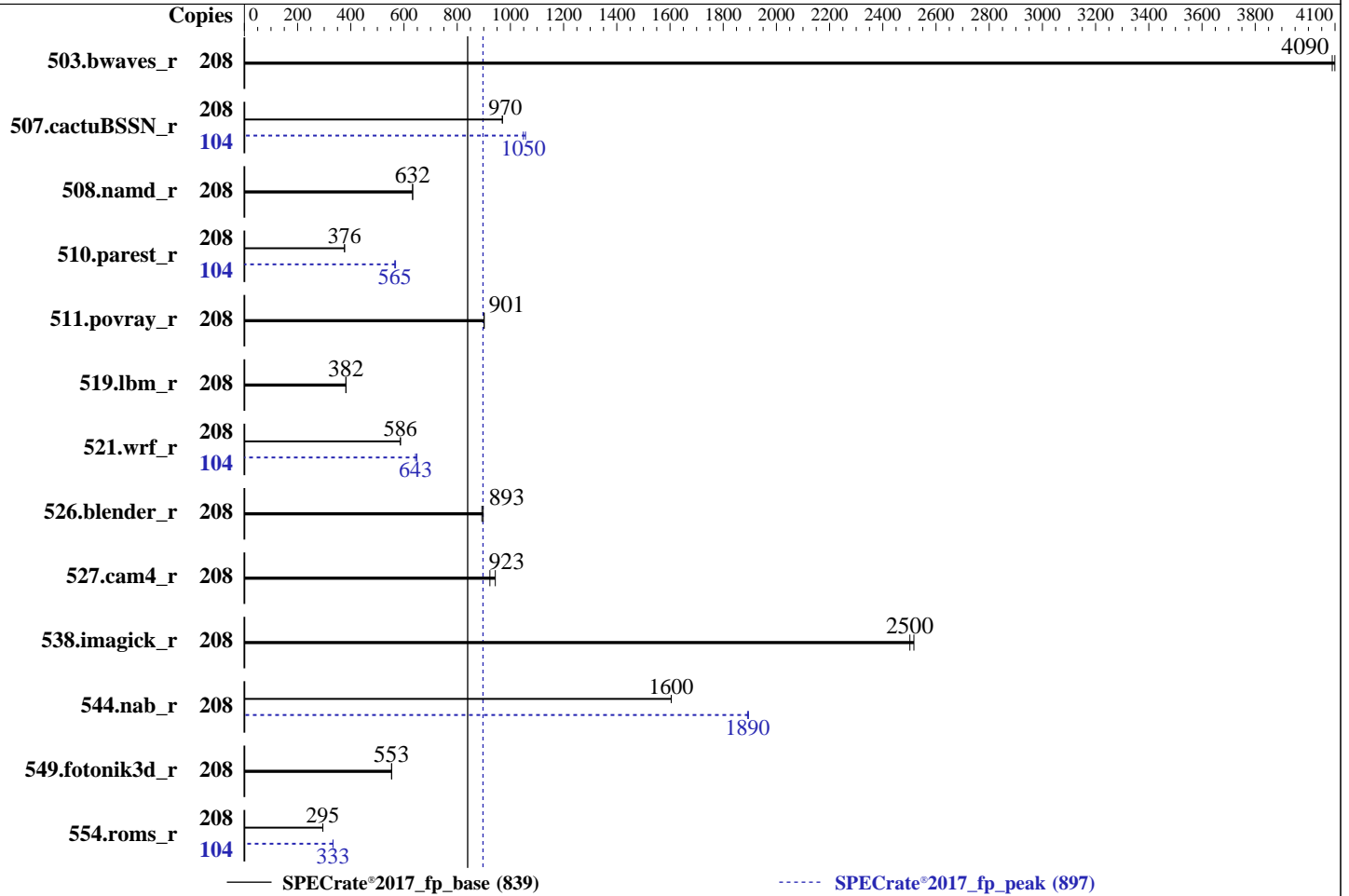
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2023

Hardware Availability: Feb-2023

Software Availability: Jun-2022



### Hardware

CPU Name: Intel Xeon Platinum 8470N  
 Max MHz: 3600  
 Nominal: 1700  
 Enabled: 104 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: 97.5 MB I+D on chip per chip  
 Other: None  
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 125 GB on tmpfs  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP4  
 5.14.21-150400.22-default  
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++  
 Compiler for Linux;  
 Fortran: Version 2022.1 of Intel Fortran Compiler  
 for Linux;  
 Parallel: No  
 Firmware: Version 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	208	<b><u>510</u></b>	<b><u>4090</u></b>	509	4100			208	<b><u>510</u></b>	<b><u>4090</u></b>	509	4100		
507.cactuBSSN_r	208	<b><u>272</u></b>	<b><u>970</u></b>	271	970			104	<b><u>126</u></b>	<b><u>1050</u></b>	125	1060		
508.namd_r	208	312	632	<b><u>312</u></b>	<b><u>632</u></b>			208	312	632	<b><u>312</u></b>	<b><u>632</u></b>		
510.parest_r	208	1445	377	<b><u>1446</u></b>	<b><u>376</u></b>			104	<b><u>481</u></b>	<b><u>565</u></b>	479	568		
511.povray_r	208	<b><u>539</u></b>	<b><u>901</u></b>	539	902			208	<b><u>539</u></b>	<b><u>901</u></b>	539	902		
519.lbm_r	208	574	382	<b><u>574</u></b>	<b><u>382</u></b>			208	574	382	<b><u>574</u></b>	<b><u>382</u></b>		
521.wrf_r	208	<b><u>795</u></b>	<b><u>586</u></b>	794	587			104	<b><u>362</u></b>	<b><u>643</u></b>	359	649		
526.blender_r	208	<b><u>355</u></b>	<b><u>893</u></b>	353	898			208	<b><u>355</u></b>	<b><u>893</u></b>	353	898		
527.cam4_r	208	<b><u>394</u></b>	<b><u>923</u></b>	386	943			208	<b><u>394</u></b>	<b><u>923</u></b>	386	943		
538.imagick_r	208	206	2520	<b><u>207</u></b>	<b><u>2500</u></b>			208	206	2520	<b><u>207</u></b>	<b><u>2500</u></b>		
544.nab_r	208	218	1600	<b><u>218</u></b>	<b><u>1600</u></b>			208	<b><u>185</u></b>	<b><u>1890</u></b>	185	1900		
549.fotonik3d_r	208	1464	553	<b><u>1465</u></b>	<b><u>553</u></b>			208	1464	553	<b><u>1465</u></b>	<b><u>553</u></b>		
554.roms_r	208	1120	295	<b><u>1121</u></b>	<b><u>295</u></b>			104	<b><u>496</u></b>	<b><u>333</u></b>	496	333		

SPECrate®2017\_fp\_base = **839**

SPECrate®2017\_fp\_peak = **897**

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

## Submit Notes

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

## Operating System Notes

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

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH =  
"/mnt/ramdisk/cpu2017-1.1.9-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2022.1/je5.0.1-64"  
MALLOC\_CONF = "retain:true"

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4  
Transparent Huge Pages enabled by default

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## General Notes (Continued)

Prior to runcpu invocation  
 Filesystem page cache synced and cleared with:  
 sync; echo 3> /proc/sys/vm/drop\_caches  
 runcpu command invoked through numactl i.e.:  
 numactl --interleave=all runcpu <etc>  
 jemalloc, a general purpose malloc implementation  
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  
 sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

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

## Platform Notes

BIOS settings:

```

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

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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2022.1/bin/sysinfo  
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
 running on localhost Sat Jan 14 01:12:34 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
01:12:34 up 5:30, 1 user, load average: 132.12, 188.79, 198.86
USER      TTY      FROM          LOGIN@      IDLE        JCPU      PCPU      WHAT
root      tty1     -             19:50      4:54m     1.56s    0.00s    /bin/bash ./dell-norun-specrate.sh
--iterations 2 --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
```

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

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

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## Platform Notes (Continued)

```

scheduling priority      (-e) 0
file size                (blocks, -f) unlimited
pending signals         (-i) 4124406
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) 4124406
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=208 -c
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=104 --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=208 --configfile
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=104 --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 8470N
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8

```

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## Platform Notes (Continued)

microcode : 0x2b000161  
bugs : spectre\_v1 spectre\_v2 spec\_store\_bypass swapgs  
cpu cores : 52  
siblings : 104  
2 physical ids (chips)  
208 processors (hardware threads)  
physical id 0: core ids 0-51  
physical id 1: core ids 0-51  
physical id 0: apicids 0-103  
physical id 1: apicids 128-231

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): 208  
On-line CPU(s) list: 0-207  
Vendor ID: GenuineIntel  
Model name: Intel(R) Xeon(R) Platinum 8470N  
CPU family: 6  
Model: 143  
Thread(s) per core: 2  
Core(s) per socket: 52  
Socket(s): 2  
Stepping: 8  
BogoMIPS: 3400.00

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant\_tsc art arch\_perfmon pebs bts rep\_good nopl xtopology nonstop\_tsc cpuid aperfmperf tsc\_known\_freq pni pclmulqdq dtes64 monitor ds\_cpl smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer aes xsave avx f16c rdrand lahf\_lm abm 3dnowprefetch cpuid\_fault epb cat\_l3 cat\_l2 cdp\_l3 invpcid\_single cdp\_l2 ssbd mba ibrs ibpb stibp ibrs\_enhanced fsgsbase tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt\_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel\_pt avx512cd sha\_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total cqm\_mbm\_local split\_lock\_detect avx\_vnni avx512\_bf16 wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku ospke waitpkg avx512\_vbmi2 gfni vaes vpclmulqdq avx512\_vnni avx512\_bitalg tme avx512\_vpopcntdq la57 rdpid bus\_lock\_detect cldemote movdiri movdir64b enqcmd fsrm md\_clear serialize

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### Platform Notes (Continued)

```

tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_llid arch_capabilities
L1d cache:          4.9 MiB (104 instances)
L1i cache:          3.3 MiB (104 instances)
L2 cache:           208 MiB (104 instances)
L3 cache:           195 MiB (2 instances)
NUMA node(s):       8
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,104,108,112,116,120,124,128,132,136,140,144,148,152
NUMA node1 CPU(s): 52,56,60,64,68,72,76,80,84,88,92,96,100,156,160,164,168,172,176,180,184,188,192,196,200,204
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,106,110,114,118,122,126,130,134,138,142,146,150,154
NUMA node3 CPU(s): 54,58,62,66,70,74,78,82,86,90,94,98,102,158,162,166,170,174,178,182,186,190,194,198,202,206
NUMA node4 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,105,109,113,117,121,125,129,133,137,141,145,149,153
NUMA node5 CPU(s): 53,57,61,65,69,73,77,81,85,89,93,97,101,157,161,165,169,173,177,181,185,189,193,197,201,205
NUMA node6 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,107,111,115,119,123,127,131,135,139,143,147,151,155
NUMA node7 CPU(s): 55,59,63,67,71,75,79,83,87,91,95,99,103,159,163,167,171,175,179,183,187,191,195,199,203,207
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/swaps 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	4.9M	12	Data	1	64	1	64
L1i	32K	3.3M	8	Instruction	1	64	1	64
L2	2M	208M	16	Unified	2	2048	1	64
L3	97.5M	195M	15	Unified	3	106496	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: 0,4,8,12,16,20,24,28,32,36,40,44,48,104,108,112,116,120,124,128,132,136,140,144,148,152

node 0 size: 128397 MB

node 0 free: 113170 MB

node 1 cpus: 52,56,60,64,68,72,76,80,84,88,92,96,100,156,160,164,168,172,176,180,184,188,192,196,200,204

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## Platform Notes (Continued)

```

node 1 size: 129017 MB
node 1 free: 118732 MB
node 2 cpus: 2,6,10,14,18,22,26,30,34,38,42,46,50,106,110,114,118,122,126,130,134,138,142,146,150,154
node 2 size: 129017 MB
node 2 free: 118715 MB
node 3 cpus: 54,58,62,66,70,74,78,82,86,90,94,98,102,158,162,166,170,174,178,182,186,190,194,198,202,206
node 3 size: 129017 MB
node 3 free: 118722 MB
node 4 cpus: 1,5,9,13,17,21,25,29,33,37,41,45,49,105,109,113,117,121,125,129,133,137,141,145,149,153
node 4 size: 129017 MB
node 4 free: 110945 MB
node 5 cpus: 53,57,61,65,69,73,77,81,85,89,93,97,101,157,161,165,169,173,177,181,185,189,193,197,201,205
node 5 size: 128982 MB
node 5 free: 118658 MB
node 6 cpus: 3,7,11,15,19,23,27,31,35,39,43,47,51,107,111,115,119,123,127,131,135,139,143,147,151,155
node 6 size: 129017 MB
node 6 free: 118695 MB
node 7 cpus: 55,59,63,67,71,75,79,83,87,91,95,99,103,159,163,167,171,175,179,183,187,191,195,199,203,207
node 7 size: 128656 MB
node 7 free: 118353 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:      1055870632 kB

```

```

-----
10. who -r
run-level 3 Jan 13 19:42

```

```

-----
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

```

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## Platform Notes (Continued)

```

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
              ebttables 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-sysexit 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
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

```

(Continued on next page)



# SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

SPECrate®2017\_fp\_base = 839

PowerEdge MX760c (Intel Xeon Platinum 8470N)

SPECrate®2017\_fp\_peak = 897

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

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

## Platform Notes (Continued)

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 82G 44G 66% /mnt/ramdisk

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

-----  
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:  
12x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800  
1x 002C0632002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800  
3x 002C069D002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800

-----  
21. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: Dell Inc.

(Continued on next page)



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## Platform Notes (Continued)

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

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

```

=====
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
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=====

```

## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx



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## 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

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

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Hardware Availability: Feb-2023

Software Availability: Jun-2022

## Base Optimization Flags (Continued)

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
```

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## Peak Optimization Flags (Continued)

544.nab\_r (continued):

```
-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

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
```



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**Test Date:** Jan-2023

**Hardware Availability:** Feb-2023

**Software Availability:** Jun-2022

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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