



SPEC CPU®2017 Floating Point Speed Result

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Dell Inc.

SPECspeed®2017_fp_base = 225

PowerEdge R650 (Intel Xeon Gold 6338N, 2.20 GHz)

SPECspeed®2017_fp_peak = 225

CPU2017 License: 6573

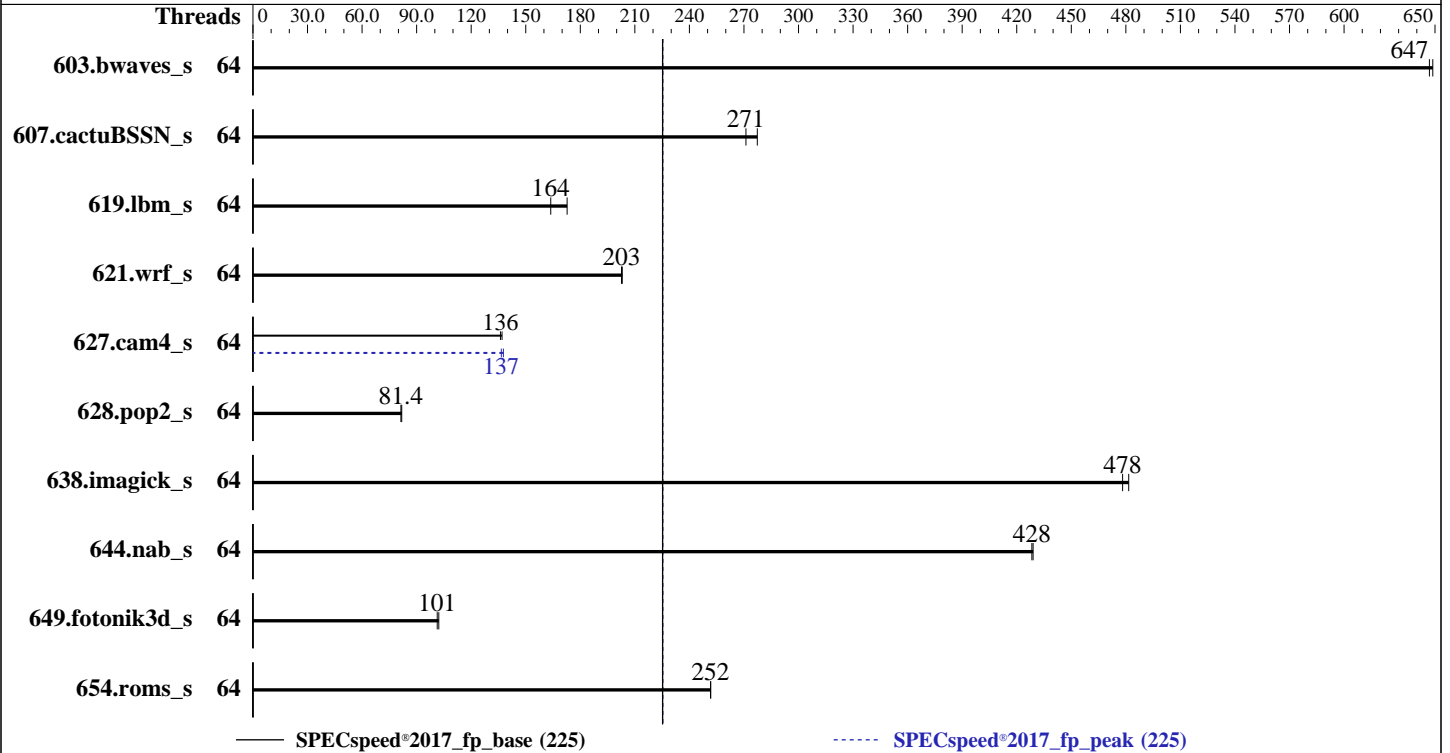
Test Date: May-2023

Test Sponsor: Dell Inc.

Hardware Availability: May-2021

Tested by: Dell Inc.

Software Availability: Dec-2022



Hardware

CPU Name: Intel Xeon Gold 6338N
 Max MHz: 3500
 Nominal: 2200
 Enabled: 64 cores, 2 chips
 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, running at 2666)
 Storage: 60 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: Yes
 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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Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	64	<u>91.2</u>	<u>647</u>	90.9	649			64	<u>91.2</u>	<u>647</u>	90.9	649		
607.cactuBSSN_s	64	<u>61.5</u>	<u>271</u>	60.1	277			64	<u>61.5</u>	<u>271</u>	60.1	277		
619.lbm_s	64	30.3	173	<u>32.0</u>	<u>164</u>			64	30.3	173	<u>32.0</u>	<u>164</u>		
621.wrf_s	64	<u>65.3</u>	<u>203</u>	65.1	203			64	<u>65.3</u>	<u>203</u>	65.1	203		
627.cam4_s	64	64.7	137	<u>65.1</u>	<u>136</u>			64	64.4	138	<u>64.9</u>	<u>137</u>		
628.pop2_s	64	<u>146</u>	<u>81.4</u>	145	81.8			64	<u>146</u>	<u>81.4</u>	145	81.8		
638.imagick_s	64	<u>30.2</u>	<u>478</u>	30.0	482			64	<u>30.2</u>	<u>478</u>	30.0	482		
644.nab_s	64	<u>40.8</u>	<u>428</u>	40.7	429			64	<u>40.8</u>	<u>428</u>	40.7	429		
649.fotonik3d_s	64	<u>90.0</u>	<u>101</u>	89.2	102			64	<u>90.0</u>	<u>101</u>	89.2	102		
654.roms_s	64	62.5	252	<u>62.6</u>	<u>252</u>			64	62.5	252	<u>62.6</u>	<u>252</u>		

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

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:
KMP_AFFINITY = "granularity=fine,compact"
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"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Redhat Enterprise Linux 8.0
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
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 60 GB ramdisk created with the cmd: "mount -t tmpfs -o size=60G tmpfs /mnt/ramdisk"



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Platform Notes

BIOS settings:

```

      ADDDC Setting : Disabled
      DIMM Self Healing on
Uncorrectable Memory Error : Disabled
      Logical Processor : Disabled
      Virtualization Technology : 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 Thu May 25 04:26:06 2023

```

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

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- ```

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
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
 04:26:06 up 2:42, 1 user, load average: 5.29, 5.78, 3.43
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT

```

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## Platform Notes (Continued)

```
root tty1 - 01:49 2:36m 1.63s 0.00s /bin/bash ./dell-run-speccpu.sh speed
--define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-LogProcD=1 --define DL-BIOS-adddcD=1 --define
DL-BIOS-VirtD=1 --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) 4125414
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) 4125414
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_speed.sh
/bin/bash ./dell-run-main.sh speed
/bin/bash ./dell-run-main.sh speed
/bin/bash ./dell-run-speccpu.sh speed --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-LogProcD=1
--define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --output_format csv,html,pdf,txt
/bin/bash ./dell-run-speccpu.sh speed --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-LogProcD=1
--define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --output_format csv,html,pdf,txt
runcpu --nobuild --action validate --define default-platform-flags -c
ic2023.0-lin-core-avx512-speed-20221201.cfg --define cores=64 --tune base,peak -o all --define drop_caches
--iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-LogProcD=1 --define
DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --output_format csv,html,pdf,txt fpspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
ic2023.0-lin-core-avx512-speed-20221201.cfg --define cores=64 --tune base,peak --output_format all
--define drop_caches --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-3.inc --define DL-BIOS-LogProcD=1
--define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --output_format csv,html,pdf,txt --nopower --runmode
speed --tune base:peak --size refspeed fpspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.002/templogs/preenv.fpspeed.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) Gold 6338N CPU @ 2.20GHz
vendor_id : GenuineIntel
cpu family : 6
model : 106
stepping : 6
microcode : 0xd000389
```

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## Platform Notes (Continued)

```
bugs : spectre_v1 spectre_v2 spec_store_bypass swappg
cpu cores : 32
siblings : 32
2 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-31
physical id 1: core ids 0-31
physical id 0: apicids
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62
physical id 1: apicids
128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
80,182,184,186,188,190
```

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): 64
On-line CPU(s) list: 0-63
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz
CPU family: 6
Model: 106
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 2
Stepping: 6
CPU max MHz: 3500.0000
CPU min MHz: 800.0000
BogoMIPS: 4400.00
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
 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): 2
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,5
2,54,56,58,60,62
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,5
3,55,57,59,61,63
```

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### Platform Notes (Continued)

|                                  |                                                                     |
|----------------------------------|---------------------------------------------------------------------|
| 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      | 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: 2 nodes (0-1)
node 0 cpus: 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62
node 0 size: 515317 MB
node 0 free: 514423 MB
node 1 cpus: 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63
node 1 size: 516058 MB
node 1 free: 506560 MB
node distances:
node 0 1
 0: 10 20
 1: 20 10

```

9. /proc/meminfo

MemTotal: 1056129372 kB

10. who -r

run-level 3 May 25 01:44

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 wicked-dhcp4 wicked-dhcp6 wickedd-nanny                                                                                                                                                                                                                                |
| enabled-runtime | systemd-remount-fs                                                                                                                                                                                                                                                                                                                                                                                                   |
| disabled        | bmc-snmpproxy boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell ebttables 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                                                                                                                                                                                                                                                                                                                                                                                                              |

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## Platform Notes (Continued)

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

```
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=0b46c224-29bd-4ee7-ala0-fda5256c0c9a
splash=silent
mitigations=auto
quiet
security=apparmor
```

14. cpupower frequency-info

```
analyzing CPU 0:
 current policy: frequency should be within 800 MHz and 3.50 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
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+madvice [madvice] never
enabled [always] madvice 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
```

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## Platform Notes (Continued)

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 | 60G  | 4.2G | 56G   | 7%   | /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, configured at 2666  
 12x 00AD063200AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200, configured at 2666  
 1x 00AD069D00AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200, configured at 2666  
 2x 00CE063200CE M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666

### 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 | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak) 644.nab\_s(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, Fortran | 607.cactuBSSN\_s(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 | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak) 654.roms\_s(base, peak)

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SPECspeed®2017\_fp\_peak = 225

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: May-2023

Hardware Availability: May-2021

Software Availability: Dec-2022

## Compiler Version Notes (Continued)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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-----  
Fortran, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_s(base, peak)  
-----

Intel(R) Fortran 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  
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-----

## Base Compiler Invocation

C benchmarks:

icx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Base Portability Flags

603.bwaves\_s: -DSPEC\_LP64  
607.cactuBSSN\_s: -DSPEC\_LP64  
619.lbm\_s: -DSPEC\_LP64  
621.wrf\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
627.cam4\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG  
628.pop2\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
-assume byterecl  
638.imagick\_s: -DSPEC\_LP64  
644.nab\_s: -DSPEC\_LP64  
649.fotonik3d\_s: -DSPEC\_LP64  
654.roms\_s: -DSPEC\_LP64



# SPEC CPU®2017 Floating Point Speed Result

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## Base Optimization Flags

C benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

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

Benchmarks using Fortran, C, and C++:

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

## Peak Compiler Invocation

C benchmarks:

icx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx



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Software Availability: Dec-2022

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: basepeak = yes

638.imagick\_s: basepeak = yes

644.nab\_s: basepeak = yes

Fortran benchmarks:

603.bwaves\_s: basepeak = yes

649.fotonik3d\_s: basepeak = yes

654.roms\_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf\_s: basepeak = yes

627.cam4\_s: -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC\_OPENMP  
-Wno-implicit-int -nostandard-realloc-lhs  
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib  
-ljemalloc

628.pop2\_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN\_s: basepeak = yes

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>



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**Software Availability:** Dec-2022

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>

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