



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate®2017\_fp\_base = 696

PowerEdge C6620 (Intel Xeon Platinum 8452Y)

SPECrate®2017\_fp\_peak = 736

CPU2017 License: 6573

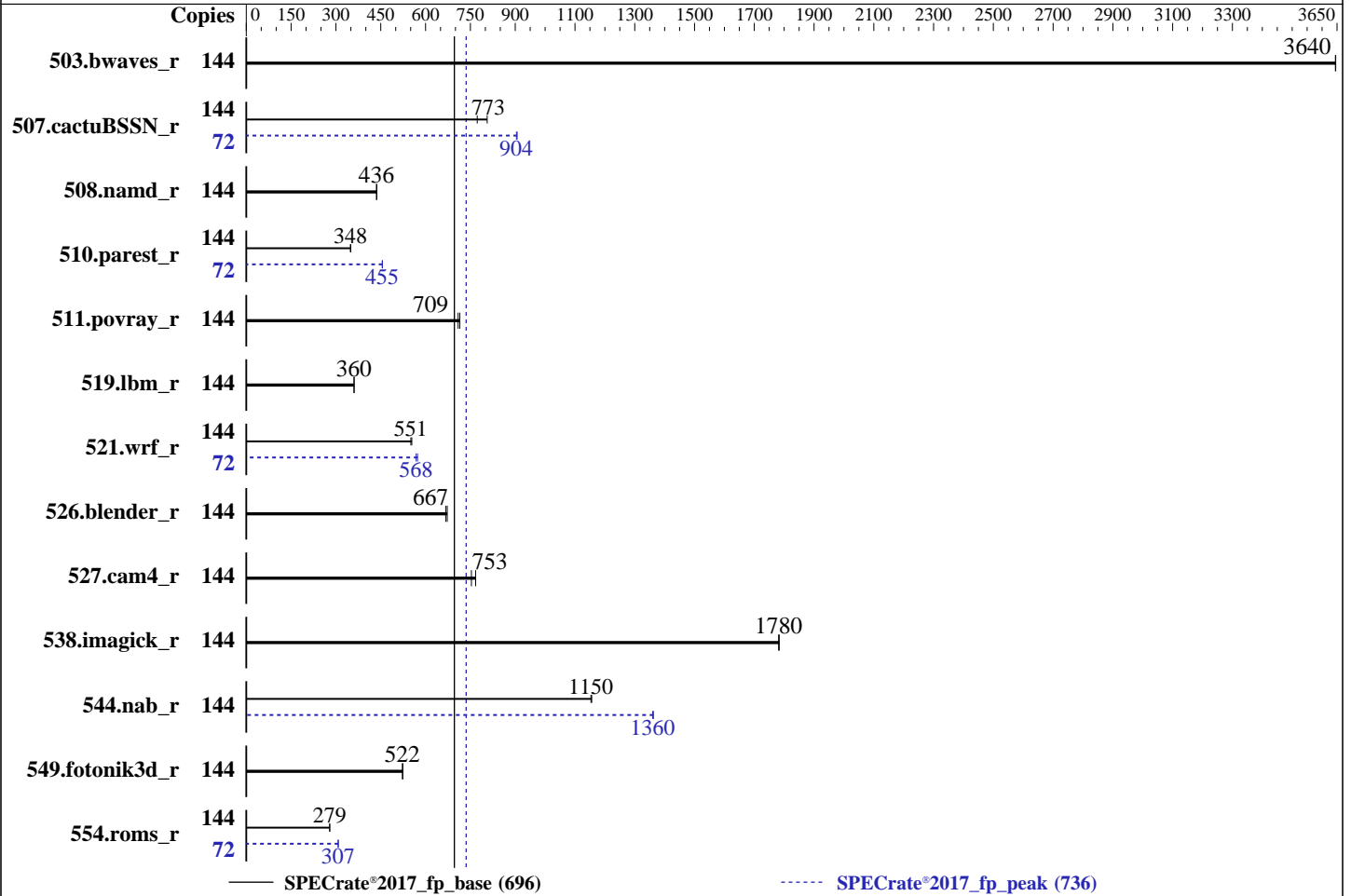
Test Date: Jan-2023

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2023

Tested by: Dell Inc.

Software Availability: May-2022



### Hardware

CPU Name: Intel Xeon Platinum 8452Y  
 Max MHz: 3200  
 Nominal: 2000  
 Enabled: 72 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: 67.5 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: Red Hat Enterprise Linux 8.6 (Ootpa)  
 4.18.0-372.9.1.el8.x86\_64  
 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 0.3.1 released Nov-2022  
 File System: tmpfs  
 System State: Run level 5 (graphical 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    | 144    | 396               | 3650              | <b><u>396</u></b>  | <b><u>3640</u></b> |         |       | 144    | 396               | 3650               | <b><u>396</u></b>  | <b><u>3640</u></b> |         |       |
| 507.cactuBSSN_r | 144    | 226               | 806               | <b><u>236</u></b>  | <b><u>773</u></b>  |         |       | 72     | 101               | 906                | <b><u>101</u></b>  | <b><u>904</u></b>  |         |       |
| 508.namd_r      | 144    | <b><u>314</u></b> | <b><u>436</u></b> | 313                | 437                |         |       | 144    | <b><u>314</u></b> | <b><u>436</u></b>  | 313                | 437                |         |       |
| 510.parest_r    | 144    | 1077              | 350               | <b><u>1081</u></b> | <b><u>348</u></b>  |         |       | 72     | 413               | 456                | <b><u>414</u></b>  | <b><u>455</u></b>  |         |       |
| 511.povray_r    | 144    | 470               | 715               | <b><u>474</u></b>  | <b><u>709</u></b>  |         |       | 144    | 470               | 715                | <b><u>474</u></b>  | <b><u>709</u></b>  |         |       |
| 519.lbm_r       | 144    | 420               | 361               | <b><u>421</u></b>  | <b><u>360</u></b>  |         |       | 144    | 420               | 361                | <b><u>421</u></b>  | <b><u>360</u></b>  |         |       |
| 521.wrf_r       | 144    | <b><u>586</u></b> | <b><u>551</u></b> | 582                | 554                |         |       | 72     | 281               | 573                | <b><u>284</u></b>  | <b><u>568</u></b>  |         |       |
| 526.blender_r   | 144    | <b><u>329</u></b> | <b><u>667</u></b> | 326                | 673                |         |       | 144    | <b><u>329</u></b> | <b><u>667</u></b>  | 326                | 673                |         |       |
| 527.cam4_r      | 144    | 328               | 768               | <b><u>334</u></b>  | <b><u>753</u></b>  |         |       | 144    | 328               | 768                | <b><u>334</u></b>  | <b><u>753</u></b>  |         |       |
| 538.imagick_r   | 144    | 201               | 1780              | <b><u>201</u></b>  | <b><u>1780</u></b> |         |       | 144    | 201               | 1780               | <b><u>201</u></b>  | <b><u>1780</u></b> |         |       |
| 544.nab_r       | 144    | 210               | 1160              | <b><u>210</u></b>  | <b><u>1150</u></b> |         |       | 144    | <b><u>178</u></b> | <b><u>1360</u></b> | 178                | 1360               |         |       |
| 549.fotonik3d_r | 144    | 1071              | 524               | <b><u>1074</u></b> | <b><u>522</u></b>  |         |       | 144    | 1071              | 524                | <b><u>1074</u></b> | <b><u>522</u></b>  |         |       |
| 554.roms_r      | 144    | <b><u>820</u></b> | <b><u>279</u></b> | 819                | 279                |         |       | 72     | 371               | 308                | <b><u>372</u></b>  | <b><u>307</u></b>  |         |       |

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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

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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 1 Mon Jan 23 14:00:20 2023

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

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## Platform Notes (Continued)

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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 239 (239-58.el8)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent\_hugepage
19. /sys/kernel/mm/transparent\_hugepage/khugepaged
20. OS release
21. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
22. Disk information
23. /sys/devices/virtual/dmi/id
24. dmidecode
25. BIOS

```
1. uname -a
Linux 1 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
14:00:21 up 4:33, 1 user, load average: 91.46, 130.99, 138.34
USER      TTY      FROM          LOGIN@      IDLE       JCPU      PCPU      WHAT
donald    :1        :1            09:29      ?xdm?      1:46      0.00s    /usr/libexec/gdm-x-session
--register-session --run-script gnome-session
```

```
3. Username
From environment variable $USER:  root
From the command 'logname':      donald
```

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## Platform Notes (Continued)

```

4. ulimit -a
   core file size          (blocks, -c) 0
   data seg size          (kbytes, -d) unlimited
   scheduling priority     (-e) 0
   file size              (blocks, -f) unlimited
   pending signals        (-i) 4124969
   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) 4124969
   virtual memory         (kbytes, -v) unlimited
   file locks             (-x) unlimited

```

```

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 18
/usr/lib/systemd/systemd --user
/usr/libexec/gnome-terminal-server
bash
sudo su
su
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=144 -c
ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=72 --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=144 --configfile
ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=72 --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/templates/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-ic2022.1

```

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## Platform Notes (Continued)

```

6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Platinum 8452Y
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 8
   microcode       : 0x2b000111
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores       : 36
   siblings        : 72
   2 physical ids (chips)
   144 processors (hardware threads)
   physical id 0: core ids 0-35
   physical id 1: core ids 0-35
   physical id 0: apicids 0-71
   physical id 1: apicids 128-199

```

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 2.32.1:
Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
Byte Order:        Little Endian
CPU(s):            144
On-line CPU(s) list: 0-143
Thread(s) per core: 2
Core(s) per socket: 36
Socket(s):         2
NUMA node(s):     8
Vendor ID:         GenuineIntel
BIOS Vendor ID:   Intel
CPU family:        6
Model:            143
Model name:        Intel(R) Xeon(R) Platinum 8452Y
BIOS Model name:   Intel(R) Xeon(R) Platinum 8452Y
Stepping:         8
CPU MHz:          2000.000
BogoMIPS:          4000.00
L1d cache:        48K
L1i cache:        32K
L2 cache:         2048K
L3 cache:         69120K

```

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## Platform Notes (Continued)

NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,72,76,80,84,88,92,96,100,104  
 NUMA node1 CPU(s): 36,40,44,48,52,56,60,64,68,108,112,116,120,124,128,132,136,140  
 NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,74,78,82,86,90,94,98,102,106  
 NUMA node3 CPU(s): 38,42,46,50,54,58,62,66,70,110,114,118,122,126,130,134,138,142  
 NUMA node4 CPU(s): 1,5,9,13,17,21,25,29,33,73,77,81,85,89,93,97,101,105  
 NUMA node5 CPU(s): 37,41,45,49,53,57,61,65,69,109,113,117,121,125,129,133,137,141  
 NUMA node6 CPU(s): 3,7,11,15,19,23,27,31,35,75,79,83,87,91,95,99,103,107  
 NUMA node7 CPU(s): 39,43,47,51,55,59,63,67,71,111,115,119,123,127,131,135,139,143

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  
 fl6c 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  
 avx2 smep bmi2 erms invpcid 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\_lld arch\_capabilities

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```
available: 8 nodes (0-7)
node 0 cpus: 0,4,8,12,16,20,24,28,32,72,76,80,84,88,92,96,100,104
node 0 size: 128174 MB
node 0 free: 115968 MB
node 1 cpus: 36,40,44,48,52,56,60,64,68,108,112,116,120,124,128,132,136,140
node 1 size: 129019 MB
node 1 free: 122141 MB
node 2 cpus: 2,6,10,14,18,22,26,30,34,74,78,82,86,90,94,98,102,106
node 2 size: 129019 MB
node 2 free: 121894 MB
node 3 cpus: 38,42,46,50,54,58,62,66,70,110,114,118,122,126,130,134,138,142
node 3 size: 129019 MB
node 3 free: 122176 MB
node 4 cpus: 1,5,9,13,17,21,25,29,33,73,77,81,85,89,93,97,101,105
node 4 size: 129019 MB
node 4 free: 118732 MB
node 5 cpus: 37,41,45,49,53,57,61,65,69,109,113,117,121,125,129,133,137,141
node 5 size: 129019 MB
node 5 free: 120789 MB
node 6 cpus: 3,7,11,15,19,23,27,31,35,75,79,83,87,91,95,99,103,107
node 6 size: 129019 MB
```

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```

node 6 free: 120102 MB
node 7 cpus: 39,43,47,51,55,59,63,67,71,111,115,119,123,127,131,135,139,143
node 7 size: 129008 MB
node 7 free: 121140 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:          1056053008 kB

```

```

-----
10. who -r
    run-level 5 Jan 23 09:29

```

```

-----
11. Systemd service manager version: systemd 239 (239-58.el8)
    Default Target  Status
    graphical      degraded

```

```

-----
12. Failed units, from systemctl list-units --state=failed
    UNIT                                LOAD  ACTIVE SUB    DESCRIPTION
* systemd-udev-settle.service loaded failed failed udev Wait for Complete Device Initialization

```

```

-----
13. Services, from systemctl list-unit-files
    STATE  UNIT FILES
enabled  ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon
        atd auditd autovt@ avahi-daemon bluetooth chronyd crond cups display-manager firewalld gdm getty@
        import-state insights-client-boot irqbalance iscsi iscsi-onboot kdump ksm ksmtuned libstoragemgmt
        libvirtfd loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
        nvme-fc-boot-connections ostree-remount qemu-guest-agent rhsmcertd rpcbind rsyslog rtkit-daemon
        selinux-autorelabel-mark smartd sshd sssd syslog timedatex tuned udisks2 vdo vgauthd vmtoolsd
disabled arp-ethers blk-availability brltyt canberra-system-bootup canberra-system-shutdown
        canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
        debug-shell dnsmasq ebttables gssproxy hwloc-dump-hwdata initial-setup
        initial-setup-reconfiguration iprddump iprinit iprupdate iscsid iscsiuiop kpatch kvm_stat ledmon
        libvirt-guests man-db-restart-cache-update ndctl-monitor netcf-transaction nfs-blkmap nfs-convert

```

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## Platform Notes (Continued)

```
nfs-server nftables numad nvme-autoconnect oddjobd podman podman-auto-update podman-restart
psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts saslauthd serial-getty@ speech-dispatcherd
sshd-keygen@ switcheroo-control systemd-nspawn@ systemd-resolved tcspd upower virtinterfaced
virtnetworkd virtnodedevd virtnwfilterd virtproxyd virtqemu virtsecret virtstoraged
wpa_supplicant
indirect spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo virtlockd
virtlogd
masked systemd-timedated
```

```
-----
14. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-4.18.0-372.9.1.el8.x86_64
root=/dev/mapper/rhel-root
ro
crashkernel=auto
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
rhgb
quiet
```

```
-----
15. cpupower frequency-info
analyzing CPU 0:
  Unable to determine current policy
  boost state support:
    Supported: yes
    Active: yes
```

```
-----
16. tuned-adm active
  Current active profile: throughput-performance
```

```
-----
17. sysctl
kernel.numa_balancing 1
kernel.randomize_va_space 2
vm.compaction_proactiveness 0
vm.dirty_background_bytes 0
vm.dirty_background_ratio 10
vm.dirty_bytes 0
vm.dirty_expire_centisecs 3000
vm.dirty_ratio 40
vm.dirty_writeback_centisecs 500
vm.dirtytime_expire_seconds 43200
vm.extfrag_threshold 500
vm.min_unmapped_ratio 1
```

(Continued on next page)



# SPEC CPU®2017 Floating Point Rate Result

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SPECrate®2017\_fp\_base = 696

PowerEdge C6620 (Intel Xeon Platinum 8452Y)

SPECrate®2017\_fp\_peak = 736

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

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

## Platform Notes (Continued)

```

vm.nr_hugepages                0
vm.nr_hugepages_mempolicy      0
vm.nr_overcommit_hugepages    0
vm.swappiness                   10
vm.watermark_boost_factor     15000
vm.watermark_scale_factor      10
vm.zone_reclaim_mode          0

```

```

-----
18. /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

```

```

-----
19. /sys/kernel/mm/transparent_hugepage/khugepaged
alloc_sleep_millisecs  60000
defrag                  1
max_ptes_none          511
max_ptes_swap          64
pages_to_scan          4096
scan_sleep_millisecs  10000

```

```

-----
20. OS release
From /etc/*-release /etc/*-version
os-release             Red Hat Enterprise Linux 8.6 (Ootpa)
redhat-release         Red Hat Enterprise Linux release 8.6 (Ootpa)
system-release         Red Hat Enterprise Linux release 8.6 (Ootpa)

```

```

-----
21. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
itlb_multihit         Not affected
l1tf                   Not affected
mds                    Not affected
meltdown               Not affected
spec_store_bypass     Mitigation: Speculative Store Bypass disabled via prctl and seccomp
spectre_v1             Mitigation: usercopy/swapgs barriers and __user pointer sanitization
spectre_v2            Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
srbds                  Not affected
tsx_async_abort        Not affected

```

For more information, see the Linux documentation on hardware vulnerabilities, for example <https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html>

-----  
22. Disk information

(Continued on next page)



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## Platform Notes (Continued)

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2022.1  
Filesystem Type Size Used Avail Use% Mounted on  
tmpfs tmpfs 125G 60G 66G 48% /mnt/ramdisk

-----  
23. /sys/devices/virtual/dmi/id  
Vendor: Dell Inc.  
Product: PowerEdge C6620  
Product Family: PowerEdge  
Serial: SL6C201  
-----

24. dmidecode  
Additional information from dmidecode 3.3 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:  
15x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800  
1x 002C0632002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800  
-----

25. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: Dell Inc.  
BIOS Version: 0.3.1  
BIOS Date: 11/24/2022  
BIOS Revision: 0.3  
-----

## Compiler Version Notes

=====  
C | 519.lbm\_r(base, peak) 538.imagick\_r(base, peak)  
| 544.nab\_r(base, peak)  
-----

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Version 2022.1.0 Build 20220316  
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-----

=====  
C++ | 508.namd\_r(base, peak) 510.parest\_r(base, peak)  
-----

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Version 2022.1.0 Build 20220316  
-----

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

## Compiler Version Notes (Continued)

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=====  
C++, C | 511.povray\_r(base, peak) 526.blender\_r(base, peak)

-----  
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=====  
C++, C, Fortran | 507.cactuBSSN\_r(base, peak)

-----  
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version  
2022.1.0 Build 20220316

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=====  
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

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=====  
Fortran, C | 521.wrf\_r(base, peak) 527.cam4\_r(base, peak)

-----  
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2022.1.0 Build 20220316

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PowerEdge C6620 (Intel Xeon Platinum 8452Y)

SPECrate®2017\_fp\_peak = 736

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2023

Hardware Availability: Feb-2023

Software Availability: May-2022

## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64

507.cactuBSSN\_r: -DSPEC\_LP64

508.namd\_r: -DSPEC\_LP64

510.parest\_r: -DSPEC\_LP64

511.povray\_r: -DSPEC\_LP64

519.lbm\_r: -DSPEC\_LP64

521.wrf\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian

526.blender\_r: -DSPEC\_LP64 -DSPEC\_LINUX -funsigned-char

527.cam4\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG

538.imagick\_r: -DSPEC\_LP64

544.nab\_r: -DSPEC\_LP64

549.fotonik3d\_r: -DSPEC\_LP64

554.roms\_r: -DSPEC\_LP64

## Base Optimization Flags

C benchmarks:

-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math

-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc

-L/usr/local/jemalloc64-5.0.1/lib

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Tested by: Dell Inc.

Test Date: Jan-2023

Hardware Availability: Feb-2023

Software Availability: May-2022

## Base Optimization Flags (Continued)

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
```

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

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Tested by: Dell Inc.

Test Date: Jan-2023

Hardware Availability: Feb-2023

Software Availability: May-2022

## Peak Compiler Invocation (Continued)

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

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## Peak Optimization Flags (Continued)

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
```

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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