



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017_fp_base = 654

PowerEdge C6620 (Intel Xeon Gold 6454S)

SPECrate®2017_fp_peak = 686

CPU2017 License: 6573

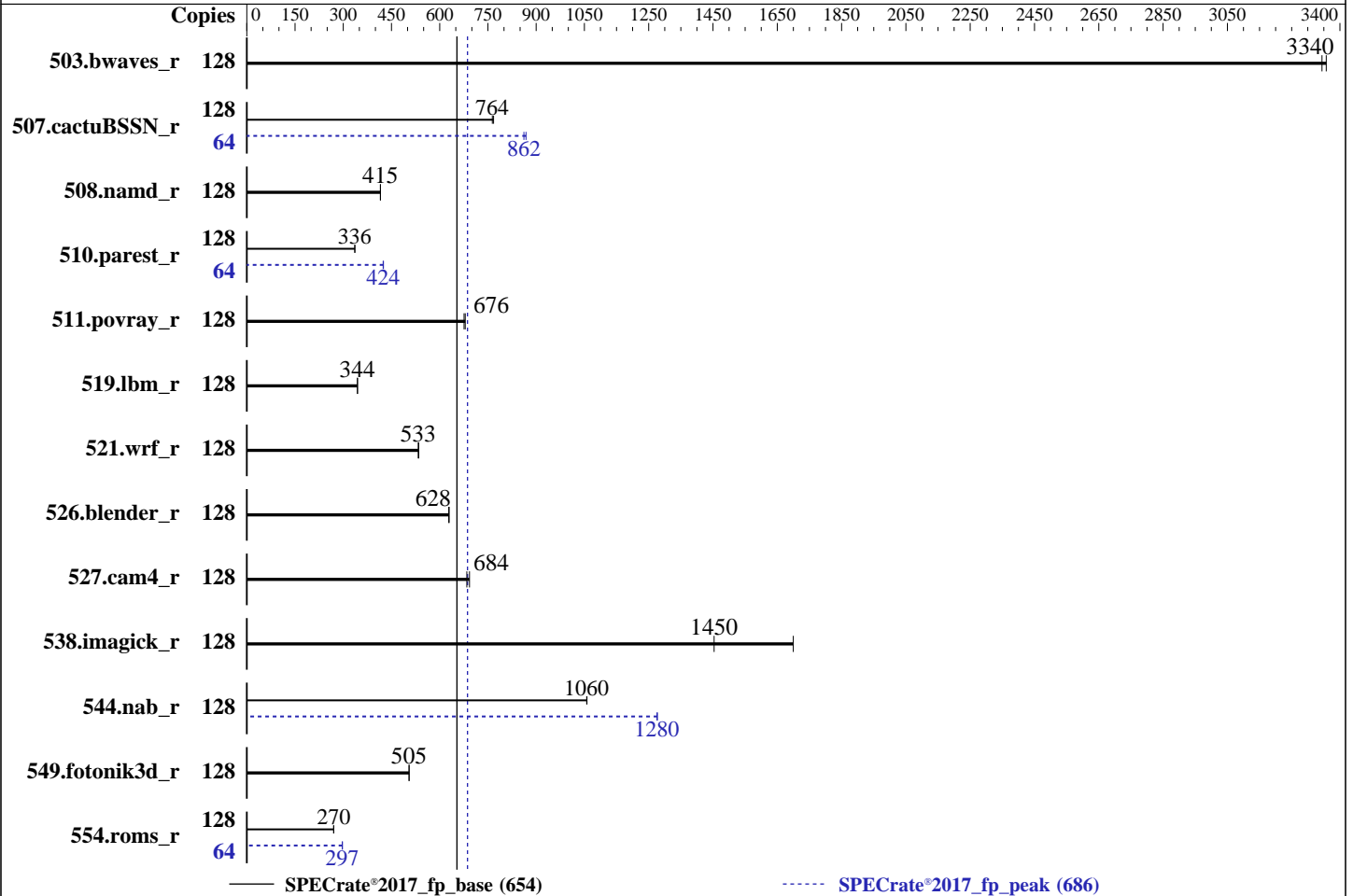
Test Date: Jan-2023

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2023

Tested by: Dell Inc.

Software Availability: May-2022



Hardware

CPU Name: Intel Xeon Gold 6454S
 Max MHz: 3400
 Nominal: 2200
 Enabled: 64 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: 60 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	128	382	3360	<u>384</u>	<u>3340</u>			128	382	3360	<u>384</u>	<u>3340</u>		
507.cactuBSSN_r	128	<u>212</u>	<u>764</u>	211	767			64	<u>94.0</u>	<u>862</u>	93.3	868		
508.namd_r	128	293	416	<u>293</u>	<u>415</u>			128	293	416	<u>293</u>	<u>415</u>		
510.parest_r	128	996	336	<u>997</u>	<u>336</u>			64	<u>395</u>	<u>424</u>	394	425		
511.povray_r	128	<u>442</u>	<u>676</u>	440	679			128	<u>442</u>	<u>676</u>	440	679		
519.lbm_r	128	392	344	<u>392</u>	<u>344</u>			128	392	344	<u>392</u>	<u>344</u>		
521.wrf_r	128	536	535	<u>538</u>	<u>533</u>			128	536	535	<u>538</u>	<u>533</u>		
526.blender_r	128	<u>310</u>	<u>628</u>	310	629			128	<u>310</u>	<u>628</u>	310	629		
527.cam4_r	128	323	693	<u>327</u>	<u>684</u>			128	323	693	<u>327</u>	<u>684</u>		
538.imagick_r	128	187	1700	<u>219</u>	<u>1450</u>			128	187	1700	<u>219</u>	<u>1450</u>		
544.nab_r	128	204	1060	<u>204</u>	<u>1060</u>			128	169	1280	<u>169</u>	<u>1280</u>		
549.fotonik3d_r	128	988	505	<u>989</u>	<u>505</u>			128	988	505	<u>989</u>	<u>505</u>		
554.roms_r	128	753	270	<u>753</u>	<u>270</u>			64	342	297	<u>342</u>	<u>297</u>		

SPECrate®2017_fp_base = **654**

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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 localhost.localdomain Tue Jan 17 23:43:34 2023

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

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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.e18)
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 localhost.localdomain 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
 23:43:34 up 4:37, 1 user, load average: 90.79, 118.87, 124.43
USER      TTY      FROM          LOGIN@      IDLE        JCPU   PCPU   WHAT
donald    :1       :1            19:08      ?xdm?      1:42    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) 4125019
  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) 4125019
  virtual memory         (kbytes, -v) unlimited
  file locks             (-x) unlimited

```

```

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 17
/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
runccpu --nobuild --action validate --define default-platform-flags --define numcopies=128 -c
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=64 --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
runccpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=64 --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/temlogs/preenv.fprate.002.0.log --lognum 002.0 --from_runccpu 2
specperl $SPEC/bin/sysinfo

```

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Platform Notes (Continued)

\$SPEC = /mnt/ramdisk/cpu2017-1.1.9-ic2022.1

```

6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Gold 6454S
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 8
   microcode       : 0x2b000111
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores       : 32
   siblings        : 64
   2 physical ids (chips)
   128 processors (hardware threads)
   physical id 0:  core ids 0-31
   physical id 1:  core ids 0-31
   physical id 0:  apicids 0-63
   physical id 1:  apicids 128-191

```

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):            128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
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) Gold 6454S
BIOS Model name:   Intel(R) Xeon(R) Gold 6454S
Stepping:          8
CPU MHz:           2200.000
BogoMIPS:          4400.00
L1d cache:         48K
L1i cache:         32K
L2 cache:          2048K

```

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Platform Notes (Continued)

```

L3 cache:                61440K
NUMA node0 CPU(s):      0, 4, 8, 12, 16, 20, 24, 28, 64, 68, 72, 76, 80, 84, 88, 92
NUMA node1 CPU(s):      32, 36, 40, 44, 48, 52, 56, 60, 96, 100, 104, 108, 112, 116, 120, 124
NUMA node2 CPU(s):      2, 6, 10, 14, 18, 22, 26, 30, 66, 70, 74, 78, 82, 86, 90, 94
NUMA node3 CPU(s):      34, 38, 42, 46, 50, 54, 58, 62, 98, 102, 106, 110, 114, 118, 122, 126
NUMA node4 CPU(s):      1, 5, 9, 13, 17, 21, 25, 29, 65, 69, 73, 77, 81, 85, 89, 93
NUMA node5 CPU(s):      33, 37, 41, 45, 49, 53, 57, 61, 97, 101, 105, 109, 113, 117, 121, 125
NUMA node6 CPU(s):      3, 7, 11, 15, 19, 23, 27, 31, 67, 71, 75, 79, 83, 87, 91, 95
NUMA node7 CPU(s):      35, 39, 43, 47, 51, 55, 59, 63, 99, 103, 107, 111, 115, 119, 123, 127
Flags:                    fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts
                        acpi mmx fxsr 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
                        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_l1d 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, 64, 68, 72, 76, 80, 84, 88, 92
node 0 size: 128216 MB
node 0 free: 114781 MB
node 1 cpus: 32, 36, 40, 44, 48, 52, 56, 60, 96, 100, 104, 108, 112, 116, 120, 124
node 1 size: 129020 MB
node 1 free: 121020 MB
node 2 cpus: 2, 6, 10, 14, 18, 22, 26, 30, 66, 70, 74, 78, 82, 86, 90, 94
node 2 size: 129020 MB
node 2 free: 121620 MB
node 3 cpus: 34, 38, 42, 46, 50, 54, 58, 62, 98, 102, 106, 110, 114, 118, 122, 126
node 3 size: 129020 MB
node 3 free: 121428 MB
node 4 cpus: 1, 5, 9, 13, 17, 21, 25, 29, 65, 69, 73, 77, 81, 85, 89, 93
node 4 size: 129020 MB
node 4 free: 121878 MB
node 5 cpus: 33, 37, 41, 45, 49, 53, 57, 61, 97, 101, 105, 109, 113, 117, 121, 125
node 5 size: 129020 MB
node 5 free: 122755 MB
node 6 cpus: 3, 7, 11, 15, 19, 23, 27, 31, 67, 71, 75, 79, 83, 87, 91, 95

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Platform Notes (Continued)

```

node 6 size: 128978 MB
node 6 free: 122404 MB
node 7 cpus: 35,39,43,47,51,55,59,63,99,103,107,111,115,119,123,127
node 7 size: 129017 MB
node 7 free: 122893 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:          1056065752 kB

```

```

-----
10. who -r
    run-level 5 Jan 17 19:08

```

```

-----
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 ksm-tuned libstoragemgmt
        libvirt-d 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 ipr-dump iprinit iprupdate iscsid iscsiuiop kpatch kvm_stat ledmon

```

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```

libvirt-guests man-db-restart-cache-update ndctl-monitor netcf-transaction nfs-blkmap nfs-convert
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 tcsd upower virtinterfaced
virtnetworkd virtnodevd virtnwfilterd virtproxyd virtqemud 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

```

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```

vm.min_unmapped_ratio      1
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+madvice [madvice] never
enabled         [always] madvice 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
lltf               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>

(Continued on next page)



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PowerEdge C6620 (Intel Xeon Gold 6454S)

SPECrate®2017_fp_peak = 686

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)

22. 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 54G 72G 44% /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)

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)

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(Continued on next page)



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Software Availability: May-2022

Compiler Version Notes (Continued)

Version 2022.1.0 Build 20220316
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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) 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
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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CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2023

Hardware Availability: Feb-2023

Software Availability: May-2022

Compiler Version Notes (Continued)

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



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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
```

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

(Continued on next page)



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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 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

(Continued on next page)



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Test Date: Jan-2023

Hardware Availability: Feb-2023

Software Availability: May-2022

Peak Optimization Flags (Continued)

```
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: basepeak = yes

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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Tested with SPEC CPU®2017 v1.1.9 on 2023-01-17 23:43:33-0500.

Report generated on 2023-02-15 10:38:11 by CPU2017 PDF formatter v6442.

Originally published on 2023-02-14.