



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate®2017\_fp\_base = 677

### PowerEdge XE8640 (Intel Xeon Gold 6448Y)

SPECrate®2017\_fp\_peak = 703

CPU2017 License: 6573

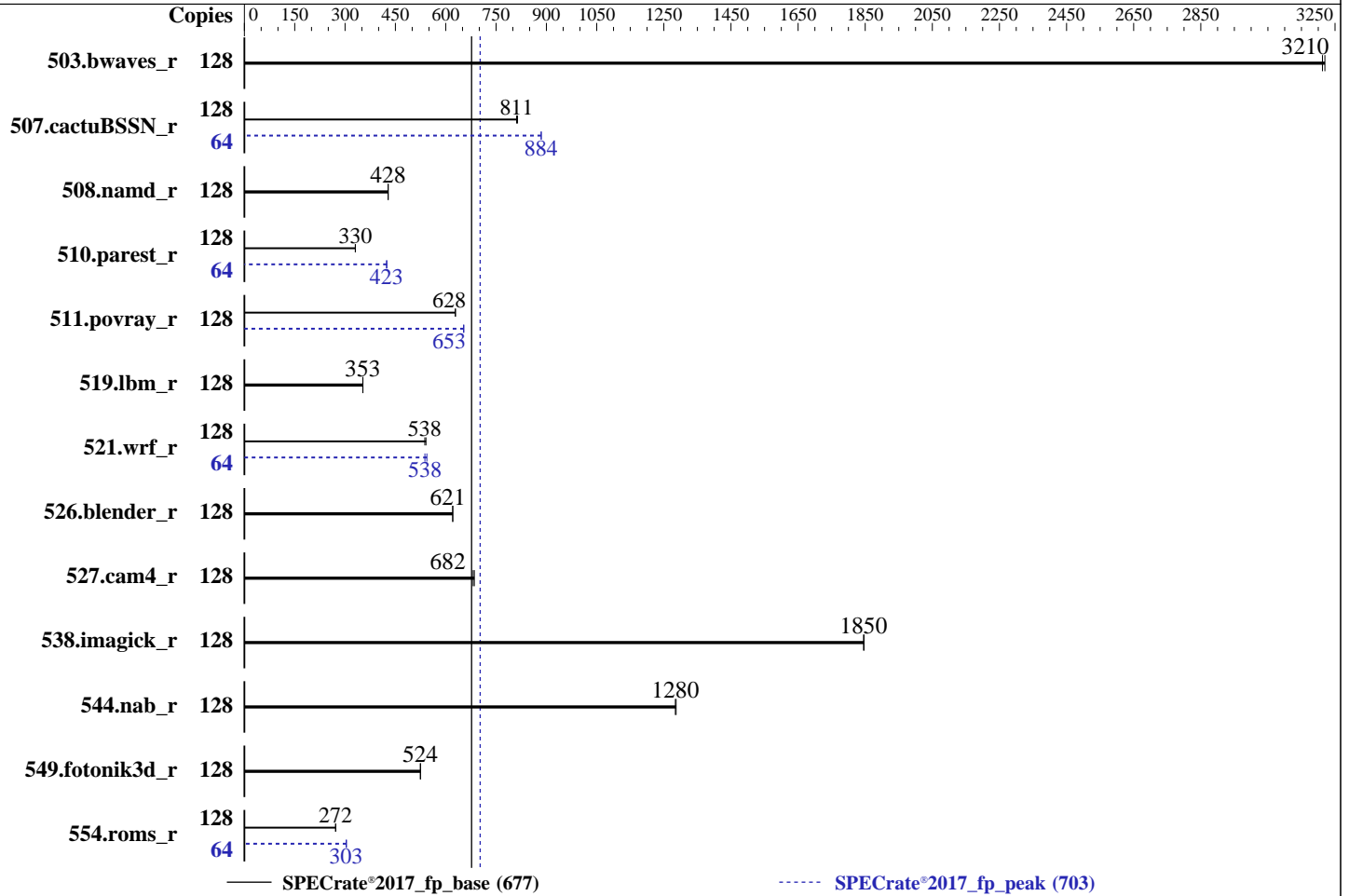
Test Date: Jun-2023

Test Sponsor: Dell Inc.

Hardware Availability: May-2023

Tested by: Dell Inc.

Software Availability: Dec-2022



### Hardware

CPU Name: Intel Xeon Gold 6448Y  
 Max MHz: 4100  
 Nominal: 2100  
 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: 80 GB on tmpfs  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP4  
 5.14.21-150400.19-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: No  
 Firmware: Version 1.2.1 released May-2023  
 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	399	3220	<b>400</b>	<b>3210</b>			128	399	3220	<b>400</b>	<b>3210</b>		
507.cactuBSSN_r	128	<b>200</b>	<b>811</b>	199	814			64	<b>91.6</b>	<b>884</b>	91.6	885		
508.namd_r	128	<b>284</b>	<b>428</b>	284	429			128	<b>284</b>	<b>428</b>	284	429		
510.parest_r	128	1012	331	<b>1013</b>	<b>330</b>			64	<b>395</b>	<b>423</b>	394	425		
511.povray_r	128	475	629	<b>476</b>	<b>628</b>			128	457	654	<b>458</b>	<b>653</b>		
519.lbm_r	128	<b>382</b>	<b>353</b>	382	353			128	<b>382</b>	<b>353</b>	382	353		
521.wrf_r	128	<b>533</b>	<b>538</b>	530	541			64	264	544	<b>267</b>	<b>538</b>		
526.blender_r	128	<b>314</b>	<b>621</b>	314	621			128	<b>314</b>	<b>621</b>	314	621		
527.cam4_r	128	<b>328</b>	<b>682</b>	327	685			128	<b>328</b>	<b>682</b>	327	685		
538.imagick_r	128	<b>173</b>	<b>1850</b>	172	1850			128	<b>173</b>	<b>1850</b>	172	1850		
544.nab_r	128	167	1290	<b>168</b>	<b>1280</b>			128	167	1290	<b>168</b>	<b>1280</b>		
549.fotonik3d_r	128	<b>952</b>	<b>524</b>	950	525			128	<b>952</b>	<b>524</b>	950	525		
554.roms_r	128	<b>749</b>	<b>272</b>	747	272			64	<b>335</b>	<b>303</b>	334	304		

SPECrate®2017\_fp\_base = **677**

SPECrate®2017\_fp\_peak = **703**

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-ic2023.0/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2023.0/je5.0.1-64"
MALLOCCONF = "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  
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

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## General Notes (Continued)

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 80 GB ramdisk created with the cmd: "mount -t tmpfs -o size=80G tmpfs /mnt/ramdisk"

## Platform Notes

BIOS settings:

```

    ADDDC Setting : Disabled
    DIMM Self Healing on
    Uncorrectable Memory Error : Disabled
    Virtualization Technology : Disabled
    DCU Streamer Prefetcher : Disabled
    Sub NUMA Cluster : 2-way Clustering
    LLC Prefetch : Disabled
    Dead Line LLC Alloc : Disabled

    System Profile : Custom
    CPU Power Management : Maximum Performance
    CIE : 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 Jun 8 06:37:06 2023

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

-----  
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. cpupower frequency-info
15. tuned-adm active
16. sysctl

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## Platform Notes (Continued)

- 17. /sys/kernel/mm/transparent\_hugepage
- 18. /sys/kernel/mm/transparent\_hugepage/khugepaged
- 19. OS release
- 20. Disk information
- 21. /sys/devices/virtual/dmi/id
- 22. dmidecode
- 23. BIOS

```
1. uname -a
Linux localhost 5.14.21-150400.19-default #1 SMP PREEMPT_DYNAMIC Wed Apr 20 08:32:52 UTC 2022 (d6fb753/lp)
x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
06:37:06 up 4:18, 2 users, load average: 78.52, 115.72, 122.88
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root : : 02:19 ?xdm? 3:36 0.02s gdm-session-worker [pam/gdm-autologin]
root :0 :0 02:19 ?xdm? 3:36 0.02s /usr/lib/gdm/gdm-x-session
--register-session --run-script gnome
```

```
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) 4126009
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) 4126009
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited
```

```
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
/usr/lib/systemd/systemd --user
/usr/lib/gnome-terminal-server
bash
/bin/bash ./DELL_rate.sh
/bin/bash ./dell-run-main.sh rate
/bin/bash ./dell-run-main.sh rate
/bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1
--define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=2 --define DL-VERS=v4.5 --output_format csv,html,pdf,txt
/bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1
--define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=2 --define DL-VERS=v4.5 --output_format csv,html,pdf,txt
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 -c
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
```

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## Platform Notes (Continued)

```
--define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2 --define
DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define DL-BIOS-SNC=2
--define DL-VERS=v4.5 --output_format csv,html,pdf,txt fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
--define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define
DL-BIOS-SNC=2 --define DL-VERS=v4.5 --output_format csv,html,pdf,txt --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_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 6448Y
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b0004b1
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 2.37.2:

```
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):            128
On-line CPU(s) list: 0-127
Vendor ID:         GenuineIntel
Model name:        Intel(R) Xeon(R) Gold 6448Y
CPU family:        6
Model:             143
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s):         2
Stepping:          8
BogoMIPS:          4200.00
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 aperfperf 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
```

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### Platform Notes (Continued)

avx2 smep bmi2 erms invpcid rtm cqm rdt\_a avx512f avx512dq rdseed adx smap  
avx512ifma clflushopt clwb intel\_pt avx512cd sha\_ni avx512bw avx512vl  
xsaveopt xsavec xgetbv1 xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total  
cqm\_mbm\_local split\_lock\_detect avx\_vnni avx512\_bf16 wbnoinvd dtherm ida  
arat pln pts avx512vbmi umip pku ospke waitpkg avx512\_vbmi2 gfni vaes  
vpclmulqdq avx512\_vnni avx512\_bitalg tme avx512\_vpopcntdq la57 rdpid  
bus\_lock\_detect cldemote movdiri movdir64b enqcmd fsrm md\_clear serialize  
tsxldtrk pconfig arch\_lbr avx512\_fp16 amx\_tile flush\_lld arch\_capabilities

L1d cache: 3 MiB (64 instances)  
L1i cache: 2 MiB (64 instances)  
L2 cache: 128 MiB (64 instances)  
L3 cache: 120 MiB (2 instances)  
NUMA node(s): 4  
NUMA node0 CPU(s): 0, 4, 8, 12, 16, 20, 22, 26, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 86, 90, 96, 100, 104, 108, 112, 116, 120, 124  
NUMA node1 CPU(s): 2, 6, 10, 14, 18, 24, 28, 30, 34, 38, 42, 46, 50, 54, 58, 62, 66, 70, 74, 78, 82, 88, 92, 94, 98, 102, 106, 110, 114, 118, 122, 126  
NUMA node2 CPU(s): 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, 41, 43, 47, 51, 55, 59, 65, 69, 73, 77, 81, 85, 89, 93, 97, 101, 105, 107, 111, 115, 119, 123  
NUMA node3 CPU(s): 3, 7, 11, 15, 19, 23, 27, 31, 35, 39, 45, 49, 53, 57, 61, 63, 67, 71, 75, 79, 83, 87, 91, 95, 99, 103, 109, 113, 117, 121, 125, 127  
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	2M	128M	16	Unified	2	2048	1	64
L3	60M	120M	15	Unified	3	65536	1	64

8. numactl --hardware

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

available: 4 nodes (0-3)  
node 0 cpus:  
0, 4, 8, 12, 16, 20, 22, 26, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 86, 90, 96, 100, 104, 108, 112, 116, 120, 124  
node 0 size: 257492 MB  
node 0 free: 246745 MB  
node 1 cpus:  
2, 6, 10, 14, 18, 24, 28, 30, 34, 38, 42, 46, 50, 54, 58, 62, 66, 70, 74, 78, 82, 88, 92, 94, 98, 102, 106, 110, 114, 118, 122, 126  
node 1 size: 258039 MB  
node 1 free: 257048 MB  
node 2 cpus:  
1, 5, 9, 13, 17, 21, 25, 29, 33, 37, 41, 43, 47, 51, 55, 59, 65, 69, 73, 77, 81, 85, 89, 93, 97, 101, 105, 107, 111, 115, 119, 123  
node 2 size: 258039 MB  
node 2 free: 256688 MB  
node 3 cpus:  
3, 7, 11, 15, 19, 23, 27, 31, 35, 39, 45, 49, 53, 57, 61, 63, 67, 71, 75, 79, 83, 87, 91, 95, 99, 103, 109, 113, 117, 121, 125, 127  
node 3 size: 257958 MB  
node 3 free: 256570 MB  
node distances:  
node 0 1 2 3

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## Platform Notes (Continued)

```
0: 10 12 21 21
1: 12 10 21 21
2: 21 21 10 12
3: 21 21 12 10
```

```
-----
9. /proc/meminfo
   MemTotal:      1056287120 kB
-----
```

```
-----
10. who -r
    run-level 5 Jun 8 02:20
-----
```

```
-----
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    Default Target   Status
    graphical        running
-----
```

```
-----
12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled ModemManager YaST2-Firstboot YaST2-Second-Stage apparmor auditd avahi-daemon bluetooth
cron display-manager firewalld getty@ haveged irqbalance iscsi issue-generator kbdsettings
klog libvirtd lvm2-monitor nscd nvme-fc-boot-connections oracle postfix purge-kernels
rollback rsyslog smartd sshd wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
wickedd-nanny wpa_supplicant xencommons
enabled-runtime systemd-remount-fs
disabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon amavis
apache2@ appstream-sync-cache autofs autoyast-initscripts avahi-dnsmasq bgpd
blk-availability bluetooth-mesh boot-sysctl booth-arbitrator booth@ ca-certificates
chrony-wait chronyd clamav-milter clamd cloud-config cloud-final cloud-init
cloud-init-local console-getty containerbuild-regionsrv corosync corosync-notifyd crm_mon
cryptctl-client cryptctl-server ctdb cups cups-browsed ddclient debug-shell dhcpd dhcpd6
dhcrelay dhcrelay6 dirsrv@ dlm dmraid-activation dnsmasq docker-img-store-setup
docker-img-store-setup-xfs drbd drbd-lvchange@ drbd-wait-promotable@ ebttables
exchange-bmc-os-info fetchmail freshclam google-guest-agent google-shutdown-scripts
google-startup-scripts gpm grub2-once guestregister haveged-switch-root hawk
hwloc-dump-hwdata ipmi ipmievdev ipvsadm iscsi-init iscsid iscsiui isis issue-add-ssh-keys
kdump kdump-early kexec-load ksm kvm_stat ldirectord libvirt-guests logd lunmask lvmlockd
lvmlocks man-db-create mariadb mariadb@ multipathd munge named nfs nfs-blkmap nfs-server
nfsserver nm-cloud-setup nmb ntp-wait ntpd nvme-fc-autoconnect openvpn@ ospf6d ospfd
ostree-remount pacemaker pppoe pppoe-server racoon racoon-setkey radvd rarpd@ rdisc ripd
ripngd rootgrow rpcbind rpmconfigcheck rsyncd rtkit-daemon salt-minion sapconf saprouter
saptune sbd sbd_remote serial-getty@ slurmd slurmdbd smartd_generate_opts smb
snmpd snmptrapd spamd spampd speech-dispatcherd squid srp_daemon srp_daemon_port@
strongswan strongswan-starter svnserv sysstat systemd-boot-check-no-failures
systemd-network-generator systemd-nspawn@ systemd-sysext systemd-time-wait-sync
systemd-timesyncd tcsh tuned udisks2 upower virtinterfaced virtnetworkd virtnodeudev
virtnwfilterd virtproxyd virtqemu virtsecret virtstoraged virtxend vsftpd waagent
winbind wpa_supplicant@ xen-dom0-modules xen-init-dom0 xen-qemu-dom0-disk-backend
xen-watchdog xenconsoled xendomains xenstored xrdp xrdp-sesman ypbind zebra
indirect pcsd saned@ uidd virtlockd virtlogd wickedd
-----
```

```
-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.19-default
root=UUID=5dbfa664-5ba7-440a-b916-2ff8d67469f6
splash=silent
mitigations=auto
quiet
-----
```

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## Platform Notes (Continued)

security=apparmor

```

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

```

```

-----
15. tuned-adm active
  No current active profile.
-----

```

```

-----
16. 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                   20
vm.watermark_boost_factor      15000
vm.watermark_scale_factor      10
vm.zone_reclaim_mode           0
-----

```

```

-----
17. /sys/kernel/mm/transparent_hugepage
defrag          always defer+madvise [madvise] never
enabled         [always] madvise never
hpage_pmd_size 2097152
shmem_enabled   always within_size advise [never] deny force
-----

```

```

-----
18. /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
-----

```

```

-----
19. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP4
-----

```

20. Disk information

(Continued on next page)





# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017\_fp\_base = 677

PowerEdge XE8640 (Intel Xeon Gold 6448Y)

SPECrate®2017\_fp\_peak = 703

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jun-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

## Platform Notes (Continued)

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.0

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
tmpfs	tmpfs	80G	4.2G	76G	6%	/mnt/ramdisk

```

-----
21. /sys/devices/virtual/dmi/id
Vendor:      Dell Inc.
Product:     PowerEdge XE8640
Product Family: PowerEdge
Serial:      1234567
-----

```

```

-----
22. 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:
  16x 00AD063200AD HMC94MEBRA109N 64 GB 2 rank 4800
-----

```

```

-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      Dell Inc.
BIOS Version:     1.2.1
BIOS Date:        05/17/2023
BIOS Revision:    1.2
-----

```

## 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 2023.0.0 Build 20221201
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 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
=====

```

```

=====
C++, C | 511.povray_r(base, peak) 526.blender_r(base, peak)
=====

```

```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 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.
=====

```

```

=====
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
=====

```

```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====

```

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Hardware Availability: May-2023

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## Compiler Version Notes (Continued)

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 | 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 2023.0.0 Build 20221201  
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 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.

## 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

(Continued on next page)



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Test Date: Jun-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

## Base Portability Flags (Continued)

```

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 -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

```

### C++ benchmarks:

```

-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

```

### Fortran benchmarks:

```

-w -m64 -Wl,-z,muldefs -xsapphirerapids -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 -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

```

### Benchmarks using both C and C++:

```

-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

```

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SPECrate®2017\_fp\_peak = 703

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jun-2023

Hardware Availability: May-2023

Software Availability: Dec-2022

## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-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
```

(Continued on next page)



# SPEC CPU®2017 Floating Point Rate Result

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Software Availability: Dec-2022

## Peak Optimization Flags (Continued)

544.nab\_r: basepeak = yes

C++ benchmarks:

508.namd\_r: basepeak = yes

```
510.parest_r: -w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids
-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512
-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 -xsapphirerapids -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 -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int
-mprefer-vector-width=512 -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: -w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int
-mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

526.blender\_r: basepeak = yes

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## Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-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-ic2023-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.5.html>

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-v1.5.xml>

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