SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

$SPECrate^{®}2017\_fp\_base = 628$

PowerEdge R760 (Intel Xeon Gold 6430)
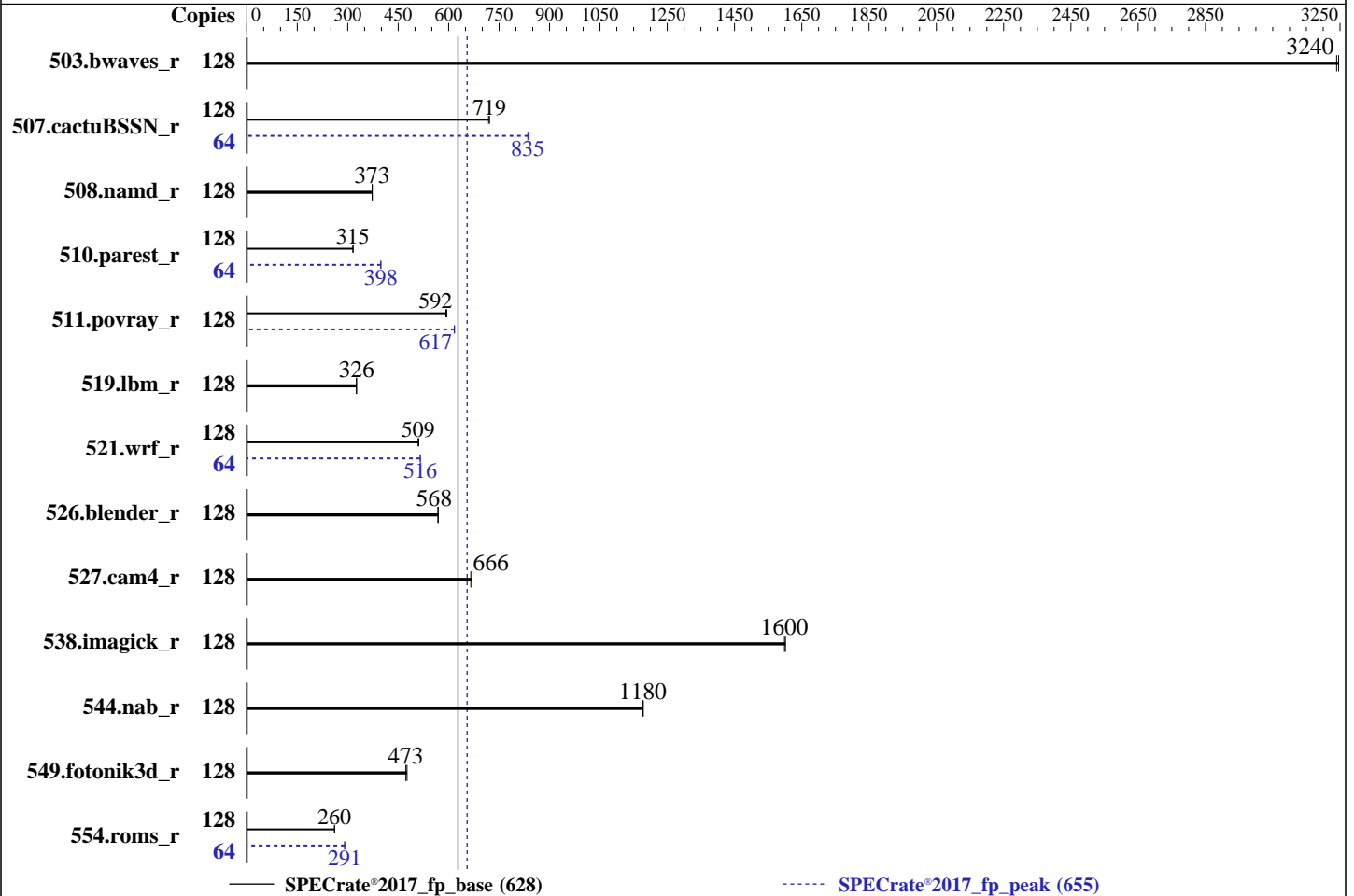
$SPECrate^{®}2017\_fp\_peak = 655$

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

Test Date: Apr-2024
Hardware Availability: Apr-2023
Software Availability: Dec-2023

Benchmark	Copies	base	peak
503.bwaves_r	128	3240	
507.cactuBSSN_r	128	719	
	64		835
508.namd_r	128	373	
510.parest_r	128	315	
	64		398
511.povray_r	128	592	
	128		617
519.lbm_r	128	326	
521.wrf_r	128	509	
	64		516
526.blender_r	128	568	
527.cam4_r	128	666	
538.imagick_r	128	1600	
544.nab_r	128	1180	
549.fotonik3d_r	128	473	
554.roms_r	128	260	
	64		291

—— SPECrate®2017_fp_base (628)
- - - - SPECrate®2017_fp_peak (655)

Hardware

CPU Name: Intel Xeon Gold 6430
 Max MHz: 3400
 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 PC5-5600B-R, running at 4400)
Storage: 80 GB on tmpfs
Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.2 (Plow)
 5.14.0-284.11.1.el9_2.x86_64
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 1.9.12 released Nov-2023
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	**396**	**3240**	395	3250			128	**396**	**3240**	395	3250		
507.cactuBSSN_r	128	**225**	**719**	225	722			64	**97.0**	**835**	96.8	837		
508.namd_r	128	**326**	**373**	326	373			128	**326**	**373**	326	373		
510.parest_r	128	**1062**	**315**	1059	316			64	**420**	**398**	420	399		
511.povray_r	128	**505**	**592**	503	594			128	**485**	**617**	484	618		
519.lbm_r	128	414	326	**414**	**326**			128	414	326	**414**	**326**		
521.wrf_r	128	561	511	**563**	**509**			64	278	516	**278**	**516**		
526.blender_r	128	**343**	**568**	343	569			128	**343**	**568**	343	569		
527.cam4_r	128	**336**	**666**	335	669			128	**336**	**666**	335	669		
538.imagick_r	128	199	1600	**199**	**1600**			128	199	1600	**199**	**1600**		
544.nab_r	128	183	1180	**183**	**1180**			128	183	1180	**183**	**1180**		
549.fotonik3d_r	128	**1055**	**473**	1047	476			128	**1055**	**473**	1047	476		
554.roms_r	128	779	261	**781**	**260**			64	350	291	**350**	**291**		
SPECrate®2017_fp_base =		**628**												
SPECrate®2017_fp_peak =		**655**												

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-ic2023.2.3/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2023.2.3/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
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
```

(Continued on next page)

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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
                        C1E : Disabled
                   C States : Autonomous
          Memory Patrol Scrub : Disabled
      Energy Efficiency Policy : Performance
          PCI ASPM L1 Link
             Power Management : Disabled
               Optimizer Mode : Enabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Apr  9 16:08:33 2024

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 252 (252-13.el9_2)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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Platform Notes (Continued)

```
  15. tuned-adm active
  16. sysctl
  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.localdomain 5.14.0-284.11.1.el9_2.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 12 10:45:03 EDT
    2023 x86_64 x86_64 x86_64 GNU/Linux

  ----------------------------------------------------------
  2. w
     16:08:33 up  4:40,  2 users,  load average: 78.18, 115.47, 122.81
    USER     TTY         LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1        11:28    4:39m  1.41s  0.00s /bin/bash /home/DellFiles/bin/Intel/dell-run-speccpu.sh
    rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1 --define DL-BIOS-adddcD=1 --define
    DL-VERS=5.1 --output_format html,pdf,txt
    root     tty2        13:53    2:14m  0.03s  0.03s -bash

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

  ----------------------------------------------------------
  4. ulimit -a
    real-time non-blocking time  (microseconds, -R) unlimited
    core file size              (blocks, -c) 0
    data seg size               (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size                   (blocks, -f) unlimited
    pending signals                 (-i) 4126034
    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) 4126034
    virtual memory              (kbytes, -v) unlimited
    file locks                      (-x) unlimited

  ----------------------------------------------------------
  5. sysinfo process ancestry
   /usr/lib/systemd/systemd rhgb cpu0_hotplug --switched-root --system --deserialize 31
   login -- root
   -bash
   /bin/bash ./DELL_rate.sh
   /bin/bash /home/DellFiles/bin/dell-run-main.sh rate
   /bin/bash /home/DellFiles/bin/dell-run-main.sh rate
   /bin/bash /home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc
     --define DL-BIOS-LogProc=1 --define DL-BIOS-adddcD=1 --define DL-VERS=5.1 --output_format html,pdf,txt
   /bin/bash /home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc
```

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Platform Notes (Continued)

```
    --define DL-BIOS-LogProc=1 --define DL-BIOS-adddcD=1 --define DL-VERS=5.1 --output_format html,pdf,txt
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 -c
    ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=64 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak -o all --define DL-BIOS-SNC=2
    --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1 --define
    DL-BIOS-adddcD=1 --define DL-VERS=5.1 --output_format html,pdf,txt fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile
    ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=64 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --define
    DL-BIOS-SNC=2 --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1 --define
    DL-BIOS-adddcD=1 --define DL-VERS=5.1 --output_format html,pdf,txt --nopower --runmode rate --tune
    base:peak --size refrate fprate --nopreenv --note-preenv --logfile
    $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /mnt/ramdisk/cpu2017-1.1.9-ic2023.2.3

    ------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Gold 6430
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
    microcode       : 0x2b000571
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
    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 2.37.4:
   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
   BIOS Vendor ID:            Intel
   Model name:                Intel(R) Xeon(R) Gold 6430
   BIOS Model name:           Intel(R) Xeon(R) Gold 6430
   CPU family:                6
   Model:                     143
   Thread(s) per core:        2
   Core(s) per socket:        32
   Socket(s):                 2
   Stepping:                  8
   CPU max MHz:               3400.0000
   CPU min MHz:               800.0000
   BogoMIPS:                  4200.00
   Flags:                     fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
```

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Platform Notes (Continued)

```
                   clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                   lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                   nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                   ds_cpl smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2
                   x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
                   abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3 invpcid_single
                   cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1
                   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 ibt amx_bf16 avx512_fp16 amx_tile amx_int8
                   flush_l1d 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):                0,2,6,8,12,16,20,22,24,28,32,36,38,46,56,60,64,66,70,72,76,80,84,86,88,92,
                                    96,100,102,110,120,124
  NUMA node1 CPU(s):                4,10,14,18,26,30,34,40,42,44,48,50,52,54,58,62,68,74,78,82,90,94,98,104,10
                                    6,108,112,114,116,118,122,126
  NUMA node2 CPU(s):                1,3,5,7,15,19,25,29,33,39,47,51,57,59,61,63,65,67,69,71,79,83,89,93,97,103
                                    ,111,115,121,123,125,127
  NUMA node3 CPU(s):                9,11,13,17,21,23,27,31,35,37,41,43,45,49,53,55,73,75,77,81,85,87,91,95,99,
                                    101,105,107,109,113,117,119
  Vulnerability Itlb multihit:      Not affected
  Vulnerability L1tf:               Not affected
  Vulnerability Mds:                Not affected
  Vulnerability Meltdown:           Not affected
  Vulnerability Mmio stale data:    Not affected
  Vulnerability Retbleed:           Not affected
  Vulnerability Spec store bypass:  Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:         Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:         Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS SW
                                    sequence
  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:
    0,2,6,8,12,16,20,22,24,28,32,36,38,46,56,60,64,66,70,72,76,80,84,86,88,92,96,100,102,110,120,124
    node 0 size: 257493 MB
    node 0 free: 247746 MB
    node 1 cpus:
    4,10,14,18,26,30,34,40,42,44,48,50,52,54,58,62,68,74,78,82,90,94,98,104,106,108,112,114,116,118,122,126
    node 1 size: 258001 MB
```

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Platform Notes (Continued)

```
  node 1 free: 256850 MB
  node 2 cpus:
  1,3,5,7,15,19,25,29,33,39,47,51,57,59,61,63,65,67,69,71,79,83,89,93,97,103,111,115,121,123,125,127
  node 2 size: 258040 MB
  node 2 free: 256874 MB
  node 3 cpus:
  9,11,13,17,21,23,27,31,35,37,41,43,45,49,53,55,73,75,77,81,85,87,91,95,99,101,105,107,109,113,117,119
  node 3 size: 258035 MB
  node 3 free: 256872 MB
  node distances:
  node   0   1   2   3
    0:  10  12  21  21
    1:  12  10  21  21
    2:  21  21  10  12
    3:  21  21  12  10


  ------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       1056329364 kB


  ------------------------------------------------------------
  10. who -r
    run-level 3 Apr 9 11:28


  ------------------------------------------------------------
  11. Systemd service manager version: systemd 252 (252-13.el9_2)
    Default Target  Status
    multi-user      running


  ------------------------------------------------------------
  12. Services, from systemctl list-unit-files
    STATE             UNIT FILES
    enabled           ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                      accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker gdm
                      getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt
                      low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
                      nvmefc-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rhsmcertd
                      rsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd switcheroo-control
                      systemd-boot-update systemd-network-generator tuned udisks2 upower vgauthd vmtoolsd
    enabled-runtime   systemd-remount-fs
    disabled          arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown
                      canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
                      dbus-daemon debug-shell dnf-system-upgrade dnsmasq firewalld hwloc-dump-hwdata iprdump
                      iprinit iprupdate iscsid iscsiuio kpatch kvm_stat ledmon man-db-restart-cache-update
                      nftables nvmf-autoconnect ostree-readonly-sysroot-migration podman podman-auto-update
                      podman-clean-transient podman-kube@ podman-restart psacct ras-mc-ctl rasdaemon rdisc rhcd
                      rhsm rhsm-facts rpmdb-rebuild selinux-check-proper-disable serial-getty@
                      speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures systemd-pstore
                      systemd-sysext wpa_supplicant
    indirect          spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
                      systemd-sysupdate systemd-sysupdate-reboot


  ------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt5)/vmlinuz-5.14.0-284.11.1.el9_2.x86_64
    root=/dev/mapper/rhel-root
    ro
    resume=/dev/mapper/rhel-swap
    rd.lvm.lv=rhel/root
    rd.lvm.lv=rhel/swap
```

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Platform Notes (Continued)

```
  rhgb
  quiet
  cpu0_hotplug


  ----------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 3.40 GHz and 3.40 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes


  ----------------------------------------------------------
15. tuned-adm active
  Current active profile: throughput-performance


  ----------------------------------------------------------
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                  40
  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                   10
  vm.watermark_boost_factor    15000
  vm.watermark_scale_factor       10
  vm.zone_reclaim_mode             0


  ----------------------------------------------------------
17. /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


  ----------------------------------------------------------
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
```

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Dell Inc.

PowerEdge R760 (Intel Xeon Gold 6430)

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SPECrate®2017_fp_peak = 655

CPU2017 License: 6573
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Test Date: Apr-2024
Hardware Availability: Apr-2023
Software Availability: Dec-2023

Platform Notes (Continued)

```
   os-release      Red Hat Enterprise Linux 9.2 (Plow)
  redhat-release Red Hat Enterprise Linux release 9.2 (Plow)
  system-release Red Hat Enterprise Linux release 9.2 (Plow)


    -------------------------------------------------------------
  20. Disk information
  SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.2.3
    Filesystem      Type   Size  Used Avail Use% Mounted on
    tmpfs           tmpfs  80G   4.1G  76G   6% /mnt/ramdisk


    -------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Vendor:         Dell Inc.
      Product:        PowerEdge R760
      Product Family: PowerEdge
      Serial:         SLR7602


    -------------------------------------------------------------
  22. 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:
      16x 002C0632002C MTC40F2046S1RC56BG1 64 GB 2 rank 5600, configured at 4400


    -------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Dell Inc.
    BIOS Version:      1.9.12
    BIOS Date:         11/10/2023
    BIOS Revision:     1.9
```

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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

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SPEC CPU®2017 Floating Point Rate Result

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Software Availability: Dec-2023

Compiler Version Notes (Continued)

```
==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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`

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Hardware Availability: Apr-2023
Software Availability: Dec-2023

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 -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

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SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R760 (Intel Xeon Gold 6430)

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SPECrate®2017_fp_peak = 655

CPU2017 License: 6573		**Test Date:**	Apr-2024
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Apr-2023
Tested by:	Dell Inc.	**Software Availability:**	Dec-2023

Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

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
```

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Dell Inc.

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Software Availability: Dec-2023

Peak Optimization Flags (Continued)

538.imagick_r: basepeak = yes

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.profdata(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

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SPEC CPU®2017 Floating Point Rate Result

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Peak Optimization Flags (Continued)

526.blender_r: `basepeak = yes`

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-ic2023p2-official-linux64.html`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.6.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.6.xml`

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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