SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge XE9640 (Intel Xeon Gold 6442Y)

SPECrate®2017_fp_base = 625

SPECrate®2017_fp_peak = 645

CPU2017 License:	6573	**Test Date:**	Jul-2023
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Sep-2023
Tested by:	Dell Inc.	**Software Availability:**	Dec-2022

Copies scale: 0 150 300 450 600 750 900 1050 1200 1350 1500 1650 1800 1950 2100 2250 2400 2550 2700 2850 3050

- 503.bwaves_r — 96 — 3000
- 507.cactuBSSN_r — 96 — 737; 48 — 801
- 508.namd_r — 96 — 360
- 510.parest_r — 96 — 338; 48 — 409
- 511.povray_r — 96 — 571; 96 — 588
- 519.lbm_r — 96 — 362
- 521.wrf_r — 96 — 525
- 526.blender_r — 96 — 545
- 527.cam4_r — 96 — 610
- 538.imagick_r — 96 — 1530
- 544.nab_r — 96 — 1100
- 549.fotonik3d_r — 96 — 504
- 554.roms_r — 96 — 269; 48 — 298

SPECrate®2017_fp_base (625)
SPECrate®2017_fp_peak (645)

Hardware

CPU Name: Intel Xeon Gold 6442Y
 Max MHz: 4000
 Nominal: 2600
Enabled: 48 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: 70 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
 5.14.0-70.13.1.el9_0.x86_64
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 1.0.0 released Jun-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.

SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

SPECrate®2017_fp_base = 625

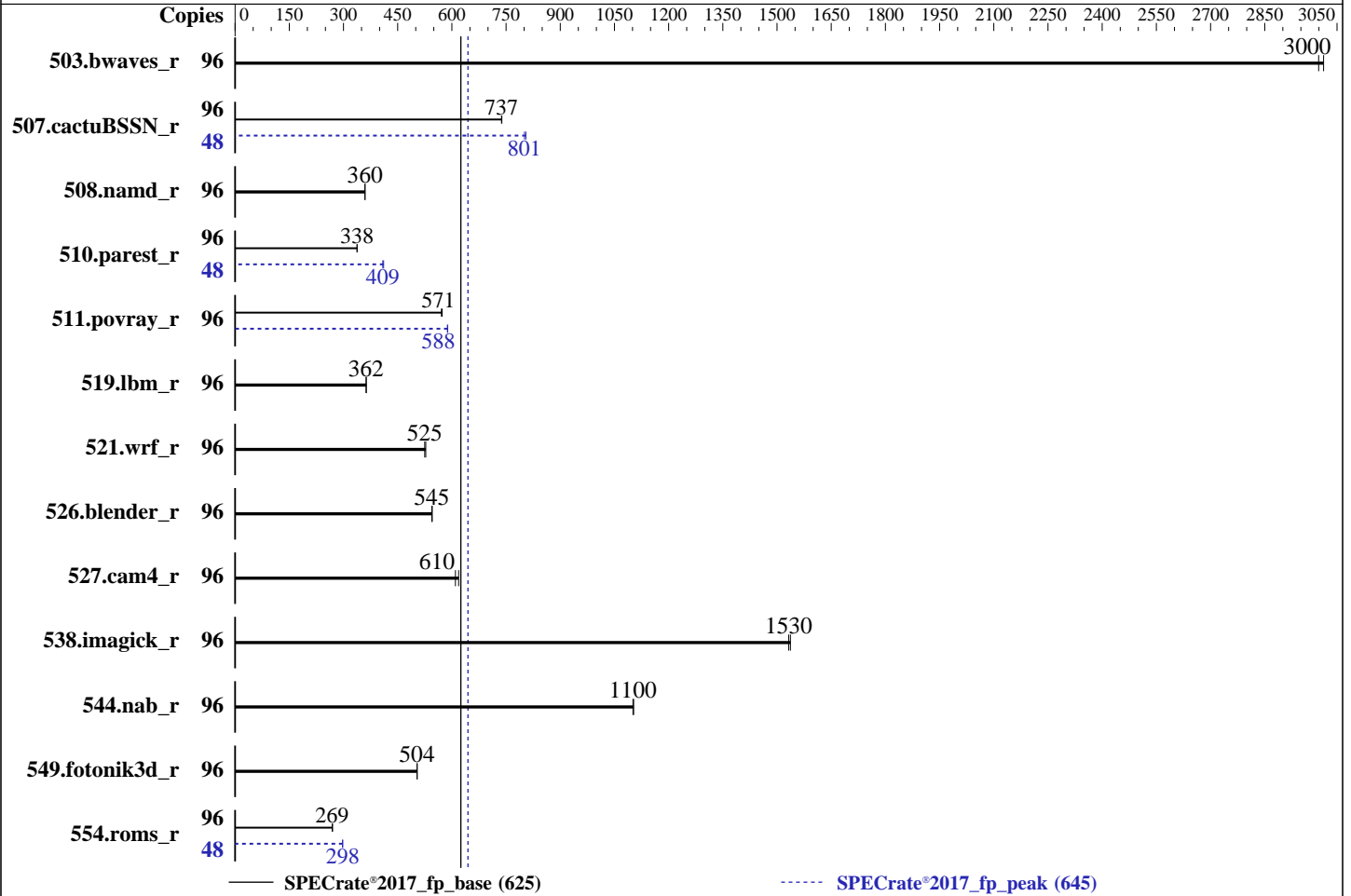PowerEdge XE9640 (Intel Xeon Gold 6442Y)

SPECrate®2017_fp_peak = 645

CPU2017 License: 6573	**Test Date:**	Jul-2023
Test Sponsor: Dell Inc.	**Hardware Availability:**	Sep-2023
Tested by: Dell Inc.	**Software Availability:**	Dec-2022

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	96	**321**	**3000**	320	3010			96	**321**	**3000**	320	3010		
507.cactuBSSN_r	96	**165**	**737**	165	738			48	**75.9**	**801**	75.5	805		
508.namd_r	96	**254**	**360**	254	360			96	**254**	**360**	254	360		
510.parest_r	96	**744**	**338**	744	338			48	**307**	**409**	305	411		
511.povray_r	96	391	573	**393**	**571**			96	**381**	**588**	381	589		
519.lbm_r	96	**279**	**362**	279	363			96	**279**	**362**	279	363		
521.wrf_r	96	407	528	**410**	**525**			96	407	528	**410**	**525**		
526.blender_r	96	268	546	**268**	**545**			96	268	546	**268**	**545**		
527.cam4_r	96	271	619	**275**	**610**			96	271	619	**275**	**610**		
538.imagick_r	96	**156**	**1530**	155	1540			96	**156**	**1530**	155	1540		
544.nab_r	96	146	1100	**147**	**1100**			96	146	1100	**147**	**1100**		
549.fotonik3d_r	96	**743**	**504**	742	504			96	**743**	**504**	742	504		
554.roms_r	96	**568**	**269**	565	270			48	256	298	**256**	**298**		
SPECrate®2017_fp_base =		**625**												
SPECrate®2017_fp_peak =		**645**												

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"
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 70 GB ramdisk created with the cmd: "mount -t tmpfs -o size=70G 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
               Optimizer Mode : Enabled

               System Profile : Custom
        CPU Power Management : Maximum Performance
                          C1E : Disabled
                     C States : Autonomous
          Memory Patrol Scrub : Disabled
      Energy Efficiency Policy : Performance
            PCI ASPM L1 Link
             Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Jul 25 22:39:17 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 250 (250-6.el9_0)
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
```

(Continued on next page)

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

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Platform Notes (Continued)

```
    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 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
      x86_64 x86_64 GNU/Linux


    -----------------------------------------------------------
    2. w
       22:39:17 up  3:45,  1 user,  load average: 29.77, 75.66, 88.44
       USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
       root     tty1       18:54    3:43m  1.32s  0.00s /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=v4.6 --define DL-LQC=1 --output_format html,pdf,txt


    -----------------------------------------------------------
    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) 4124014
      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) 4124014
      virtual memory              (kbytes, -v) unlimited
      file locks                          (-x) unlimited


    -----------------------------------------------------------
    5. sysinfo process ancestry
     /usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
     login -- root
     -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=v4.6 --define DL-LQC=1 --output_format
       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=v4.6 --define DL-LQC=1 --output_format
```

(Continued on next page)

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Software Availability: Dec-2022

Platform Notes (Continued)

```
   html,pdf,txt
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=48 --define physicalfirst
   --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=v4.6 --define DL-LQC=1 --output_format html,pdf,txt fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=48 --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=v4.6 --define DL-LQC=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-ic2023.0

   ------------------------------------------------------------
6. /proc/cpuinfo
   model name       : Intel(R) Xeon(R) Gold 6442Y
   vendor_id        : GenuineIntel
   cpu family       : 6
   model            : 143
   stepping         : 7
   microcode        : 0x2b0004b1
   bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores        : 24
   siblings         : 48
   2 physical ids (chips)
   96 processors (hardware threads)
   physical id 0: core ids 0-23
   physical id 1: core ids 0-23
   physical id 0: apicids 0-47
   physical id 1: apicids 128-175
 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:           52 bits physical, 57 bits virtual
 Byte Order:              Little Endian
 CPU(s):                  96
 On-line CPU(s) list:     0-95
 Vendor ID:               GenuineIntel
 BIOS Vendor ID:          Intel
 Model name:              Intel(R) Xeon(R) Gold 6442Y
 BIOS Model name:         Intel(R) Xeon(R) Gold 6442Y
 CPU family:              6
 Model:                   143
 Thread(s) per core:      2
 Core(s) per socket:      24
 Socket(s):               2
 Stepping:                7
 BogoMIPS:                5200.00
 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
```

(Continued on next page)

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Platform Notes (Continued)

```
                         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
  L1d cache:             2.3 MiB (48 instances)
  L1i cache:             1.5 MiB (48 instances)
  L2 cache:              96 MiB (48 instances)
  L3 cache:              120 MiB (2 instances)
  NUMA node(s):          4
  NUMA node0 CPU(s):     0,4,8,12,14,18,24,28,32,36,38,44,48,52,56,60,62,66,72,76,80,84,86,92
  NUMA node1 CPU(s):     2,6,10,16,20,22,26,30,34,40,42,46,50,54,58,64,68,70,74,78,82,88,90,94
  NUMA node2 CPU(s):     1,5,11,13,17,21,23,27,31,37,41,45,49,53,59,61,65,69,71,75,79,85,89,93
  NUMA node3 CPU(s):     3,7,9,15,19,25,29,33,35,39,43,47,51,55,57,63,67,73,77,81,83,87,91,95
  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
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs 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     2.3M   12 Data             1    64        1             64
    L1i       32K     1.5M    8 Instruction      1    64        1             64
    L2         2M      96M   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: 0,4,8,12,14,18,24,28,32,36,38,44,48,52,56,60,62,66,72,76,80,84,86,92
  node 0 size: 256983 MB
  node 0 free: 247071 MB
  node 1 cpus: 2,6,10,16,20,22,26,30,34,40,42,46,50,54,58,64,68,70,74,78,82,88,90,94
  node 1 size: 258006 MB
  node 1 free: 257046 MB
  node 2 cpus: 1,5,11,13,17,21,23,27,31,37,41,45,49,53,59,61,65,69,71,75,79,85,89,93
  node 2 size: 258042 MB
  node 2 free: 257080 MB
  node 3 cpus: 3,7,9,15,19,25,29,33,35,39,43,47,51,55,57,63,67,73,77,81,83,87,91,95
  node 3 size: 258031 MB
  node 3 free: 257091 MB
  node distances:
  node   0   1   2   3
    0:  10  12  21  21
    1:  12  10  21  21
    2:  21  21  10  12
```

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Platform Notes (Continued)

```
      3:  21  21  12  10

    ------------------------------------------------------------
 9. /proc/meminfo
    MemTotal:      1055809688 kB


    ------------------------------------------------------------
10. who -r
   run-level 3 Jul 25 18:54


    ------------------------------------------------------------
11. Systemd service manager version: systemd 250 (250-6.el9_0)
   Default Target  Status
   multi-user      degraded


    ------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT                   LOAD   ACTIVE SUB    DESCRIPTION
   * dnf-makecache.service loaded failed failed dnf makecache


    ------------------------------------------------------------
13. 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 firewalld
                    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-network-generator 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 dnsmasq iprdump iprinit iprupdate iscsid iscsiuio kpatch kvm_stat
                    ledmon man-db-restart-cache-update nftables nvmf-autoconnect podman podman-auto-update
                    podman-restart psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts rpmdb-rebuild
                    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

    ------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
    root=/dev/mapper/rhel-root
    ro
    crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
    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
```

(Continued on next page)

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Platform Notes (Continued)

```
        ----------------------------------------------------------
        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                   60
          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
          os-release     Red Hat Enterprise Linux 9.0 (Plow)
          redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
          system-release Red Hat Enterprise Linux release 9.0 (Plow)

        ----------------------------------------------------------
        20. Disk information
        SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.0
          Filesystem      Type   Size  Used Avail Use% Mounted on
          tmpfs          tmpfs   70G  4.2G   66G   6% /mnt/ramdisk

        ----------------------------------------------------------
        21. /sys/devices/virtual/dmi/id
            Vendor:         Dell Inc.
            Product:        PowerEdge XE9640
            Product Family: PowerEdge
            Serial:         MS01513

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

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge XE9640 (Intel Xeon Gold 6442Y)

SPECrate®2017_fp_base = 625

SPECrate®2017_fp_peak = 645

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

Test Date: Jul-2023
Hardware Availability: Sep-2023
Software Availability: Dec-2022

Platform Notes (Continued)

```
  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:
      14x 00AD063200AD HMCG94MEBRA109N 64 GB 2 rank 4800
      2x 00CE00B300CE M321R8GA0BB0-CQKEG 64 GB 2 rank 4800


    ------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Dell Inc.
    BIOS Version:      1.0.0
    BIOS Date:         06/15/2023
    BIOS Revision:     1.0
```

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
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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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran      | 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
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```

(Continued on next page)

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Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Jul-2023
Hardware Availability: Sep-2023
Software Availability: Dec-2022

Compiler Version Notes (Continued)

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

==============================================================================================
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`
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`

(Continued on next page)

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Base Portability Flags (Continued)

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
```

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
```

SPEC CPU®2017 Floating Point Rate Result

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

Test Date: Jul-2023
Hardware Availability: Sep-2023
Software Availability: Dec-2022

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`

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`

(Continued on next page)

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Software Availability: Dec-2022

Peak Optimization Flags (Continued)

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: basepeak = yes

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

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-ic2023-official-linux64_revB.2023-10-11.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-ic2023-official-linux64_revB.2023-10-11.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.6.xml

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

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