SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

Precision 7960 Tower (Intel Xeon w9-3495X)

SPECrate®2017_fp_base = 414
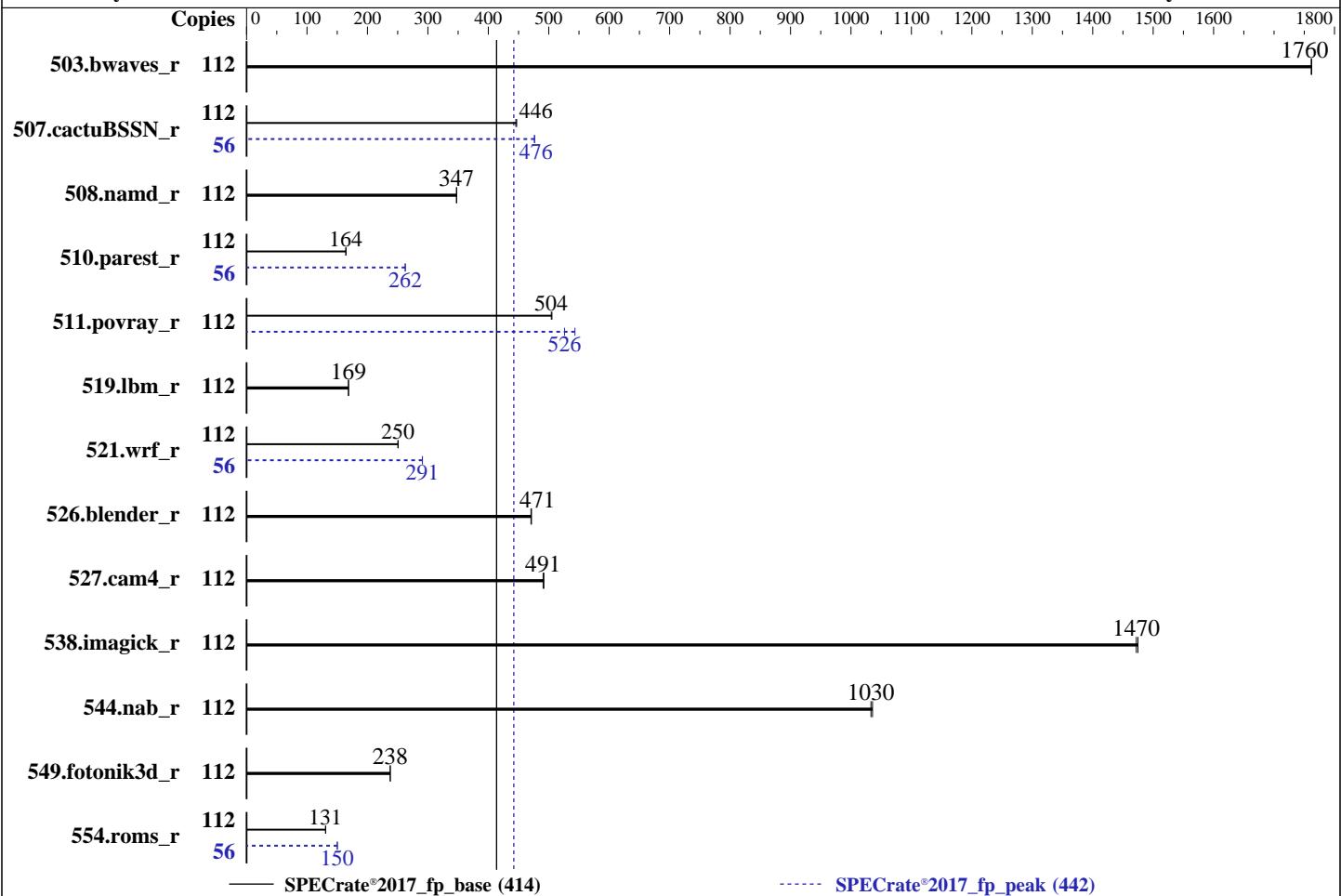
SPECrate®2017_fp_peak = 442

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

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

Copies

Benchmark	Copies	base	peak
503.bwaves_r	112	1760	
507.cactuBSSN_r	112 / 56	446	476
508.namd_r	112	347	
510.parest_r	112 / 56	164	262
511.povray_r	112	504	526
519.lbm_r	112	169	
521.wrf_r	112 / 56	250	291
526.blender_r	112	471	
527.cam4_r	112	491	
538.imagick_r	112	1470	
544.nab_r	112	1030	
549.fotonik3d_r	112	238	
554.roms_r	112 / 56	131	150

SPECrate®2017_fp_base (414)   SPECrate®2017_fp_peak (442)

Hardware

CPU Name: Intel Xeon w9-3495X
 Max MHz: 4800
 Nominal: 1900
Enabled: 56 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 105 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R, running at 4400)
Storage: 80 GB on tmpfs
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-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 1.1.10 released Jul-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.

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

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Results Table

	Base							Peak						
Benchmark	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
503.bwaves_r	112	637	1760	**638**	**1760**			112	637	1760	**638**	**1760**		
507.cactuBSSN_r	112	317	447	**318**	**446**			56	149	477	**149**	**476**		
508.namd_r	112	**306**	**347**	306	347			112	**306**	**347**	306	347		
510.parest_r	112	**1786**	**164**	1780	165			56	558	263	**558**	**262**		
511.povray_r	112	**519**	**504**	518	505			112	**497**	**526**	481	543		
519.lbm_r	112	**700**	**169**	700	169			112	**700**	**169**	700	169		
521.wrf_r	112	1000	251	**1002**	**250**			56	**431**	**291**	431	291		
526.blender_r	112	**363**	**471**	362	471			112	**363**	**471**	362	471		
527.cam4_r	112	398	492	**399**	**491**			112	398	492	**399**	**491**		
538.imagick_r	112	**189**	**1470**	189	1470			112	**189**	**1470**	189	1470		
544.nab_r	112	182	1040	**182**	**1030**			112	182	1040	**182**	**1030**		
549.fotonik3d_r	112	**1837**	**238**	1836	238			112	**1837**	**238**	1836	238		
554.roms_r	112	1361	131	**1362**	**131**			56	592	150	**593**	**150**		
SPECrate®2017_fp_base =			**414**											
SPECrate®2017_fp_peak =			**442**											

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

(Continued on next page)

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General Notes (Continued)

```
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:
     Virtualization Technology : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Mon Oct 16 15:40:13 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. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
------------------------------------------------------------


------------------------------------------------------------
1. uname -a
  Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
  x86_64 x86_64 x86_64 GNU/Linux


------------------------------------------------------------
2. w
   15:40:13 up  5:05,  2 users,  load average: 69.30, 101.43, 107.79
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   dell     console  :0               10:35    5:05m  0.00s  0.04s gdm-session-worker [pam/gdm-autologin]
```

(Continued on next page)

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

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Platform Notes (Continued)

```
  dell     :0        :0              10:35   ?xdm?   6:10   0.12s /usr/lib/gnome-session-binary


  ------------------------------------------------------------
  3. Username
    From environment variable $USER:  root
    From the command 'logname':       dell


  ------------------------------------------------------------
  4. ulimit -a
    core file size          (blocks, -c) 0
    data seg size           (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size               (blocks, -f) unlimited
    pending signals                 (-i) 4120955
    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) 4120955
    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
   sudo ./DELL_rate.sh
   /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-3w.inc --define DL-BIOS-LogProc=1
     --define DL-BIOS-adddcD=1 --define DL-VERS=v4.8 --output_format html,pdf,txt
   /bin/bash ./dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-3w.inc --define DL-BIOS-LogProc=1
     --define DL-BIOS-adddcD=1 --define DL-VERS=v4.8 --output_format html,pdf,txt
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=112 -c
     ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=56 --define physicalfirst
     --define no-numa --tune base,peak -o all --define drop_caches --define DL-LQC=1 --iterations 2 --define
     DL-BIOSinc=Dell-BIOS_Xeon-3w.inc --define DL-BIOS-LogProc=1 --define DL-BIOS-adddcD=1 --define
     DL-VERS=v4.8 --output_format html,pdf,txt fprate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=112 --configfile
     ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=56 --define physicalfirst
     --define no-numa --tune base,peak --output_format all --define drop_caches --define DL-LQC=1 --iterations
     2 --define DL-BIOSinc=Dell-BIOS_Xeon-3w.inc --define DL-BIOS-LogProc=1 --define DL-BIOS-adddcD=1 --define
     DL-VERS=v4.8 --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) w9-3495X
     vendor_id       : GenuineIntel
     cpu family      : 6
```

(Continued on next page)

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Platform Notes (Continued)

```
    model           : 143
    stepping        : 8
    microcode       : 0x2b0004b1
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 56
    siblings        : 112
    1 physical ids (chips)
    112 processors (hardware threads)
    physical id 0: core ids 0-55
    physical id 0: apicids 0-111
  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:                   52 bits physical, 57 bits virtual
   Byte Order:                      Little Endian
   CPU(s):                          112
   On-line CPU(s) list:             0-111
   Vendor ID:                       GenuineIntel
   Model name:                      Intel(R) Xeon(R) w9-3495X
   CPU family:                      6
   Model:                           143
   Thread(s) per core:              2
   Core(s) per socket:              56
   Socket(s):                       1
   Stepping:                        8
   CPU max MHz:                     4800.0000
   CPU min MHz:                     800.0000
   BogoMIPS:                        3792.00
   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 aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                                    ds_cpl vmx 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 intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                                    tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle
                                    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 hwp hwp_act_window hwp_epp hwp_pkg_req 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
   Virtualization:                  VT-x
   L1d cache:                       2.6 MiB (56 instances)
   L1i cache:                       1.8 MiB (56 instances)
   L2 cache:                        112 MiB (56 instances)
   L3 cache:                        105 MiB (1 instance)
   NUMA node(s):                    1
   NUMA node0 CPU(s):               0-111
   Vulnerability Itlb multihit:     Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
  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/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     2.6M   12 Data            1     64        1             64
     L1i       32K     1.8M    8 Instruction     1     64        1             64
     L2         2M     112M   16 Unified         2   2048        1             64
     L3       105M     105M   15 Unified         3 114688        1             64


----------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0-111
  node 0 size: 1030262 MB
  node 0 free: 1018876 MB
  node distances:
  node   0
    0:  10


----------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1054988880 kB


----------------------------------------------------------------
10. who -r
   run-level 5 Oct 16 10:36


----------------------------------------------------------------
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          YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron display-manager
                    firewalld getty@ haveged irqbalance iscsi issue-generator kbdsettings kdump kdump-early
                    klog lvm2-monitor nscd nvmefc-boot-connections postfix purge-kernels rollback rsyslog
                    smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
   enabled-runtime  systemd-remount-fs
   disabled         accounts-daemon appstream-sync-cache autofs autoyast-initscripts blk-availability
                    bluetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
                    cups-browsed debug-shell ebtables exchange-bmc-os-info gpm grub2-once haveged-switch-root
                    hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid iscsiuio issue-add-ssh-keys kexec-load
                    lunmask man-db-create multipathd nfs nfs-blkmap nmb nvmf-autoconnect ostree-remount rdisc
                    rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd_generate_opts smb snmpd
                    snmptrapd speech-dispatcherd systemd-boot-check-no-failures systemd-network-generator
                    systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2 upower
   indirect         wickedd


----------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
```

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Platform Notes (Continued)

```
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=ef56451f-df00-4165-8d14-fdc6d29bd4a6
    splash=silent
    resume=/dev/disk/by-uuid/f3054370-acfc-47f1-9507-513a8eda8ff6
    mitigations=auto
    quiet
    security=apparmor
    crashkernel=305M,high
    crashkernel=72M,low


    ---------------------------------------------------------------
    14. cpupower frequency-info
      analyzing CPU 0:
        current policy: frequency should be within 800 MHz and 4.60 GHz.
                        The governor "powersave" may decide which speed to use
                        within this range.
        boost state support:
          Supported: yes
          Active: yes


    ---------------------------------------------------------------
    15. sysctl
      kernel.numa_balancing                 0
      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

    ---------------------------------------------------------------
    16. /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


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

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

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Platform Notes (Continued)

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

  -------------------------------------------------------------
  19. Disk information
  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

  -------------------------------------------------------------
  20. /sys/devices/virtual/dmi/id
      Vendor:         Dell Inc.
      Product:        Precision 7960 Tower
      Product Family: Precision
      Serial:         72LYTX3

  -------------------------------------------------------------
  21. 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 00AD00B300AD HMCG94AEBRA123N 64 GB 2 rank 4800, configured at 4400


  -------------------------------------------------------------
  22. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:      Dell Inc.
    BIOS Version:     1.1.10
    BIOS Date:        07/27/2023
    BIOS Revision:    1.1
```

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.
------------------------------------------------------------------------------
```

(Continued on next page)

Dell Inc.

Precision 7960 Tower (Intel Xeon w9-3495X)

SPECrate®2017_fp_base = 414

SPECrate®2017_fp_peak = 442

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

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

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 2023.0.0 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
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
Fortran        | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
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
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------------------------------------------------------------------------------
```

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
```

SPEC CPU®2017 Floating Point Rate Result

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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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Dell Inc.

Precision 7960 Tower (Intel Xeon w9-3495X)

SPECrate®2017_fp_base = 414

SPECrate®2017_fp_peak = 442

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

Dell Inc.

Precision 7960 Tower (Intel Xeon w9-3495X)

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

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

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`

Dell Inc.

Precision 7960 Tower (Intel Xeon w9-3495X)

SPECrate®2017_fp_base = 414

SPECrate®2017_fp_peak = 442

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

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-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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