SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

$SPECrate®2017\_fp\_base = \quad 1120$

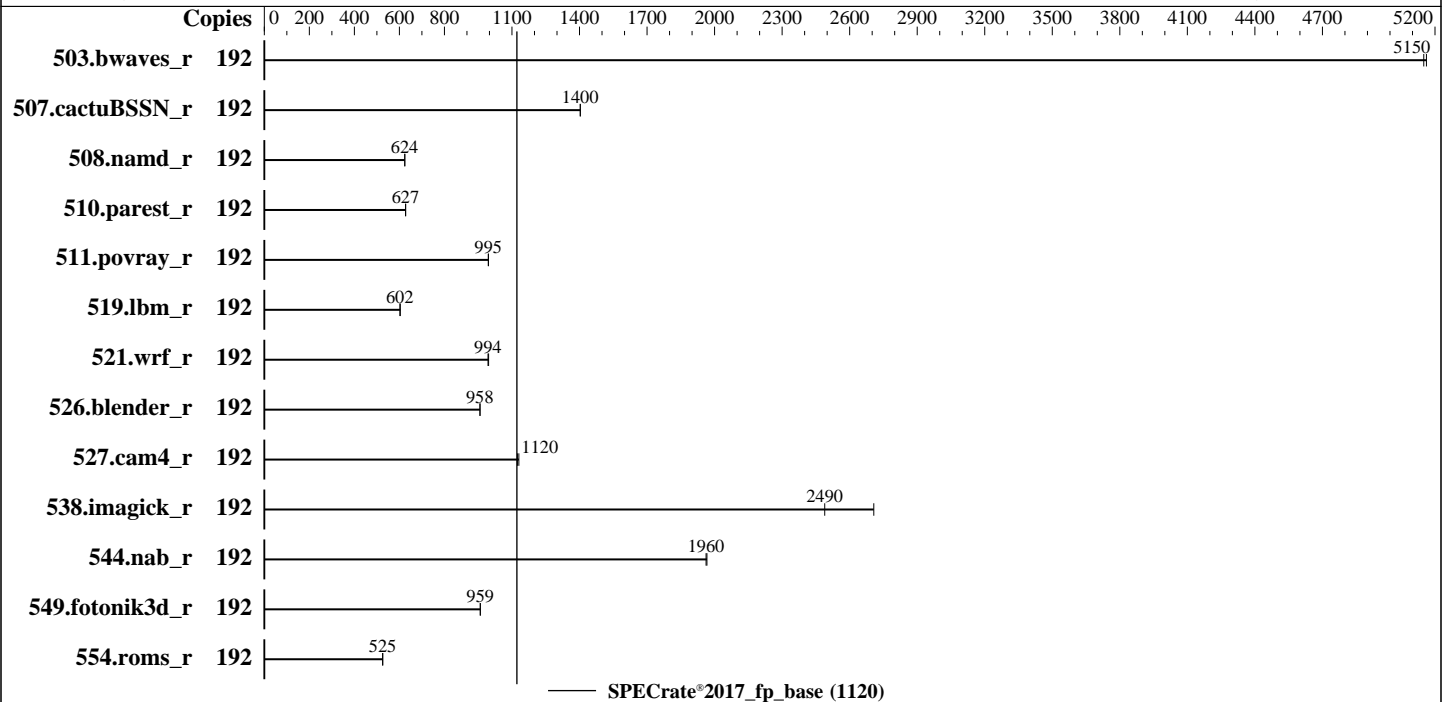### PowerEdge R960 (Intel Xeon Gold 6418H)

$SPECrate®2017\_fp\_peak = Not\ Run$

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

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

Benchmark	Copies	Result
503.bwaves_r	192	5150
507.cactuBSSN_r	192	1400
508.namd_r	192	624
510.parest_r	192	627
511.povray_r	192	995
519.lbm_r	192	602
521.wrf_r	192	994
526.blender_r	192	958
527.cam4_r	192	1120
538.imagick_r	192	2490
544.nab_r	192	1960
549.fotonik3d_r	192	959
554.roms_r	192	525

SPECrate®2017_fp_base (1120)

Hardware

CPU Name: Intel Xeon Gold 6418H
  Max MHz: 4000
  Nominal: 2100
Enabled: 96 cores, 4 chips, 2 threads/core
Orderable: 2,4 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 (32 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 110 GB on tmpfs
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 5.14.21-150500.53-default
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 1.7.6 released Jan-2024
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS 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	192	373	5160	**374**	**5150**									
507.cactuBSSN_r	192	173	1400	**173**	**1400**									
508.namd_r	192	**292**	**624**	292	624									
510.parest_r	192	800	628	**801**	**627**									
511.povray_r	192	**451**	**995**	450	996									
519.lbm_r	192	**336**	**602**	335	604									
521.wrf_r	192	**433**	**994**	432	996									
526.blender_r	192	305	958	**305**	**958**									
527.cam4_r	192	**299**	**1120**	297	1130									
538.imagick_r	192	176	2710	**192**	**2490**									
544.nab_r	192	**165**	**1960**	164	1970									
549.fotonik3d_r	192	**780**	**959**	780	959									
554.roms_r	192	580	526	**581**	**525**									

SPECrate®2017_fp_base =	**1120**
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

```
The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.
```

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/mnt/ramdisk/cpu2017-1.1.9-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 110 GB ramdisk created with the cmd: "mount -t tmpfs -o size=110G tmpfs /mnt/ramdisk"
```

Platform Notes

```
BIOS settings:
        DIMM Self Healing on
    Uncorrectable Memory Error : Disabled

      DCU Streamer Prefetcher : Disabled
                 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 Thu Apr 18 04:53:26 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 249 (249.16+suse.171.gdad0071f15)
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
```

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Platform Notes (Continued)

```
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
    -----------------------------------------------------------

    -----------------------------------------------------------
 1. uname -a
   Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
   x86_64 x86_64 x86_64 GNU/Linux

    -----------------------------------------------------------
 2. w
    04:53:26 up  2:23,  1 user,  load average: 134.47, 177.15, 184.97
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                02:46    2:07m  1.20s  0.01s /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-VERS=5.2 --output_format html,pdf,txt --tune base

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

    -----------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 4124113
   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) 4124113
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

    -----------------------------------------------------------
 5. sysinfo process ancestry
  /usr/lib/systemd/systemd linux --switched-root --system --deserialize 30
  login -- root
  -bash
  /bin/bash ./DELL_rate.sh --tune base
  /bin/bash /home/DellFiles/bin/dell-run-main.sh rate --tune base
  /bin/bash /home/DellFiles/bin/dell-run-main.sh rate --tune base
  /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-VERS=5.2 --output_format html,pdf,txt --tune base
  /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-VERS=5.2 --output_format html,pdf,txt --tune base
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 -c
    ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=96 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base,peak -o all --define DL-4S=1 --iterations
    2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1 --define DL-VERS=5.2 --output_format
    html,pdf,txt --tune base fprate
```

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Platform Notes (Continued)

```
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 --configfile
   ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=96 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --define DL-4S=1
   --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-4.inc --define DL-BIOS-LogProc=1 --define DL-VERS=5.2
   --output_format html,pdf,txt --tune base --nopower --runmode rate --tune base --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 6418H
    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        : 24
    siblings         : 48
    4 physical ids (chips)
    192 processors (hardware threads)
    physical id 0: core ids 0-23
    physical id 1: core ids 0-23
    physical id 2: core ids 0-23
    physical id 3: core ids 0-23
    physical id 0: apicids 0-47
    physical id 1: apicids 128-175
    physical id 2: apicids 256-303
    physical id 3: apicids 384-431
   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):                 192
   On-line CPU(s) list:    0-191
   Vendor ID:              GenuineIntel
   Model name:             Intel(R) Xeon(R) Gold 6418H
   CPU family:             6
   Model:                  143
   Thread(s) per core:     2
   Core(s) per socket:     24
   Socket(s):              4
   Stepping:               8
   CPU max MHz:            4000.0000
   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
                           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
```

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Platform Notes (Continued)

```
                            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 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 hfi 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:              4.5 MiB (96 instances)
    L1i cache:              3 MiB (96 instances)
    L2 cache:               192 MiB (96 instances)
    L3 cache:               240 MiB (4 instances)
    NUMA node(s):           4
    NUMA node0 CPU(s):      0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,10
                            0,104,108,112,116,120,124,128,132,136,140,144,148,152,156,160,164,168,172,
                            176,180,184,188
    NUMA node1 CPU(s):      1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,10
                            1,105,109,113,117,121,125,129,133,137,141,145,149,153,157,161,165,169,173,
                            177,181,185,189
    NUMA node2 CPU(s):      2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,1
                            02,106,110,114,118,122,126,130,134,138,142,146,150,154,158,162,166,170,174
                            ,178,182,186,190
    NUMA node3 CPU(s):      3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79,83,87,91,95,99,1
                            03,107,111,115,119,123,127,131,135,139,143,147,151,155,159,163,167,171,175
                            ,179,183,187,191
    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 and seccomp
    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     4.5M    12 Data           1    64      1         64
      L1i     32K       3M     8 Instruction    1    64      1         64
      L2       2M     192M    16 Unified        2  2048      1         64
      L3      60M     240M    15 Unified        3 65536      1         64

    ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 4 nodes (0-3)
    node 0 cpus:
  0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100,104,108,112,116,120,124,128,132
  ,136,140,144,148,152,156,160,164,168,172,176,180,184,188
    node 0 size: 257380 MB
    node 0 free: 249719 MB
    node 1 cpus:
```

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Platform Notes (Continued)

```
   1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109,113,117,121,125,129,133
   ,137,141,145,149,153,157,161,165,169,173,177,181,185,189
   node 1 size: 258035 MB
   node 1 free: 256573 MB
   node 2 cpus:
   2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110,114,118,122,126,130,13
   4,138,142,146,150,154,158,162,166,170,174,178,182,186,190
   node 2 size: 258035 MB
   node 2 free: 238925 MB
   node 3 cpus:
   3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79,83,87,91,95,99,103,107,111,115,119,123,127,131,13
   5,139,143,147,151,155,159,163,167,171,175,179,183,187,191
   node 3 size: 257606 MB
   node 3 free: 256246 MB
   node distances:
   node   0   1   2   3
     0:  10  21  21  21
     1:  21  10  21  21
     2:  21  21  10  21
     3:  21  21  21  10

   ------------------------------------------------------------
   9. /proc/meminfo
     MemTotal:       1055804432 kB


   ------------------------------------------------------------
   10. who -r
     run-level 3 Apr 18 02:30


   ------------------------------------------------------------
   11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
     Default Target  Status
     multi-user      running


   ------------------------------------------------------------
   12. Services, from systemctl list-unit-files
     STATE            UNIT FILES
     enabled          YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager firewalld getty@
                      irqbalance issue-generator kbdsettings kdump kdump-early klog lvm2-monitor nscd
                      nvmefc-boot-connections postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore
                      wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
     enabled-runtime  systemd-remount-fs
     disabled         autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                      chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info gpm
                      grub2-once haveged haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load lunmask
                      man-db-create multipathd nfs nfs-blkmap nvmf-autoconnect rpcbind rpmconfigcheck rsyncd
                      serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
                      systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd
                      vncserver@
     indirect         wickedd


   ------------------------------------------------------------
   13. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
     root=UUID=893df238-76cf-4e2c-9a9f-c2a0607a3ac0
     linux
     splash=silent
     resume=/dev/disk/by-uuid/5c615f9e-f05b-4599-88a9-51ccf1033619
     mitigations=auto
     quiet
```

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Platform Notes (Continued)

```
   security=apparmor
   crashkernel=390M,high
   crashkernel=72M,low


   ----------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 4.00 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             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

   ----------------------------------------------------------
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


   ----------------------------------------------------------
18. OS release
   From /etc/*-release /etc/*-version
   os-release SUSE Linux Enterprise Server 15 SP5


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

(Continued on next page)

Dell Inc.

PowerEdge R960 (Intel Xeon Gold 6418H)

SPECrate®2017_fp_base = 1120

SPECrate®2017_fp_peak = Not Run

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

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

Platform Notes (Continued)

```
  SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2023.2.3
    Filesystem      Type   Size  Used Avail Use% Mounted on
    tmpfs           tmpfs  110G  4.1G  106G   4% /mnt/ramdisk


  -------------------------------------------------------------
  20. /sys/devices/virtual/dmi/id
      Vendor:         Dell Inc.
      Product:        PowerEdge R960
      Product Family: PowerEdge
      Serial:         BL1X7V3


  -------------------------------------------------------------
  21. dmidecode
    Additional information from dmidecode 3.4 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:
      9x 002C00B3002C MTC20F2085S1RC48BA1 32 GB 2 rank 4800
      14x 002C0632002C MTC20F2085S1RC48BA1 32 GB 2 rank 4800
      2x 002C069D002C MTC20F2085S1RC48BA1 32 GB 2 rank 4800
      1x 00AD00B300AD HMCG88MEBRA115N 32 GB 2 rank 4800
      1x 00AD063200AD HMCG88MEBRA107N 32 GB 2 rank 4800
      2x 00CE069D00CE M321R4GA3BB0-CQKVG 32 GB 2 rank 4800
      3x 00CE069D00CE M321R4GA3BB6-CQKVG 32 GB 2 rank 4800



  -------------------------------------------------------------
  22. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:      Dell Inc.
    BIOS Version:     1.7.6
    BIOS Date:        01/11/2024
    BIOS Revision:    1.7
```

Compiler Version Notes

```
==============================================================================
C            | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
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) 510.parest_r(base)
------------------------------------------------------------------------------
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) 526.blender_r(base)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

SPECrate®2017_fp_base =   1120

PowerEdge R960 (Intel Xeon Gold 6418H)

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

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

Compiler Version Notes (Continued)

```
==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------------
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) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
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) 527.cam4_r(base)
------------------------------------------------------------------------------
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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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

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Test Date: Apr-2024
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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
```

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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