SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

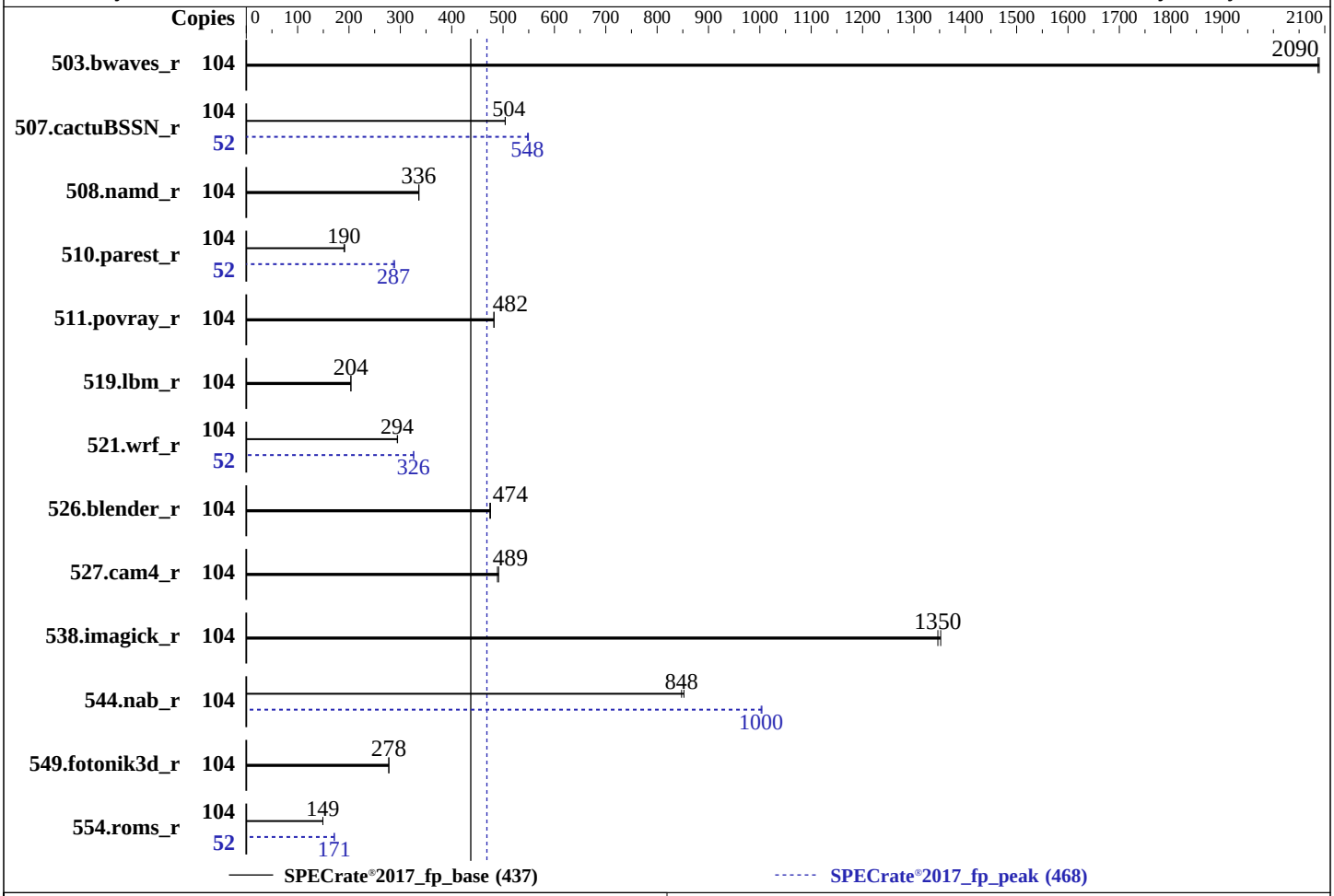
PowerEdge C6620 (Intel Xeon Platinum 8471N)

SPECrate®2017_fp_base = 437

SPECrate®2017_fp_peak = 468

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

Test Date: Jan-2023
Hardware Availability: Feb-2023
Software Availability: May-2022



Hardware

CPU Name:	Intel Xeon Platinum 8471N
Max MHz:	3600
Nominal:	1800
Enabled:	52 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:	97.5 MB I+D on chip per chip
Other:	None
Memory:	512 GB (8 x 64 GB 2Rx4 PC5-4800B-R)
Storage:	125 GB on tmpfs
Other:	None

Software

OS:	Red Hat Enterprise Linux 8.6 (Ootpa) 4.18.0-372.9.1.el8.x86_64
Compiler:	C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
Parallel:	No
Firmware:	Version 0.3.1 released Nov-2022
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.

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	104	499	2090	**500**	**2090**			104	499	2090	**500**	**2090**		
507.cactuBSSN_r	104	**261**	**504**	261	504			52	120	549	**120**	**548**		
508.namd_r	104	294	336	**294**	**336**			104	294	336	**294**	**336**		
510.parest_r	104	**1430**	**190**	1420	192			52	**474**	**287**	471	289		
511.povray_r	104	**504**	**482**	503	482			104	**504**	**482**	503	482		
519.lbm_r	104	**538**	**204**	538	204			104	**538**	**204**	538	204		
521.wrf_r	104	791	295	**792**	**294**			52	357	326	**358**	**326**		
526.blender_r	104	**334**	**474**	333	476			104	**334**	**474**	333	476		
527.cam4_r	104	370	491	**372**	**489**			104	370	491	**372**	**489**		
538.imagick_r	104	191	1350	**192**	**1350**			104	191	1350	**192**	**1350**		
544.nab_r	104	**207**	**848**	205	852			104	174	1000	**175**	**1000**		
549.fotonik3d_r	104	1460	278	**1460**	**278**			104	1460	278	**1460**	**278**		
554.roms_r	104	**1108**	**149**	1108	149			52	**482**	**171**	482	172		

SPECrate®2017_fp_base = 437

SPECrate®2017_fp_peak = 468

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-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.
     1.9-ic2022.1/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
```

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General Notes (Continued)

```
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
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 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"
```

Platform Notes

```
BIOS settings:
                ADDDC Setting : Disabled
      DIMM Self Healing on
  Uncorrectable Memory Error : Disabled
   Virtualization Technology : Disabled
            Sub NUMA Cluster : 4-way Clustering
     DCU Streamer Prefetcher : Disabled
                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-ic2022.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on l Thu Jan 26 12:44:42 2023

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

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Platform Notes (Continued)

```
------------------------------------------------------------
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 239 (239-58.el8)
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
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
22. Disk information
23. /sys/devices/virtual/dmi/id
24. dmidecode
25. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux l 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   12:44:42 up  4:44,  1 user,  load average: 66.62, 94.96, 100.58
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  donald   :1       :1               08:04   ?xdm?   1:26   0.00s /usr/libexec/gdm-x-session
   --register-session --run-script gnome-session

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

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Platform Notes (Continued)

```
------------------------------------------------------------
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) 2060660
  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) 2060660
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 17
 /usr/lib/systemd/systemd --user
 /usr/libexec/gnome-terminal-server
 bash
 sudo su
 su
 bash
 /bin/bash ./DELL_rate.sh
 /bin/bash ./dell-norun-main.sh rate
 /bin/bash ./dell-norun-main.sh rate
 /bin/bash ./dell-norun-specrate.sh --iterations 2 --output_format csv,html,pdf,txt --define
   Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
 /bin/bash ./dell-norun-specrate.sh --iterations 2 --output_format csv,html,pdf,txt --define
   Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=104 -c
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=52 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak -o all --iterations 2
   --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=104 --configfile
   ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=52 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --iterations 2
   --output_format csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_Xeon-4.inc --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-ic2022.1
```

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Platform Notes (Continued)

```
------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Platinum 8471N
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
    microcode       : 0x2b000111
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 52
    siblings        : 104
    1 physical ids (chips)
    104 processors (hardware threads)
    physical id 0: core ids 0-51
    physical id 0: apicids 0-103
  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 2.32.1:
  Architecture:        x86_64
  CPU op-mode(s):      32-bit, 64-bit
  Byte Order:          Little Endian
  CPU(s):              104
  On-line CPU(s) list: 0-103
  Thread(s) per core:  2
  Core(s) per socket:  52
  Socket(s):           1
  NUMA node(s):        4
  Vendor ID:           GenuineIntel
  BIOS Vendor ID:      Intel
  CPU family:          6
  Model:               143
  Model name:          Intel(R) Xeon(R) Platinum 8471N
  BIOS Model name:     Intel(R) Xeon(R) Platinum 8471N
  Stepping:            8
  CPU MHz:             1800.000
  BogoMIPS:            3600.00
  L1d cache:           48K
  L1i cache:           32K
  L2 cache:            2048K
  L3 cache:            99840K
  NUMA node0 CPU(s):   0,2,4,6,8,10,12,14,16,18,20,22,24,52,54,56,58,60,62,64,66,68,70,72,74,76
  NUMA node1 CPU(s):   26,28,30,32,34,36,38,40,42,44,46,48,50,78,80,82,84,86,88,90,92,94,96,98,100,102
```

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Platform Notes (Continued)

```
  NUMA node2 CPU(s):   1,3,5,7,9,11,13,15,17,19,21,23,25,53,55,57,59,61,63,65,67,69,71,73,75,77
  NUMA node3 CPU(s):   27,29,31,33,35,37,39,41,43,45,47,49,51,79,81,83,85,87,89,91,93,95,97,99,101,103
  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 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 flush_l1d arch_capabilities

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0,2,4,6,8,10,12,14,16,18,20,22,24,52,54,56,58,60,62,64,66,68,70,72,74,76
  node 0 size: 128172 MB
  node 0 free: 111585 MB
  node 1 cpus: 26,28,30,32,34,36,38,40,42,44,46,48,50,78,80,82,84,86,88,90,92,94,96,98,100,102
  node 1 size: 129018 MB
  node 1 free: 116551 MB
  node 2 cpus: 1,3,5,7,9,11,13,15,17,19,21,23,25,53,55,57,59,61,63,65,67,69,71,73,75,77
  node 2 size: 129018 MB
  node 2 free: 116460 MB
  node 3 cpus: 27,29,31,33,35,37,39,41,43,45,47,49,51,79,81,83,85,87,89,91,93,95,97,99,101,103
  node 3 size: 129015 MB
  node 3 free: 117232 MB
  node distances:
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
    2:  12  12  10  12
    3:  12  12  12  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       527589748 kB

------------------------------------------------------------
10. who -r
  run-level 5 Jan 26 08:02
```

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Platform Notes (Continued)

```
------------------------------------------------------------
11. Systemd service manager version: systemd 239 (239-58.el8)
  Default Target  Status
  graphical       degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                         LOAD   ACTIVE SUB    DESCRIPTION
  * dnf-makecache.service        loaded failed failed dnf makecache
  * systemd-udev-settle.service loaded failed failed udev Wait for Complete Device Initialization

------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE     UNIT FILES
  enabled   ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon
            atd auditd autovt@ avahi-daemon bluetooth chronyd crond cups display-manager firewalld gdm getty@
            import-state insights-client-boot irqbalance iscsi iscsi-onboot kdump ksm ksmtuned libstoragemgmt
            libvirtd loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
            nvmefc-boot-connections ostree-remount qemu-guest-agent rhsmcertd rpcbind rsyslog rtkit-daemon
            selinux-autorelabel-mark smartd sshd sssd syslog timedatex tuned udisks2 vdo vgauthd vmtoolsd
  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
            debug-shell dnsmasq ebtables gssproxy hwloc-dump-hwdata initial-setup
            initial-setup-reconfiguration iprdump iprinit iprupdate iscsid iscsiuio kpatch kvm_stat ledmon
            libvirt-guests man-db-restart-cache-update ndctl-monitor netcf-transaction nfs-blkmap nfs-convert
            nfs-server nftables numad nvmf-autoconnect oddjobd podman podman-auto-update podman-restart
            psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts saslauthd serial-getty@ speech-dispatcherd
            sshd-keygen@ switcheroo-control systemd-nspawn@ systemd-resolved tcsd upower virtinterfaced
            virtnetworkd virtnodedevd virtnwfilterd virtproxyd virtqemud virtsecretd virtstoraged
            wpa_supplicant
  indirect  spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo virtlockd
            virtlogd
  masked    systemd-timedated

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd0,gpt2)/vmlinuz-4.18.0-372.9.1.el8.x86_64
  root=/dev/mapper/rhel-root
  ro
  crashkernel=auto
  resume=/dev/mapper/rhel-swap
  rd.lvm.lv=rhel/root
  rd.lvm.lv=rhel/swap
  rhgb
  quiet
```

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Platform Notes (Continued)

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

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

------------------------------------------------------------
17. sysctl
  kernel.numa_balancing               1
  kernel.randomize_va_space           2
  vm.compaction_proactiveness         0
  vm.dirty_background_bytes           0
  vm.dirty_background_ratio          10
  vm.dirty_bytes                      0
  vm.dirty_expire_centisecs        3000
  vm.dirty_ratio                     40
  vm.dirty_writeback_centisecs      500
  vm.dirtytime_expire_seconds     43200
  vm.extfrag_threshold              500
  vm.min_unmapped_ratio               1
  vm.nr_hugepages                     0
  vm.nr_hugepages_mempolicy           0
  vm.nr_overcommit_hugepages          0
  vm.swappiness                      10
  vm.watermark_boost_factor       15000
  vm.watermark_scale_factor          10
  vm.zone_reclaim_mode                0

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

------------------------------------------------------------
19. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_swap              64
```

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Platform Notes (Continued)

```
  pages_to_scan             4096
  scan_sleep_millisecs     10000

------------------------------------------------------------
20. OS release
  From /etc/*-release /etc/*-version
  os-release     Red Hat Enterprise Linux 8.6 (Ootpa)
  redhat-release Red Hat Enterprise Linux release 8.6 (Ootpa)
  system-release Red Hat Enterprise Linux release 8.6 (Ootpa)

------------------------------------------------------------
21. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
  itlb_multihit        Not affected
  l1tf                 Not affected
  mds                  Not affected
  meltdown             Not affected
  spec_store_bypass    Mitigation: Speculative Store Bypass disabled via prctl and seccomp
  spectre_v1           Mitigation: usercopy/swapgs barriers and __user pointer sanitization
  spectre_v2           Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
  srbds                Not affected
  tsx_async_abort      Not affected
For more information, see the Linux documentation on hardware vulnerabilities, for example
     https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html

------------------------------------------------------------
22. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2022.1
  Filesystem     Type   Size  Used Avail Use% Mounted on
  tmpfs          tmpfs  125G   46G   80G  37% /mnt/ramdisk

------------------------------------------------------------
23. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge C6620
    Product Family: PowerEdge
    Serial:         SL6C201

------------------------------------------------------------
24. 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:
    8x 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
```

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Platform Notes (Continued)

```
 ------------------------------------------------------------
 25. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Dell Inc.
    BIOS Version:      0.3.1
    BIOS Date:         11/24/2022
    BIOS Revision:     0.3
```

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 2022.1.0 Build 20220316
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 2022.1.0 Build 20220316
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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
```

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Compiler Version Notes (Continued)

```
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2022.1.0 Build 20220316
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
  2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2022.1.0 Build 20220316
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
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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

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 -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -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 C and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
`-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -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`

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: `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops`

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Peak Optimization Flags (Continued)

544.nab_r (continued):
-qopt-mem-layout-trans=4 -qopt-zmm-usage=high -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -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 -xCORE-AVX512 -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 -xCORE-AVX512 -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

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: basepeak = yes

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -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

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64-revB.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64-revB.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.3.xml

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