SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R670 (Intel Xeon 6746E)

$SPECrate^{®}2017\_fp\_base = 880$

$SPECrate^{®}2017\_fp\_peak = 885$
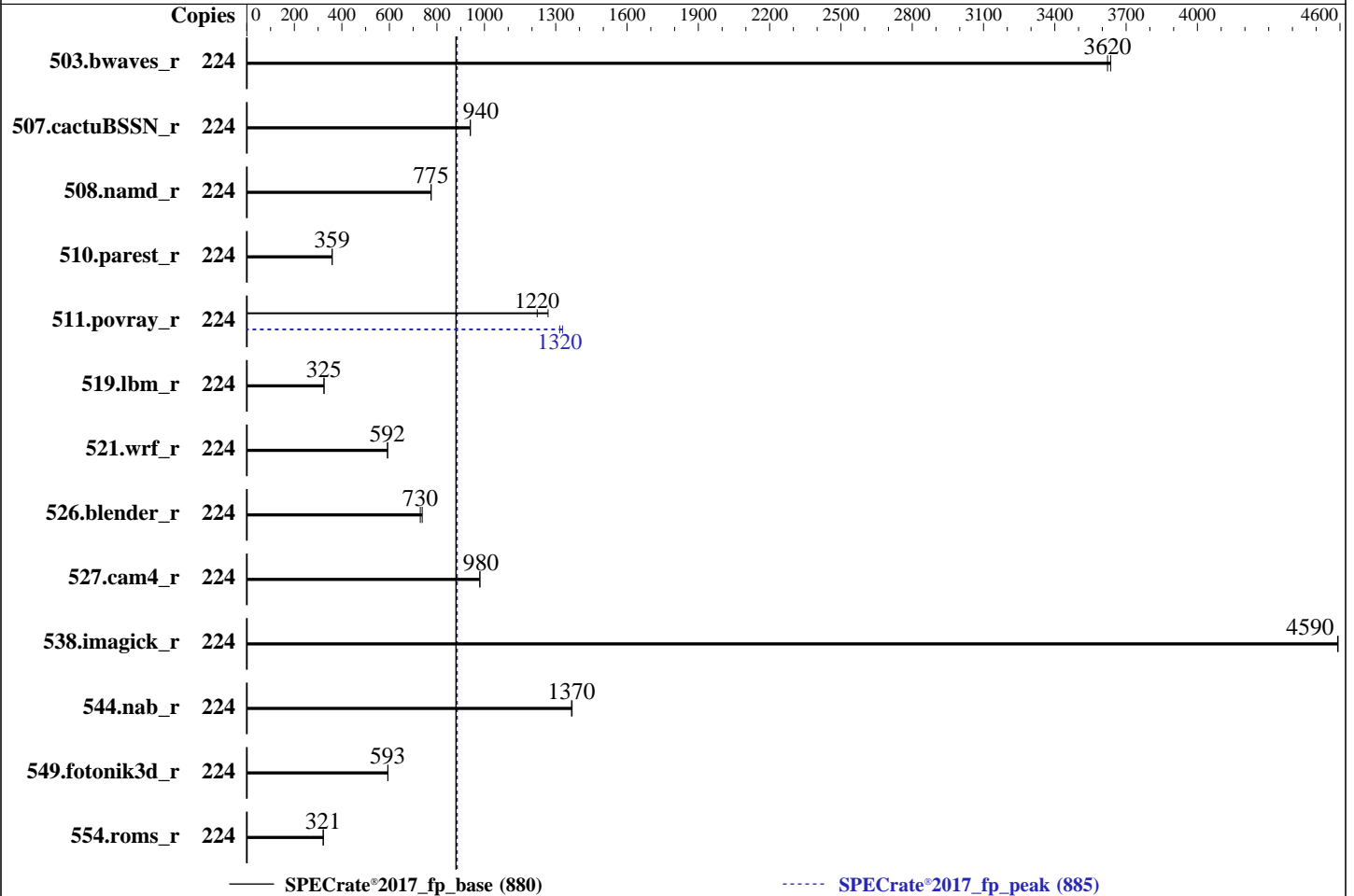
CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Aug-2024

Hardware Availability: Jul-2024

Software Availability: Jun-2024

Copies

Benchmark	Copies	Result
503.bwaves_r	224	3620
507.cactuBSSN_r	224	940
508.namd_r	224	775
510.parest_r	224	359
511.povray_r	224	1220 / 1320
519.lbm_r	224	325
521.wrf_r	224	592
526.blender_r	224	730
527.cam4_r	224	980
538.imagick_r	224	4590
544.nab_r	224	1370
549.fotonik3d_r	224	593
554.roms_r	224	321

SPECrate®2017_fp_base (880)

SPECrate®2017_fp_peak (885)

Hardware

CPU Name: Intel Xeon 6746E

 Max MHz: 2700

 Nominal: 2000

Enabled: 224 cores, 2 chips

Orderable: 1,2 chips

Cache L1: 64 KB I + 32 KB D on chip per core

 L2: 4 MB I+D on chip per core

 L3: 96 MB I+D on chip per chip

 Other: None

Memory: 1 TB (16 x 64 GB 2Rx4 PC5-6400B-R, running at 5600)

Storage: 120 GB on tmpfs

Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
6.4.0-150600.21-default

Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;

Parallel: No

Firmware: Version 1.0.2 released Aug-2024

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 set to prefer performance at the cost of additional power usage.

https://www.spec.org/

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CPU2017 License: 6573	**Test Date:** Aug-2024
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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	224	618	3630	**620**	**3620**			224	618	3630	**620**	**3620**		
507.cactuBSSN_r	224	301	941	**302**	**940**			224	301	941	**302**	**940**		
508.namd_r	224	**274**	**775**	274	776			224	**274**	**775**	274	776		
510.parest_r	224	**1632**	**359**	1632	359			224	**1632**	**359**	1632	359		
511.povray_r	224	**428**	**1220**	413	1270			224	**397**	**1320**	394	1330		
519.lbm_r	224	**727**	**325**	727	325			224	**727**	**325**	727	325		
521.wrf_r	224	847	593	**848**	**592**			224	847	593	**848**	**592**		
526.blender_r	224	**467**	**730**	462	738			224	**467**	**730**	462	738		
527.cam4_r	224	**400**	**980**	399	981			224	**400**	**980**	399	981		
538.imagick_r	224	**121**	**4590**	121	4590			224	**121**	**4590**	121	4590		
544.nab_r	224	**276**	**1370**	275	1370			224	**276**	**1370**	275	1370		
549.fotonik3d_r	224	1470	594	**1472**	**593**			224	1470	594	**1472**	**593**		
554.roms_r	224	1105	322	**1109**	**321**			224	1105	322	**1109**	**321**		

SPECrate®2017_fp_base =	**880**
SPECrate®2017_fp_peak =	**885**

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-ic2024.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.9-ic2024.1/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
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)

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

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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 120 GB ramdisk created with the cmd: "mount -t tmpfs -o size=120G tmpfs /mnt/ramdisk"
```

Platform Notes

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


                System Profile : Custom
          CPU Power Management : Maximum Performance
         Energy Efficient Turbo : Disabled
                           C1E : Disabled
                      C States : Autonomous
      Energy Efficiency Policy : Performance
          CPU Interconnect Bus
         Link Power Management : Disabled
         PCI ASPM L1 Link
              Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-ic2024.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on DN01113-R670 Sat Aug 31 19:20:14 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 254 (254.10+suse.84.ge8d77af424)
 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
```

(Continued on next page)

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Test Date: Aug-2024

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Platform Notes (Continued)

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


   --------------------------------------------------------
   1. uname -a
     Linux DN01113-R670 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
     x86_64 x86_64 x86_64 GNU/Linux


   --------------------------------------------------------
   2. w
      19:20:14 up  4:26,  1 user,  load average: 102.02, 190.55, 211.00
     USER     TTY       FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
     root     tty1      -                14:59    4:21m  2.53s  0.04s /bin/bash
     /home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-7.inc --define
     DL-BIOS-adddcD=1 --define DL-VERS=5.3.3 --output_format html,pdf,txt


   --------------------------------------------------------
   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) 4126537
     max locked memory       (kbytes, -l) 8192
     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) 4126537
     virtual memory          (kbytes, -v) unlimited
     file locks                      (-x) unlimited


   --------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize=42 linux
    login -- root
    -bash
    /bin/bash /home/DellFiles/bin/DELL_rate.sh
    /bin/bash /home/DellFiles/bin/dell-run-main.sh rate
    /bin/bash /home/DellFiles/bin/dell-run-main.sh rate
    /bin/bash /home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-7.inc
      --define DL-BIOS-adddcD=1 --define DL-VERS=5.3.3 --output_format html,pdf,txt
    /bin/bash /home/DellFiles/bin/Intel/dell-run-speccpu.sh rate --define DL-BIOSinc=Dell-BIOS_Xeon-7.inc
      --define DL-BIOS-adddcD=1 --define DL-VERS=5.3.3 --output_format html,pdf,txt
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=224 -c
      ic2024.1-lin-sierraforest-rate-20240308.cfg --define smt-on --define peakfpcopies=112 --define
      physicalfirst --define invoke_with_interleave --define drop_caches --reportable --tune base,peak -o all
      --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-7.inc --define DL-BIOS-adddcD=1 --define DL-VERS=5.3.3
      --output_format html,pdf,txt fprate
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=224 --configfile
```

(Continued on next page)

Dell Inc.

PowerEdge R670 (Intel Xeon 6746E)

SPECrate®2017_fp_base = 880

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CPU2017 License: 6573　　　　　　　　　　　　　　　　**Test Date:**　　　　　Aug-2024
Test Sponsor:　　Dell Inc.　　　　　　　　　　　　　**Hardware Availability:** Jul-2024
Tested by:　　　　Dell Inc.　　　　　　　　　　　　　**Software Availability:**　Jun-2024

Platform Notes (Continued)

```
    ic2024.1-lin-sierraforest-rate-20240308.cfg --define smt-on --define peakfpcopies=112 --define
    physicalfirst --define invoke_with_interleave --define drop_caches --reportable --tune base,peak
    --output_format all --iterations 2 --define DL-BIOSinc=Dell-BIOS_Xeon-7.inc --define DL-BIOS-adddcD=1
    --define DL-VERS=5.3.3 --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-ic2024.1


    ----------------------------------------------------------
6. /proc/cpuinfo
    model name        : Intel(R) Xeon(R) 6746E
    vendor_id         : GenuineIntel
    cpu family        : 6
    model             : 175
    stepping          : 3
    microcode         : 0x3000211
    bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
    cpu cores         : 112
    siblings          : 112
    2 physical ids (chips)
    224 processors (hardware threads)
    physical id 0: core ids 0-111
    physical id 1: core ids 0-111
    physical id 0: apicids
    0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
    ,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118,120,122,124,126,128,130,1
    32,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,180,182,18
    4,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222
    physical id 1: apicids
    512,514,516,518,520,522,524,526,528,530,532,534,536,538,540,542,544,546,548,550,552,554,556,558,560,562,5
    64,566,568,570,572,574,576,578,580,582,584,586,588,590,592,594,596,598,600,602,604,606,608,610,612,614,61
    6,618,620,622,624,626,628,630,632,634,636,638,640,642,644,646,648,650,652,654,656,658,660,662,664,666,668
    ,670,672,674,676,678,680,682,684,686,688,690,692,694,696,698,700,702,704,706,708,710,712,714,716,718,720,
    722,724,726,728,730,732,734
  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 2.39.3:
  Architecture:                   x86_64
  CPU op-mode(s):                 32-bit, 64-bit
  Address sizes:                  52 bits physical, 48 bits virtual
  Byte Order:                     Little Endian
  CPU(s):                         224
  On-line CPU(s) list:            0-223
  Vendor ID:                      GenuineIntel
  BIOS Vendor ID:                 Intel
  Model name:                     Intel(R) Xeon(R) 6746E
  BIOS Model name:                Intel(R) Xeon(R) 6746E  CPU @ 2.0GHz
  BIOS CPU family:                179
  CPU family:                     6
  Model:                          175
  Thread(s) per core:             1
  Core(s) per socket:             112
  Socket(s):                      2
  Stepping:                       3
  BogoMIPS:                       4000.00
```

(Continued on next page)

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Platform Notes (Continued)

```
  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 intel_ppin cdp_l2
                                  ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept
                                  vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid cqm
                                  rdt_a rdseed adx smap clflushopt clwb intel_pt sha_ni xsaveopt xsavec
                                  xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                                  split_lock_detect user_shstk avx_vnni lam wbnoinvd dtherm ida arat
                                  pln pts vnmi umip pku ospke waitpkg gfni vaes vpclmulqdq tme rdpid
                                  bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear
                                  serialize pconfig arch_lbr ibt flush_l1d arch_capabilities
  Virtualization:                 VT-x
  L1d cache:                      7 MiB (224 instances)
  L1i cache:                      14 MiB (224 instances)
  L2 cache:                       224 MiB (56 instances)
  L3 cache:                       192 MiB (2 instances)
  NUMA node(s):                   2
  NUMA node0 CPU(s):              0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48
                                  ,50,52,54,56,58,60,62,64,66,68,70,72,74,76,78,80,82,84,86,88,90,92,94
                                  ,96,98,100,102,104,106,108,110,112,114,116,118,120,122,124,126,128,13
                                  0,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164
                                  ,166,168,170,172,174,176,178,180,182,184,186,188,190,192,194,196,198,
                                  200,202,204,206,208,210,212,214,216,218,220,222
  NUMA node1 CPU(s):              1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49
                                  ,51,53,55,57,59,61,63,65,67,69,71,73,75,77,79,81,83,85,87,89,91,93,95
                                  ,97,99,101,103,105,107,109,111,113,115,117,119,121,123,125,127,129,13
                                  1,133,135,137,139,141,143,145,147,149,151,153,155,157,159,161,163,165
                                  ,167,169,171,173,175,177,179,181,183,185,187,189,191,193,195,197,199,
                                  201,203,205,207,209,211,213,215,217,219,221,223
  Vulnerability Gather data sampling:  Not affected
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Mmio stale data:  Not affected
  Vulnerability Reg file data sampling: Not affected
  Vulnerability Retbleed:         Not affected
  Vulnerability Spec rstack overflow:  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 / Automatic IBRS; IBPB conditional; RSB filling;
                                  PBRSB-eIBRS Not affected; BHI BHI_DIS_S
  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        32K       7M    8 Data              1      64        1             64
      L1i        64K      14M    8 Instruction       1     128        1             64
      L2          4M     224M   16 Unified           2    4096        1             64
      L3         96M     192M   12 Unified           3  131072        1             64


  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
```

(Continued on next page)

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Platform Notes (Continued)

```
    available: 2 nodes (0-1)
    node 0 cpus:
    0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72,7
    4,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118,120,122,124,126,128,130,132,1
    34,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,180,182,184,186,
    188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222
    node 0 size: 515671 MB
    node 0 free: 514328 MB
    node 1 cpus:
    1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63,65,67,69,71,73,7
    5,77,79,81,83,85,87,89,91,93,95,97,99,101,103,105,107,109,111,113,115,117,119,121,123,125,127,129,131,133,1
    35,137,139,141,143,145,147,149,151,153,155,157,159,161,163,165,167,169,171,173,175,177,179,181,183,185,187,
    189,191,193,195,197,199,201,203,205,207,209,211,213,215,217,219,221,223
    node 1 size: 515989 MB
    node 1 free: 504550 MB
    node distances:
    node   0   1
      0:  10  21
      1:  21  10


    -----------------------------------------------------------
    9. /proc/meminfo
      MemTotal:       1056420496 kB


    -----------------------------------------------------------
    10. who -r
      run-level 3 Aug 31 14:54


    -----------------------------------------------------------
    11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
      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 klog lvm2-monitor nscd nvmefc-boot-connections
                      nvmf-autoconnect 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 fsidd
                      gpm grub2-once haveged ipmi ipmievd issue-add-ssh-keys kexec-load lunmask man-db-create
                      multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts
                      snmpd snmptrapd systemd-boot-check-no-failures systemd-confext systemd-network-generator
                      systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2 vncserver@
      indirect        systemd-userdbd wickedd

    -----------------------------------------------------------
    13. Linux kernel boot-time arguments, from /proc/cmdline
      BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
      root=UUID=ab78c1eb-763f-4bbd-bae6-2e79c83e47d6
      linux
      splash=silent
      mitigations=auto
      quiet
      security=apparmor

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

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Dell Inc.

PowerEdge R670 (Intel Xeon 6746E)

$SPECrate^{®}2017\_fp\_base = 880$

$SPECrate^{®}2017\_fp\_peak = 885$

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

Test Date: Aug-2024
Hardware Availability: Jul-2024
Software Availability: Jun-2024

Platform Notes (Continued)

```
14. cpupower frequency-info
  analyzing CPU 96:
    Unable to determine current policy
    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 SP6

  --------------------------------------------------------------
19. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-ic2024.1
  Filesystem     Type   Size  Used Avail Use% Mounted on
  tmpfs          tmpfs  120G  5.0G  116G   5% /mnt/ramdisk

  --------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:        Dell Inc.
```

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Dell Inc.

PowerEdge R670 (Intel Xeon 6746E)

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Test Date: Aug-2024
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Platform Notes (Continued)

```
      Product:        PowerEdge R670
      Product Family: PowerEdge
      Serial:         DN01113


    ------------------------------------------------------------
 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 00AD042300AD HMCG94AHBRA480N 64 GB 2 rank 6400, configured at 5600
     7x 00AD063200AD HMCG94AHBRA277N 64 GB 2 rank 6400, configured at 5600


    ------------------------------------------------------------
 22. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Dell Inc.
    BIOS Version:      1.0.2
    BIOS Date:         08/29/2024
    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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

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SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R670 (Intel Xeon 6746E)

SPECrate®2017_fp_base = 880

SPECrate®2017_fp_peak = 885

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

Test Date: Aug-2024
Hardware Availability: Jul-2024
Software Availability: Jun-2024

Compiler Version Notes (Continued)

```
==============================================================================
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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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`

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

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Base Portability Flags (Continued)

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 -xsierraforest -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsierraforest -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 -xsierraforest -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 -xsierraforest -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -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 -xsierraforest -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsierraforest -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -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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Dell Inc.

PowerEdge R670 (Intel Xeon 6746E)

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

Test Date: Aug-2024
Hardware Availability: Jul-2024
Software Availability: Jun-2024

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: `basepeak = yes`

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

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SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R670 (Intel Xeon 6746E)

SPECrate®2017_fp_base = 880

SPECrate®2017_fp_peak = 885

Peak Optimization Flags (Continued)

549.fotonik3d_r: `basepeak = yes`

554.roms_r: `basepeak = yes`

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 -flto`
`-Ofast -ffast-math -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

526.blender_r: `basepeak = yes`

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.html`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.9.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.9.xml`

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

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