SPEC CPU®2017 Floating Point Rate Result

IEIT Systems Co., Ltd.

NF5280M7 (Intel Xeon Gold 5520+)

SPECrate®2017_fp_base = 659
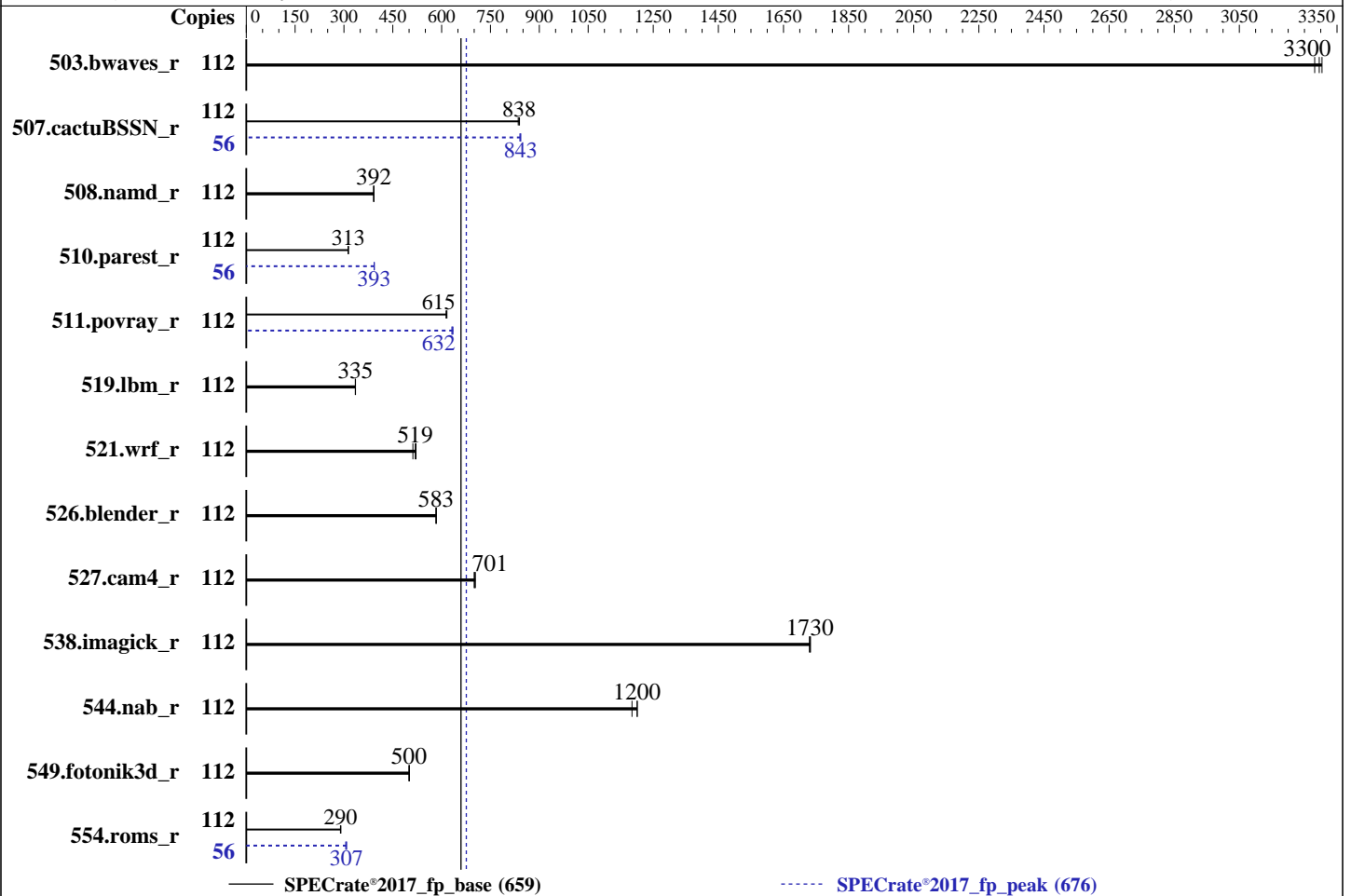### SPECrate®2017_fp_peak = 676

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Feb-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023

Benchmark	Copies	Base	Peak
503.bwaves_r	112	3300	
507.cactuBSSN_r	112 / 56	838	843
508.namd_r	112	392	
510.parest_r	112 / 56	313	393
511.povray_r	112	615	632
519.lbm_r	112	335	
521.wrf_r	112	519	
526.blender_r	112	583	
527.cam4_r	112	701	
538.imagick_r	112	1730	
544.nab_r	112	1200	
549.fotonik3d_r	112	500	
554.roms_r	112 / 56	290	307

—— SPECrate®2017_fp_base (659)   ----- SPECrate®2017_fp_peak (676)

Hardware

CPU Name: Intel Xeon Gold 5520+
 Max MHz: 4000
 Nominal: 2200
Enabled: 56 cores, 2 chips, 2 threads/core
Orderable: 2 chip
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 52.5 MB I+D on chip per chip
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC5-5600B-R, running at 4400)
Storage: 1 x 1.92 TB NVME SSD
Other: None

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 05.13.00 released Nov-2023
File System: btrfs
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.

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

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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	112	340	3300	**341**	**3300**	342	3280	112	340	3300	**341**	**3300**	342	3280
507.cactuBSSN_r	112	**169**	**838**	169	839	170	835	56	84.1	843	84.4	840	**84.1**	**843**
508.namd_r	112	272	391	272	392	**272**	**392**	112	272	391	272	392	**272**	**392**
510.parest_r	112	**936**	**313**	933	314	937	313	56	373	393	**373**	**393**	372	393
511.povray_r	112	**425**	**615**	426	614	424	616	112	412	635	**414**	**632**	414	632
519.lbm_r	112	**352**	**335**	353	335	352	335	112	**352**	**335**	353	335	352	335
521.wrf_r	112	481	521	**483**	**519**	490	512	112	481	521	**483**	**519**	490	512
526.blender_r	112	293	583	**293**	**583**	292	583	112	293	583	**293**	**583**	292	583
527.cam4_r	112	278	704	**279**	**701**	280	700	112	278	704	**279**	**701**	280	700
538.imagick_r	112	161	1730	161	1730	**161**	**1730**	112	161	1730	161	1730	**161**	**1730**
544.nab_r	112	159	1180	**157**	**1200**	157	1200	112	159	1180	**157**	**1200**	157	1200
549.fotonik3d_r	112	**873**	**500**	873	500	871	501	112	**873**	**500**	873	500	871	501
554.roms_r	112	613	290	**614**	**290**	615	289	56	291	305	**289**	**307**	289	308

SPECrate®2017_fp_base =	**659**
SPECrate®2017_fp_peak =	**676**

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 = "/home/CPU2017/lib/intel64:/home/CPU2017/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>

   NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
```

(Continued on next page)

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General Notes (Continued)

```
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.

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
```

Platform Notes

```
BIOS configuration:
ENERGY_PERF_BIAS_CFG mode set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
Sub NUMA Cluster (SNC) set to SNC2

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Thu Jan 25 16:22:08 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. sysctl
15. /sys/kernel/mm/transparent_hugepage
16. /sys/kernel/mm/transparent_hugepage/khugepaged
17. OS release
18. Disk information
19. /sys/devices/virtual/dmi/id
20. dmidecode
21. 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
   16:22:08 up  6:02,  1 user,  load average: 61.87, 98.79, 106.58
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

(Continued on next page)

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Platform Notes (Continued)

```
   root     tty1      -                10:21   6:00m  1.68s  0.03s -bash


   ----------------------------------------------------------
   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) 2062225
     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) 2062225
     virtual memory          (kbytes, -v) unlimited
     file locks                      (-x) unlimited


   ----------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 29
    login -- root
    -bash
    -bash
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=112 -c
      ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=56 --define physicalfirst
      --define invoke_with_interleave --define drop_caches --tune base,peak -o all fprate
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=112 --configfile
      ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=56 --define physicalfirst
      --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
      --runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.017/templogs/preenv.fprate.017.0.log --lognum 017.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
   $SPEC = /home/CPU2017


   ----------------------------------------------------------
   6. /proc/cpuinfo
     model name      : INTEL(R) XEON(R) GOLD 5520+
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 207
     stepping        : 2
     microcode       : 0x21000161
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
     cpu cores       : 28
     siblings        : 56
     2 physical ids (chips)
     112 processors (hardware threads)
     physical id 0: core ids 0-27
     physical id 1: core ids 0-27
     physical id 0: apicids 0-55
     physical id 1: apicids 128-183
    Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
```

(Continued on next page)

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CPU2017 License: 3358　　　　　　　　　　　　　　　　　　　**Test Date:**　　　　　　　Feb-2024
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Platform Notes (Continued)

```
   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):                          112
      On-line CPU(s) list:             0-111
      Vendor ID:                       GenuineIntel
      Model name:                      INTEL(R) XEON(R) GOLD 5520+
      CPU family:                      6
      Model:                           207
      Thread(s) per core:              2
      Core(s) per socket:              28
      Socket(s):                       2
      Stepping:                        2
      CPU max MHz:                     4000.0000
      CPU min MHz:                     800.0000
      BogoMIPS:                        4400.00
      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 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 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 avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
                                       hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke waitpkg
                                       avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
                                       avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
                                       enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16
                                       amx_tile flush_l1d arch_capabilities
      L1d cache:                       2.6 MiB (56 instances)
      L1i cache:                       1.8 MiB (56 instances)
      L2 cache:                        112 MiB (56 instances)
      L3 cache:                        105 MiB (2 instances)
      NUMA node(s):                    4
      NUMA node0 CPU(s):               0-13,56-69
      NUMA node1 CPU(s):               14-27,70-83
      NUMA node2 CPU(s):               28-41,84-97
      NUMA node3 CPU(s):               42-55,98-111
      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
```

(Continued on next page)

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Platform Notes (Continued)

```
  Vulnerability Tsx async abort:   Not affected

  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d      48K      2.6M  12 Data              1    64        1            64
      L1i      32K      1.8M   8 Instruction       1    64        1            64
      L2        2M      112M  16 Unified           2  2048        1            64
      L3     52.5M      105M  15 Unified           3 57344        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: 0-13,56-69
  node 0 size: 128583 MB
  node 0 free: 114342 MB
  node 1 cpus: 14-27,70-83
  node 1 size: 128982 MB
  node 1 free: 116621 MB
  node 2 cpus: 28-41,84-97
  node 2 size: 129016 MB
  node 2 free: 117163 MB
  node 3 cpus: 42-55,98-111
  node 3 size: 128996 MB
  node 3 free: 117193 MB
  node distances:
  node   0   1   2   3
    0:  10  12  21  21
    1:  12  10  21  21
    2:  21  21  10  12
    3:  21  21  12  10


  ----------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       527953204 kB


  ----------------------------------------------------------------
10. who -r
   run-level 3 Jan 25 10:19


  ----------------------------------------------------------------
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          apparmor auditd cron getty@ irqbalance issue-generator kbdsettings nvmefc-boot-connections
                    postfix purge-kernels rollback systemd-pstore wicked wickedd-auto4 wickedd-dhcp4
                    wickedd-dhcp6 wickedd-nanny
   enabled-runtime  systemd-remount-fs
   disabled         boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
                    exchange-bmc-os-info grub2-once haveged haveged-switch-root ipmievd issue-add-ssh-keys
                    kexec-load lunmask nvmf-autoconnect rpmconfigcheck serial-getty@
                    systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                    systemd-time-wait-sync systemd-timesyncd
   indirect         wickedd


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

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Platform Notes (Continued)

```
 13. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
     root=UUID=e0c623aa-ee95-4c1b-a983-a707e455061f
     splash=silent
     mitigations=auto
     quiet
     security=apparmor


    ----------------------------------------------------------------
 14. 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


    ----------------------------------------------------------------
 15. /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


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


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


    ----------------------------------------------------------------
 18. Disk information
 SPEC is set to: /home/CPU2017
     Filesystem      Type   Size  Used Avail Use% Mounted on
     /dev/nvme0n1p3 btrfs  891G   95G  797G  11% /home


    ----------------------------------------------------------------
 19. /sys/devices/virtual/dmi/id
```

(Continued on next page)

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Platform Notes (Continued)

```
        Vendor:         IEIT
        Product:        NF5280-M7-A0-R0-00
        Product Family: Not specified
        Serial:         000000000


    --------------------------------------------------------------
 20. 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:
      16x Samsung M321R4GA3PB0-CWMCH 32 GB 2 rank 5600


    --------------------------------------------------------------
 21. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:        American Megatrends International, LLC.
    BIOS Version:       05.13.00
    BIOS Date:          11/30/2023
```

Compiler Version Notes

```
==============================================================================================
C                | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C++              | 508.namd_r(base, peak) 510.parest_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C++, C           | 511.povray_r(base, peak) 526.blender_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 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.
----------------------------------------------------------------------------------------------


==============================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
----------------------------------------------------------------------------------------------
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.
----------------------------------------------------------------------------------------------


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

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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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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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`

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

IEIT Systems Co., Ltd.

NF5280M7 (Intel Xeon Gold 5520+)

SPECrate®2017_fp_base = 659

SPECrate®2017_fp_peak = 676

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Feb-2024
Hardware Availability: Dec-2023
Software Availability: Dec-2023

Base Portability Flags (Continued)

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
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

SPEC CPU®2017 Floating Point Rate Result

IEIT Systems Co., Ltd.

NF5280M7 (Intel Xeon Gold 5520+)

SPECrate®2017_fp_base = 659

SPECrate®2017_fp_peak = 676

Peak Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

Benchmarks using both C and C++:
```
icpx icx
```

Benchmarks using Fortran, C, and C++:
```
icpx icx ifx
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `basepeak = yes`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

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Hardware Availability: Dec-2023
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Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: `-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: `-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2`(pass 1)
`-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
`-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-intel-V3.4.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/Inspur-Platform-Settings-intel-V3.4.xml

SPEC CPU®2017 Floating Point Rate Result

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

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