SPEC CPU®2017 Floating Point Speed Result

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ASUSTeK Computer Inc.

ASUS ESC4000-E11
(2.00 GHz, Intel Xeon Gold 6438N)

$SPECspeed^{®}2017\_fp\_base = 328$

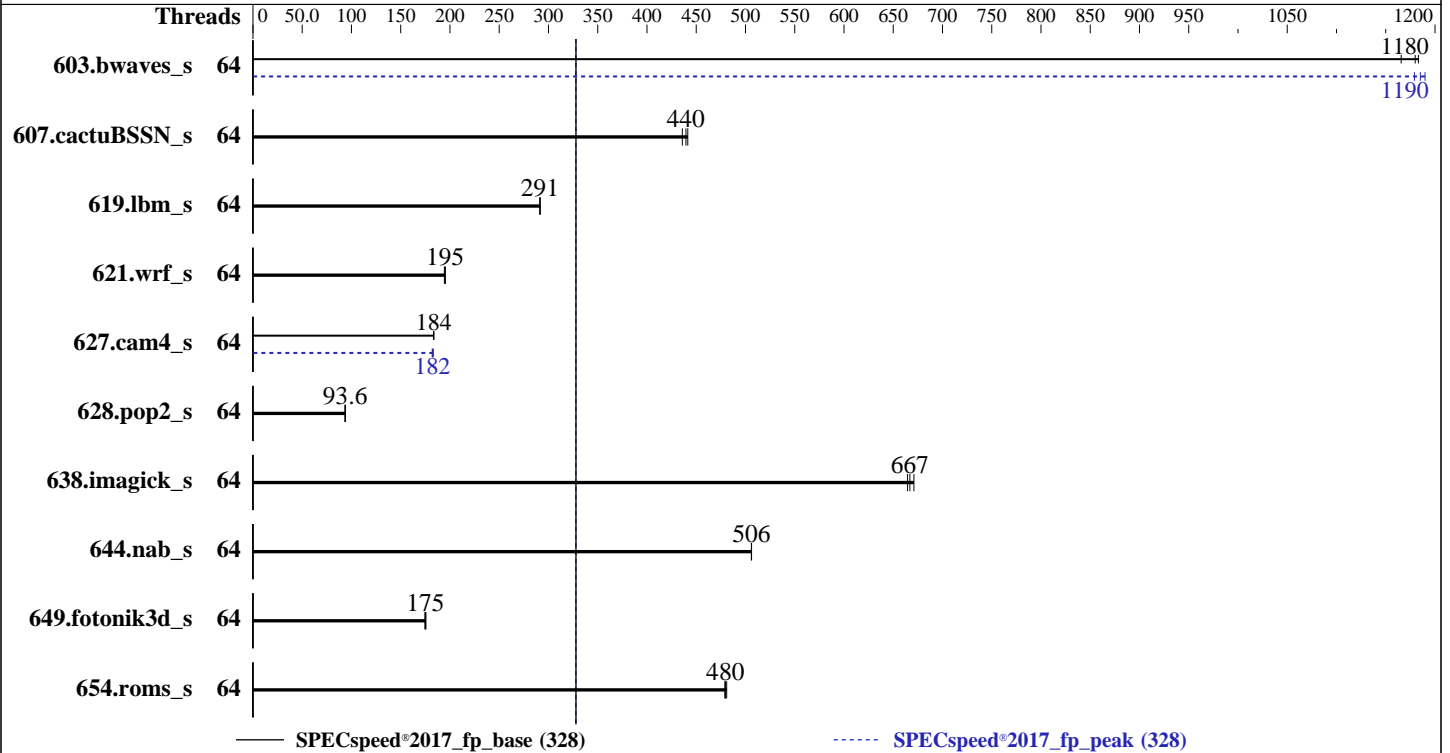$SPECspeed^{®}2017\_fp\_peak = 328$

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

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

SPECspeed®2017_fp_base (328)   SPECspeed®2017_fp_peak (328)

Benchmark	Threads	Base	Peak
603.bwaves_s	64	1180	1190
607.cactuBSSN_s	64	440	
619.lbm_s	64	291	
621.wrf_s	64	195	
627.cam4_s	64	184	182
628.pop2_s	64	93.6	
638.imagick_s	64	667	
644.nab_s	64	506	
649.fotonik3d_s	64	175	
654.roms_s	64	480	

Hardware

CPU Name: Intel Xeon Gold 6438N
 Max MHz: 3600
 Nominal: 2000
Enabled: 64 cores, 2 chips
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 60 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.6 TB PCIe NVMe SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64)
 Kernel 5.14.21-150400.22-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: Yes
Firmware: Version 0301 released May-2023
File System: xfs
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 and OS set to prefer performance
 at the cost of additional power usage.

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

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	64	**50.0**	**1180**	50.6	1170	49.9	1180	64	49.6	1190	50.0	1180	**49.8**	**1190**
607.cactuBSSN_s	64	37.8	441	38.2	436	**37.9**	**440**	64	37.8	441	38.2	436	**37.9**	**440**
619.lbm_s	64	18.0	291	18.0	292	**18.0**	**291**	64	18.0	291	18.0	292	**18.0**	**291**
621.wrf_s	64	**67.8**	**195**	67.8	195	68.1	194	64	**67.8**	**195**	67.8	195	68.1	194
627.cam4_s	64	**48.3**	**184**	48.3	184	48.3	183	64	**48.6**	**182**	48.4	183	48.7	182
628.pop2_s	64	126	94.0	**127**	**93.6**	127	93.4	64	126	94.0	**127**	**93.6**	127	93.4
638.imagick_s	64	21.7	665	21.5	671	**21.6**	**667**	64	21.7	665	21.5	671	**21.6**	**667**
644.nab_s	64	**34.5**	**506**	34.5	506	34.5	506	64	**34.5**	**506**	34.5	506	34.5	506
649.fotonik3d_s	64	52.2	175	51.9	176	**52.1**	**175**	64	52.2	175	51.9	176	**52.1**	**175**
654.roms_s	64	32.7	481	**32.8**	**480**	32.9	479	64	32.7	481	**32.8**	**480**	32.9	479
SPECspeed®2017_fp_base =		**328**												
SPECspeed®2017_fp_peak =		**328**												

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

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
OS set to performance mode via cpupower frequency-set -g performance
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/ic23u2/lib/intel64:/ic23u2/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
 Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
 memory using Red Hat Enterprise Linux 8.0
 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
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.
 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:
VT-d = Disabled
```

(Continued on next page)

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Platform Notes (Continued)

```
Patrol Scrub = Disabled
Hyper-Threading = Disable
LLC dead line allc = Disabled
Engine Boost = Aggressive
SR-IOV Support = Disabled
BMC Configuration:
Fan mode = Full speed mode

 Sysinfo program /ic23u2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Fri Dec 15 14:48:24 2023

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

 -----------------------------------------------------------
 Table of contents
 -----------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. tuned-adm active
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS
 -----------------------------------------------------------

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

 -----------------------------------------------------------
 2. w
    14:48:24 up  3:31,  2 users,  load average: 46.18, 56.52, 58.37
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                11:17    3:31m  0.86s  0.00s /bin/bash ./speed.sh
   root     tty2     -                13:55    52:52  0.04s  0.04s -bash

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

 -----------------------------------------------------------
 4. ulimit -a
```

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Platform Notes (Continued)

```
    core file size          (blocks, -c) unlimited
    data seg size           (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size               (blocks, -f) unlimited
    pending signals                 (-i) 4126892
    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) 4126892
    virtual memory          (kbytes, -v) unlimited
    file locks                      (-x) unlimited

    ------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 30
 login -- root
 -bash
 /bin/bash ./speed.sh
 /bin/bash ./speed.sh
 runcpu --nobuild --action validate --define default-platform-flags -c
   ic2023.2.3-lin-core-avx512-speed-20231121.cfg --define cores=64 --tune base,peak -o all --define
   drop_caches fpspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2023.2.3-lin-core-avx512-speed-20231121.cfg --define cores=64 --tune base,peak --output_format all
   --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed fpspeed --nopreenv
   --note-preenv --logfile $SPEC/tmp/CPU2017.089/templogs/preenv.fpspeed.089.0.log --lognum 089.0
   --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /ic23u2

    ------------------------------------------------------------
6. /proc/cpuinfo
    model name       : Intel(R) Xeon(R) Gold 6438N
    vendor_id        : GenuineIntel
    cpu family       : 6
    model            : 143
    stepping         : 8
    microcode        : 0x2b000461
    bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores        : 32
    siblings         : 32
    2 physical ids (chips)
    64 processors (hardware threads)
    physical id 0: core ids 0-31
    physical id 1: core ids 0-31
    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
    physical id 1: apicids
    128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
    80,182,184,186,188,190
 Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
 virtualized systems.  Use the above data carefully.

    ------------------------------------------------------------
7. lscpu
```

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Platform Notes (Continued)

```
From lscpu from util-linux 2.37.2:
  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):                   64
  On-line CPU(s) list:      0-63
  Vendor ID:                GenuineIntel
  Model name:               Intel(R) Xeon(R) Gold 6438N
  CPU family:               6
  Model:                    143
  Thread(s) per core:       1
  Core(s) per socket:       32
  Socket(s):                2
  Stepping:                 8
  CPU max MHz:              3600.0000
  CPU min MHz:              800.0000
  BogoMIPS:                 4000.00
  Flags:                    fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                            clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                            lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                            nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                            ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                            sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                            lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                            invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                            tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle
                            avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
                            avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
                            xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                            cqm_mbm_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
                            arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku
                            ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                            tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
                            enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16
                            amx_tile flush_l1d arch_capabilities
  Virtualization:           VT-x
  L1d cache:                3 MiB (64 instances)
  L1i cache:                2 MiB (64 instances)
  L2 cache:                 128 MiB (64 instances)
  L3 cache:                 120 MiB (2 instances)
  NUMA node(s):             2
  NUMA node0 CPU(s):        0-31
  NUMA node1 CPU(s):        32-63
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:       Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
  Vulnerability Srbds:            Not affected
  Vulnerability Tsx async abort:  Not affected

From lscpu --cache:
    NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
    L1d       48K       3M   12 Data            1    64        1             64
    L1i       32K       2M    8 Instruction     1    64        1             64
    L2         2M     128M   16 Unified         2  2048        1             64
```

(Continued on next page)

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Platform Notes (Continued)

```
        L3         60M       120M    15 Unified       3 65536         1            64


    --------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 2 nodes (0-1)
   node 0 cpus: 0-31
   node 0 size: 515723 MB
   node 0 free: 513275 MB
   node 1 cpus: 32-63
   node 1 size: 516024 MB
   node 1 free: 515132 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10


    --------------------------------------------------------------
 9. /proc/meminfo
    MemTotal:       1056509740 kB


    --------------------------------------------------------------
 10. who -r
    run-level 3 Dec 15 11:17


    --------------------------------------------------------------
 11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    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 getty@ haveged
                     irqbalance issue-generator kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections
                     postfix purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4
                     wickedd-dhcp6 wickedd-nanny
    enabled-runtime  systemd-remount-fs
    disabled         autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                     chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                     firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                     issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap
                     nvmf-autoconnect rdisc rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts
                     snmpd snmptrapd svnserve systemd-boot-check-no-failures systemd-network-generator
                     systemd-sysext systemd-time-wait-sync systemd-timesyncd tuned udisks2
    indirect         wickedd
    --------------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=9bcf0374-b29f-4a4c-932e-9c0e90fb0803
    splash=silent
    mitigations=auto
    quiet


    --------------------------------------------------------------
 14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 3.60 GHz.
                      The governor "performance" may decide which speed to use
```

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Platform Notes (Continued)

```
                    within this range.
     boost state support:
       Supported: yes
       Active: yes


  ----------------------------------------------------------
  15. tuned-adm active
    It seems that tuned daemon is not running, preset profile is not activated.
    Preset profile: throughput-performance


  ----------------------------------------------------------
  16. 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


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


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


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


  ----------------------------------------------------------
  20. Disk information
  SPEC is set to: /ic23u2
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p8 xfs   500G  295G  206G  59% /
```

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Platform Notes (Continued)

```
  ---------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Vendor:         ASUSTeK COMPUTER INC.
      Product:        ESC4000-E11
      Product Family: Server
      Serial:         /psn/


  ---------------------------------------------------------------
  22. dmidecode
    Additional information from dmidecode 3.2 follows.  WARNING: Use caution when you interpret this section.
    The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
    "DMTF SMBIOS" standard.
    Memory:
      16x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800



  ---------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:        American Megatrends Inc.
    BIOS Version:       0301
    BIOS Date:          05/18/2023
    BIOS Revision:      3.1
```

Compiler Version Notes

```
==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(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, Fortran | 607.cactuBSSN_s(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.
------------------------------------------------------------------------------


==============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(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      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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Tested by: ASUSTeK Computer Inc.

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

Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
`icx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

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

Base Portability Flags

603.bwaves_s: `-DSPEC_LP64`
607.cactuBSSN_s: `-DSPEC_LP64`
619.lbm_s: `-DSPEC_LP64`
621.wrf_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
627.cam4_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
628.pop2_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
`-assume byterecl`
638.imagick_s: `-DSPEC_LP64`
644.nab_s: `-DSPEC_LP64`
649.fotonik3d_s: `-DSPEC_LP64`
654.roms_s: `-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 -fiopenmp`
`-DSPEC_OPENMP -Wno-implicit-int -L/usr/local/jemalloc64-5.0.1/lib`
`-ljemalloc`

Fortran benchmarks:
`-w -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs`

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SPEC CPU®2017 Floating Point Speed Result

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ASUSTeK Computer Inc.

ASUS ESC4000-E11
(2.00 GHz, Intel Xeon Gold 6438N)

SPECspeed®2017_fp_base = 328

SPECspeed®2017_fp_peak = 328

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Dec-2023
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Software Availability: Dec-2023

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using Fortran, C, and C++:
```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

Fortran benchmarks:
```
ifx
```

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

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

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
619.lbm_s: basepeak = yes
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

ASUSTeK Computer Inc.

ASUS ESC4000-E11
(2.00 GHz, Intel Xeon Gold 6438N)

SPECspeed®2017_fp_base = 328

SPECspeed®2017_fp_peak = 328

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
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Test Date: Dec-2023
Hardware Availability: Jul-2023
Software Availability: Dec-2023

Peak Optimization Flags (Continued)

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: `-w -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512`
`-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs`
`-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib`
`-ljemalloc`

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP`
`-Wno-implicit-int -nostandard-realloc-lhs`
`-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib`
`-ljemalloc`

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

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/ASUSTekPlatform-Settings-z13-V1.2.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/ASUSTekPlatform-Settings-z13-V1.2.xml

SPEC CPU®2017 Floating Point Speed Result
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ASUSTeK Computer Inc.

ASUS ESC4000-E11
(2.00 GHz, Intel Xeon Gold 6438N)

$SPECspeed®2017\_fp\_base = 328$

$SPECspeed®2017\_fp\_peak = 328$

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

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