SPEC CPU®2017 Floating Point Rate Result

Fusionstor

(Test Sponsor: Meganet)

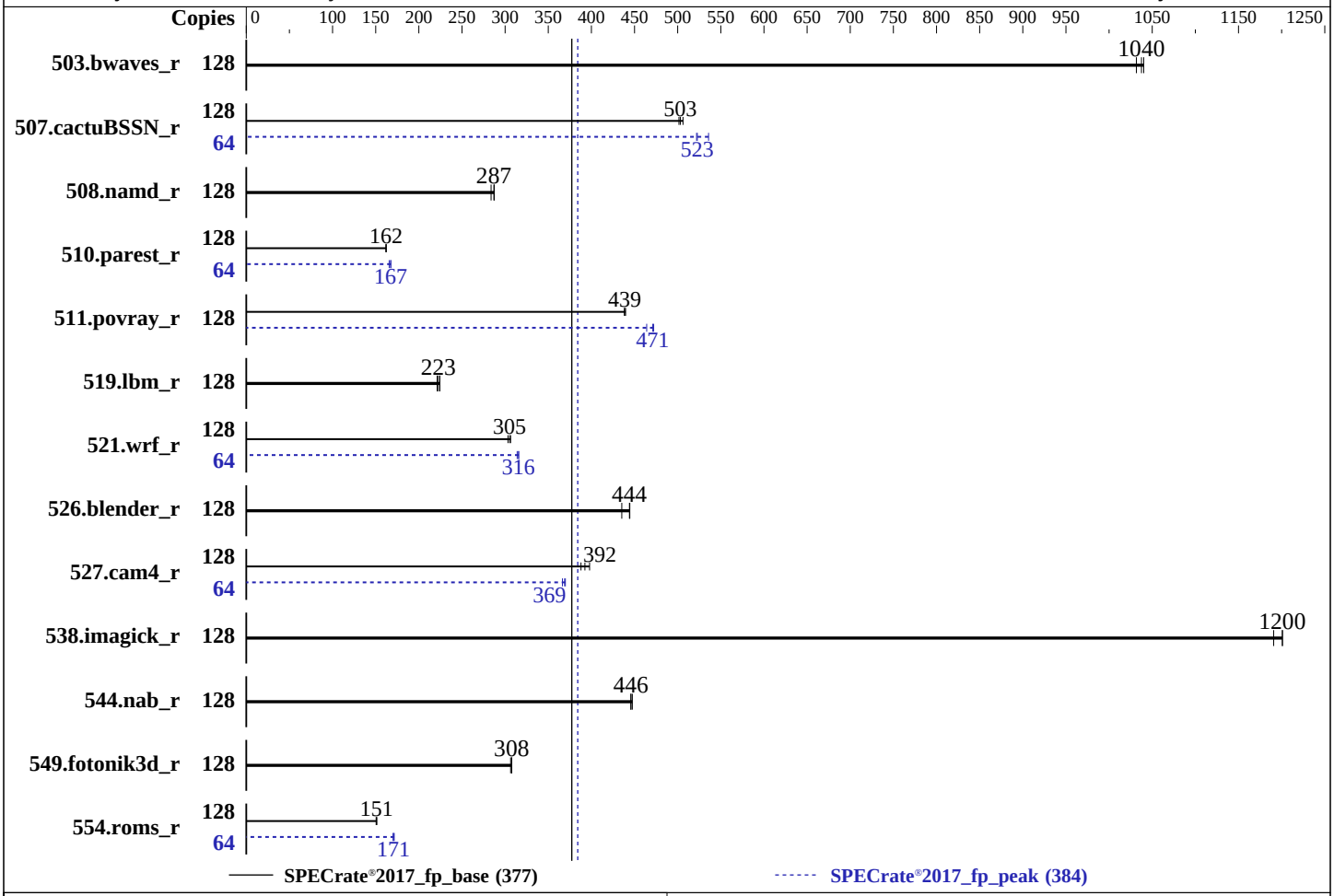
Invento i6327 (Intel Xeon Gold 6338N)

SPECrate®2017_fp_base = 377

SPECrate®2017_fp_peak = 384

CPU2017 License: 6221
Test Sponsor: Meganet
Tested by: Fusionstor system

Test Date: Jun-2024
Hardware Availability: Dec-2021
Software Availability: Feb-2024



Hardware

CPU Name:	Intel Xeon Gold 6338N
Max MHz:	3500
Nominal:	2200
Enabled:	64 cores, 2 chips, 2 threads/core
Orderable:	1-2 chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	1.25 MB I+D on chip per core
L3:	48 MB I+D on chip per chip
Other:	None
Memory:	1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage:	960 GB SATA SSD
Other:	CPU Cooling: Air

Software

OS:	Ubuntu 22.04.4 LTS 6.5.0-41-generic
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 w25.33.03 5.22 released Nov-2023
File System:	ext4
System State:	Run level 5 (multi-user mode)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other:	jemalloc memory allocator V5.0.1
Power Management:	Default

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	**1237**	**1040**	1244	1030	1234	1040	128	**1237**	**1040**	1244	1030	1234	1040
507.cactuBSSN_r	128	323	501	**322**	**503**	320	506	64	151	536	**155**	**523**	155	522
508.namd_r	128	423	287	**424**	**287**	429	284	128	423	287	**424**	**287**	429	284
510.parest_r	128	**2066**	**162**	2066	162	2067	162	64	**1000**	**167**	999	168	1011	166
511.povray_r	128	**681**	**439**	682	438	680	440	128	633	472	**635**	**471**	644	464
519.lbm_r	128	601	224	610	221	**606**	**223**	128	601	224	610	221	**606**	**223**
521.wrf_r	128	**939**	**305**	945	303	936	306	64	**454**	**316**	454	316	457	314
526.blender_r	128	**439**	**444**	439	444	448	435	128	**439**	**444**	439	444	448	435
527.cam4_r	128	**570**	**392**	563	398	577	388	64	**303**	**369**	305	366	303	370
538.imagick_r	128	265	1200	**265**	**1200**	267	1190	128	265	1200	**265**	**1200**	267	1190
544.nab_r	128	**483**	**446**	481	447	483	446	128	**483**	**446**	481	447	483	446
549.fotonik3d_r	128	1621	308	**1622**	**308**	1628	306	128	1621	308	**1622**	**308**	1628	306
554.roms_r	128	1352	150	**1346**	**151**	1346	151	64	598	170	593	171	**596**	**171**

SPECrate®2017_fp_base = 377

SPECrate®2017_fp_peak = 384

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/speccpu/cpu2017/lib/intel64:/home/speccpu/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>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
```

(Continued on next page)

General Notes (Continued)

sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

Platform Notes

```
Sysinfo program /home/speccpu/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on intel Mon Jun 24 19:59:23 2024

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

------------------------------------------------------------
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------------------------------------------------------------
 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 (249.11-0ubuntu3.12)
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 intel 6.5.0-41-generic #41~22.04.2-Ubuntu SMP PREEMPT_DYNAMIC Mon Jun  3 11:32:55 UTC 2 x86_64 x86_64
  x86_64 GNU/Linux

------------------------------------------------------------
2. w
   19:59:23 up 3 days,  9:26,  2 users,  load average: 73.80, 113.51, 121.85
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  intel    :1       :1               Fri10   ?xdm?  15:54m  0.02s /usr/libexec/gdm-x-session --run-script env
  GNOME_SHELL_SESSION_MODE=ubuntu /usr/bin/gnome-session --session=ubuntu
  intel    pts/1    -                11:15    8:44m  1.06s  0.01s sudo
  ./reportable-ic2023.2.3-lin-core-avx512-rate-smt-on-20231121.sh

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

------------------------------------------------------------
4. ulimit -a
  time(seconds)        unlimited
```

(Continued on next page)

Platform Notes (Continued)

```
   file(blocks)         unlimited
   data(kbytes)         unlimited
   stack(kbytes)        unlimited
   coredump(blocks)     0
   memory(kbytes)       unlimited
   locked memory(kbytes) 132056320
   process              4126457
   nofiles              1024
   vmemory(kbytes)      unlimited
   locks                unlimited
   rtprio               0

------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init splash
 /lib/systemd/systemd --user
 /usr/libexec/gnome-terminal-server
 bash
 sudo ./reportable-ic2023.2.3-lin-core-avx512-rate-smt-on-20231121.sh
 sudo ./reportable-ic2023.2.3-lin-core-avx512-rate-smt-on-20231121.sh
 sh ./reportable-ic2023.2.3-lin-core-avx512-rate-smt-on-20231121.sh
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 -c
   ic2023.2.3-lin-core-avx512-rate-20231121.cfg --define smt-on --define cores=64 --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=128 --configfile
   ic2023.2.3-lin-core-avx512-rate-20231121.cfg --define smt-on --define cores=64 --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/CPU2017.009/templogs/preenv.fprate.009.0.log --lognum 009.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpu/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 106
    stepping        : 6
    microcode       : 0xd0003d1
    bugs            : apic_c1e spectre_v1 spectre_v2 spec_store_bypass swapgs mmio_stale_data eibrs_pbrsb gds
                      bhi
    cpu cores       : 32
    siblings        : 64
    2 physical ids (chips)
    128 processors (hardware threads)
    physical id 0: core ids 0-31
    physical id 1: core ids 0-31
    physical id 0: apicids 0-63
    physical id 1: apicids 128-191
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
  virtualized systems.  Use the above data carefully.

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

From lscpu from util-linux 2.37.2:
  Architecture:                    x86_64
  CPU op-mode(s):                  32-bit, 64-bit
  Address sizes:                   46 bits physical, 57 bits virtual
```

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Platform Notes (Continued)

```
  Byte Order:                      Little Endian
  CPU(s):                          128
  On-line CPU(s) list:             0-127
  Vendor ID:                       GenuineIntel
  Model name:                      Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz
  CPU family:                      6
  Model:                           106
  Thread(s) per core:              2
  Core(s) per socket:              32
  Socket(s):                       2
  Stepping:                        6
  CPU max MHz:                     3500.0000
  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 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 invpcid_single
                                   intel_ppin 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 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 wbnoinvd dtherm ida arat pln pts hwp hwp_act_window
                                   hwp_epp hwp_pkg_req vnmi avx512vbmi umip pku ospke avx512_vbmi2 gfni
                                   vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57
                                   rdpid fsrm md_clear pconfig flush_l1d arch_capabilities
  Virtualization:                  VT-x
  L1d cache:                       3 MiB (64 instances)
  L1i cache:                       2 MiB (64 instances)
  L2 cache:                        80 MiB (64 instances)
  L3 cache:                        96 MiB (2 instances)
  NUMA node(s):                    2
  NUMA node0 CPU(s):               0-31,64-95
  NUMA node1 CPU(s):               32-63,96-127
  Vulnerability Gather data sampling: Mitigation; Microcode
  Vulnerability Itlb multihit:     Not affected
  Vulnerability L1tf:              Not affected
  Vulnerability Mds:               Not affected
  Vulnerability Meltdown:          Not affected
  Vulnerability Mmio stale data:   Mitigation; Clear CPU buffers; SMT vulnerable
  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 SW sequence; BHI Syscall hardening, KVM SW loop
  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       1.3M      80M   20 Unified         2  1024        1             64
      L3        48M      96M   12 Unified         3 65536        1             64
```

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Platform Notes (Continued)

```
------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-31,64-95
  node 0 size: 515617 MB
  node 0 free: 473719 MB
  node 1 cpus: 32-63,96-127
  node 1 size: 516072 MB
  node 1 free: 477062 MB
  node distances:
  node   0   1
    0:  10  20
    1:  20  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1056450564 kB

------------------------------------------------------------
10. who -r
  run-level 5 Jun 21 10:33

------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
  Default Target  Status
  graphical       running

------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                   accounts-daemon anacron anydesk apparmor avahi-daemon bluetooth console-setup cron cups
                   cups-browsed dmesg e2scrub_reap getty@ gpu-manager grub-common grub-initrd-fallback
                   irqbalance kerneloops keyboard-setup networkd-dispatcher openvpn power-profiles-daemon
                   rsyslog secureboot-db setvtrgb snapd ssh switcheroo-control systemd-oomd systemd-pstore
                   systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                   unattended-upgrades wpa_supplicant
  enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
  disabled         acpid brltty console-getty debug-shell nftables openvpn-client@ openvpn-server@ openvpn@
                   rsync rtkit-daemon serial-getty@ speech-dispatcherd systemd-boot-check-no-failures
                   systemd-network-generator systemd-networkd systemd-networkd-wait-online systemd-sysext
                   systemd-time-wait-sync upower wpa_supplicant-nl80211@ wpa_supplicant-wired@
                   wpa_supplicant@
  generated        apport speech-dispatcher
  indirect         saned@ spice-vdagentd uuidd
  masked           alsa-utils cryptdisks cryptdisks-early hwclock pulseaudio-enable-autospawn rc rcS saned
                   screen-cleanup sudo x11-common

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.5.0-41-generic
  root=UUID=eed05ad7-3678-4b37-aff7-318ba9064a38
  ro
  quiet
  splash
  vt.handoff=7

------------------------------------------------------------
14. sysctl
```

(Continued on next page)

Platform Notes (Continued)

```
  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 Ubuntu 22.04.4 LTS

------------------------------------------------------------
18. Disk information
SPEC is set to: /home/speccpu/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda2      ext4  879G  243G  592G  30% /

------------------------------------------------------------
19. /sys/devices/virtual/dmi/id
    Vendor:         Fusionstor
    Product:        Invento i6327
    Product Family: Family
    Serial:         i6327240317

------------------------------------------------------------
20. 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
```

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Platform Notes (Continued)

```
  "DMTF SMBIOS" standard.
  Memory:
    16x NO DIMM NO DIMM
    16x Samsung M393A8G40CB4-CWE 64 GB 2 rank 3200, configured at 2666


 ------------------------------------------------------------
 21. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       American Megatrends International, LLC.
    BIOS Version:      W25.33.03
    BIOS Date:         11/16/2023
    BIOS Revision:     5.22
```

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.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
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)
```

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Compiler Version Notes (Continued)

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

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

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

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
-Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:
```
-w -std=c++14 -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
-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 -xCORE-AVX512 -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 -xCORE-AVX512 -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
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

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

Fortran benchmarks:
```
ifx
```

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Peak Compiler Invocation (Continued)

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 -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

(Continued on next page)

Peak Optimization Flags (Continued)

554.roms_r (continued):
-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
-Wno-implicit-int -nostandard-realloc-lhs -align array32byte -auto
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

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

526.blender_r: basepeak = yes

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 -Wno-implicit-int -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/Fusionstor-Platform-Flags-Intel-ICX-rev3.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/Fusionstor-Platform-Flags-Intel-ICX-rev3.xml

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

Tested with SPEC CPU®2017 v1.1.9 on 2024-06-24 10:29:23-0400.
Report generated on 2024-08-23 12:07:23 by CPU2017 PDF formatter v6716.
Originally published on 2024-08-23.