



SPEC CPU®2017 Floating Point Rate Result

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Fusionstor
(Test Sponsor: Meganet)

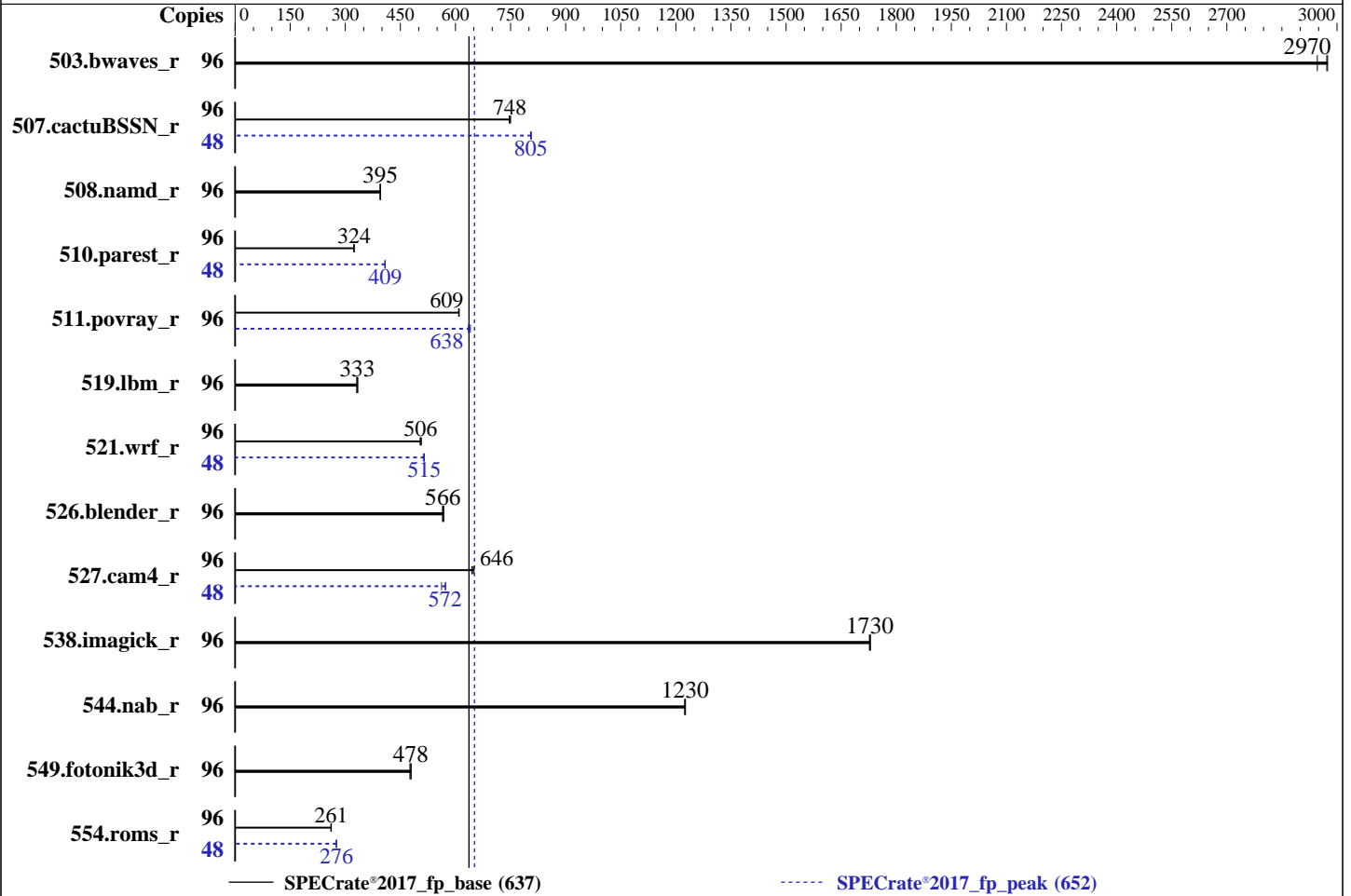
SPECrate®2017_fp_base = 637

Invento i6000 (Intel Xeon Gold 6542Y)

SPECrate®2017_fp_peak = 652

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

Test Date: Nov-2024
Hardware Availability: Feb-2024
Software Availability: Oct-2024



Hardware

CPU Name: Intel Xeon Gold 6542Y
 Max MHz: 4100
 Nominal: 2900
 Enabled: 48 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 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: 5 GB I+D off chip per system board
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R, running at 4400)
 Storage: 960 GB SATA SSD
 Other: CPU Cooling: Air

Software

OS: Ubuntu 22.04.5 LTS
 6.8.0-48-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 EG0.10.01 released Mar-2024
 File System: ext4
 System State: Run level 5 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: jemalloc memory allocator V5.0.1
 Power Management: OS set to prefer performance at the expense of additional power usage



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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	96	327	2950	<u>324</u>	<u>2970</u>	324	2970	96	327	2950	<u>324</u>	<u>2970</u>	324	2970
507.cactuBSSN_r	96	163	746	<u>162</u>	<u>748</u>	162	750	48	75.4	806	<u>75.5</u>	<u>805</u>	75.5	805
508.namd_r	96	<u>231</u>	<u>395</u>	231	395	231	395	96	<u>231</u>	<u>395</u>	231	395	231	395
510.parest_r	96	777	323	774	324	<u>775</u>	<u>324</u>	48	308	408	<u>307</u>	<u>409</u>	307	409
511.povray_r	96	367	610	368	609	<u>368</u>	<u>609</u>	96	353	635	<u>351</u>	<u>638</u>	350	641
519.lbm_r	96	306	331	<u>304</u>	<u>333</u>	303	334	96	306	331	<u>304</u>	<u>333</u>	303	334
521.wrf_r	96	427	504	<u>425</u>	<u>506</u>	424	507	48	209	515	210	512	<u>209</u>	<u>515</u>
526.blender_r	96	259	565	<u>258</u>	<u>566</u>	257	568	96	259	565	<u>258</u>	<u>566</u>	257	568
527.cam4_r	96	258	651	261	644	<u>260</u>	<u>646</u>	48	146	573	<u>147</u>	<u>572</u>	149	562
538.imagick_r	96	138	1730	<u>138</u>	<u>1730</u>	138	1730	96	138	1730	<u>138</u>	<u>1730</u>	138	1730
544.nab_r	96	132	1220	132	1230	<u>132</u>	<u>1230</u>	96	132	1220	132	1230	<u>132</u>	<u>1230</u>
549.fotonik3d_r	96	786	476	<u>782</u>	<u>478</u>	781	479	96	786	476	<u>782</u>	<u>478</u>	781	479
554.roms_r	96	585	261	582	262	<u>584</u>	<u>261</u>	48	<u>276</u>	<u>276</u>	277	275	276	276

SPECrate®2017_fp_base = **637**

SPECrate®2017_fp_peak = **652**

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

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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 Thu Nov 28 17:47:09 2024

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

Table of contents

1. uname -a
2. w
3. Username
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5. sysinfo process ancestry
6. /proc/cpuinfo
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9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. 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 intel 6.8.0-48-generic #48~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Mon Oct 7 11:24:13 UTC 2 x86_64 x86_64
x86_64 GNU/Linux
```

```
2. w
17:47:09 up 5:20, 2 users, load average: 63.28, 87.71, 92.07
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
intel :1 :1 12:26 ?xdm? 14:42 0.00s /usr/libexec/gdm-x-session --run-script env
GNOME_SHELL_SESSION_MODE=ubuntu /usr/bin/gnome-session --session=ubuntu
intel pts/1 - 12:30 5:16m 0.89s 0.01s sudo
./reportable-ic2023.2.3-lin-sapphirerapids-rate-smt-on-20231121.sh
```

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

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Platform Notes (Continued)

```
4. ulimit -a
time(seconds)          unlimited
file(blocks)           unlimited
data(kbytes)           unlimited
stack(kbytes)          unlimited
coredump(blocks)      0
memory(kbytes)         unlimited
locked memory(kbytes) 132059564
process                4126557
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-sapphirerapids-rate-smt-on-20231121.sh
sudo ./reportable-ic2023.2.3-lin-sapphirerapids-rate-smt-on-20231121.sh
sh ./reportable-ic2023.2.3-lin-sapphirerapids-rate-smt-on-20231121.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 -c
  ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=48 --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=96 --configfile
  ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=48 --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/CPU2017.021/templogs/preenv.fprate.021.0.log --lognum 021.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpu/cpu2017
```

```
-----
6. /proc/cpuinfo
model name      : INTEL(R) XEON(R) GOLD 6542Y
vendor_id      : GenuineIntel
cpu family     : 6
model          : 207
stepping       : 2
microcode      : 0x21000230
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores      : 24
siblings       : 48
2 physical ids (chips)
96 processors (hardware threads)
physical id 0: core ids 0-23
physical id 1: core ids 0-23
physical id 0: apicids 0-47
physical id 1: apicids 128-175
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
```

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Platform Notes (Continued)

```

Address sizes:                52 bits physical, 57 bits virtual
Byte Order:                   Little Endian
CPU(s):                        96
On-line CPU(s) list:         0-95
Vendor ID:                     GenuineIntel
Model name:                   INTEL(R) XEON(R) GOLD 6542Y
CPU family:                   6
Model:                         207
Thread(s) per core:          2
Core(s) per socket:          24
Socket(s):                    2
Stepping:                    2
CPU max MHz:                  4100.0000
CPU min MHz:                  800.0000
BogoMIPS:                    5800.00
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
                               pdpelgb rdtscp lm constant_tsc art arch_perfmnon pebs bts rep_good
                               nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni
                               pclmulqdq dtes64 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 bmil 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
                               user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hfi
                               vnmi avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
                               vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpoptndq la57 rdpid
                               bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear
                               serialize tsxldtrk pconfig arch_lbr ibt amx_bf16 avx512_fp16 amx_tile
                               amx_int8 flush_lld arch_capabilities

Virtualization:              VT-x
L1d cache:                   2.3 MiB (48 instances)
L1i cache:                   1.5 MiB (48 instances)
L2 cache:                    96 MiB (48 instances)
L3 cache:                    120 MiB (2 instances)
NUMA node(s):                2
NUMA node0 CPU(s):          0-23,48-71
NUMA node1 CPU(s):          24-47,72-95
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit:  Not affected
Vulnerability Lltf:         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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:   Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling;
                               PBRSE-eIBRS SW sequence; 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

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Platform Notes (Continued)

L1d	48K	2.3M	12 Data	1	64	1	64
L1i	32K	1.5M	8 Instruction	1	64	1	64
L2	2M	96M	16 Unified	2	2048	1	64
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: 0-23,48-71
node 0 size: 515685 MB
node 0 free: 489973 MB
node 1 cpus: 24-47,72-95
node 1 size: 516029 MB
node 1 free: 493379 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

```

9. /proc/meminfo

MemTotal: 1056476540 kB

10. who -r

run-level 5 Nov 28 12:27

11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)

```

Default Target Status
graphical degraded

```

12. Failed units, from systemctl list-units --state=failed

```

UNIT                                LOAD    ACTIVE SUB    DESCRIPTION
* NetworkManager-wait-online.service loaded failed failed Network Manager Wait Online

```

13. 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 teamviewerd 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 tlp upower wpa_supplicant-nl80211@ wpa_supplicant-wired@
wpa_supplicant@
generated  apport cpufrequtils loadcpufreq speech-dispatcher
indirect   saned@ spice-vdagentd uidd
masked    alsa-utils cryptdisks cryptdisks-early hwclock pulseaudio-enable-autospawn rc rcS saned
screen-cleanup sudo systemd-rfkill x11-common

```

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Platform Notes (Continued)

14. Linux kernel boot-time arguments, from /proc/cmdline

```
BOOT_IMAGE=/boot/vmlinuz-6.8.0-48-generic
root=UUID=073562bb-1438-42b9-adfa-6a6f7f3d3559
ro
quiet
splash
vt.handoff=7
```

15. cpupower frequency-info

```
analyzing CPU 48:
  current policy: frequency should be within 800 MHz and 4.10 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

  boost state support:
    Supported: yes
    Active: yes
```

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+madvice [madvice] never
enabled         always [madvice] 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
```

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Platform Notes (Continued)

os-release Ubuntu 22.04.5 LTS

20. Disk information

SPEC is set to: /home/speccpu/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 879G 684G 151G 82% /

21. /sys/devices/virtual/dmi/id

Vendor: Fusionstor
Product: Invento_i6000
Product Family: SG_Intel_EagleStream
Serial: HQ3110001BDA03CD0002

22. dmidecode

Additional information from dmidecode 3.3 follows. **WARNING:** Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:

16x NO DIMM NO DIMM
16x Samsung M321R8GA0BB0-CQKZJ 64 GB 2 rank 4800, configured at 4400

23. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: American Megatrends International, LLC.
BIOS Version: EG0.10.01
BIOS Date: 03/22/2024
BIOS Revision: 5.32

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
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Compiler Version Notes (Continued)

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)

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



SPEC CPU®2017 Floating Point Rate Result

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Fusionstor
(Test Sponsor: Meganet)

SPECrate®2017_fp_base = 637

Invento i6000 (Intel Xeon Gold 6542Y)

SPECrate®2017_fp_peak = 652

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

Test Date: Nov-2024
Hardware Availability: Feb-2024
Software Availability: Oct-2024

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 -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
```

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Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):

`-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 -xsaphirerapids -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`

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`

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Peak Optimization Flags (Continued)

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

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:

-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++:

511.povray_r: -w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profddata(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

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Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-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/Fusionstor-Platform-Flags-Intel-ICX-rev6.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-rev6.xml>

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