



SPEC CPU®2017 Integer Speed Result

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xFusion

SPECspeed®2017_int_base = 12.4

FusionServer 2288H V7 (Intel Xeon Silver 4514Y)

SPECspeed®2017_int_peak = 12.7

CPU2017 License: 6488

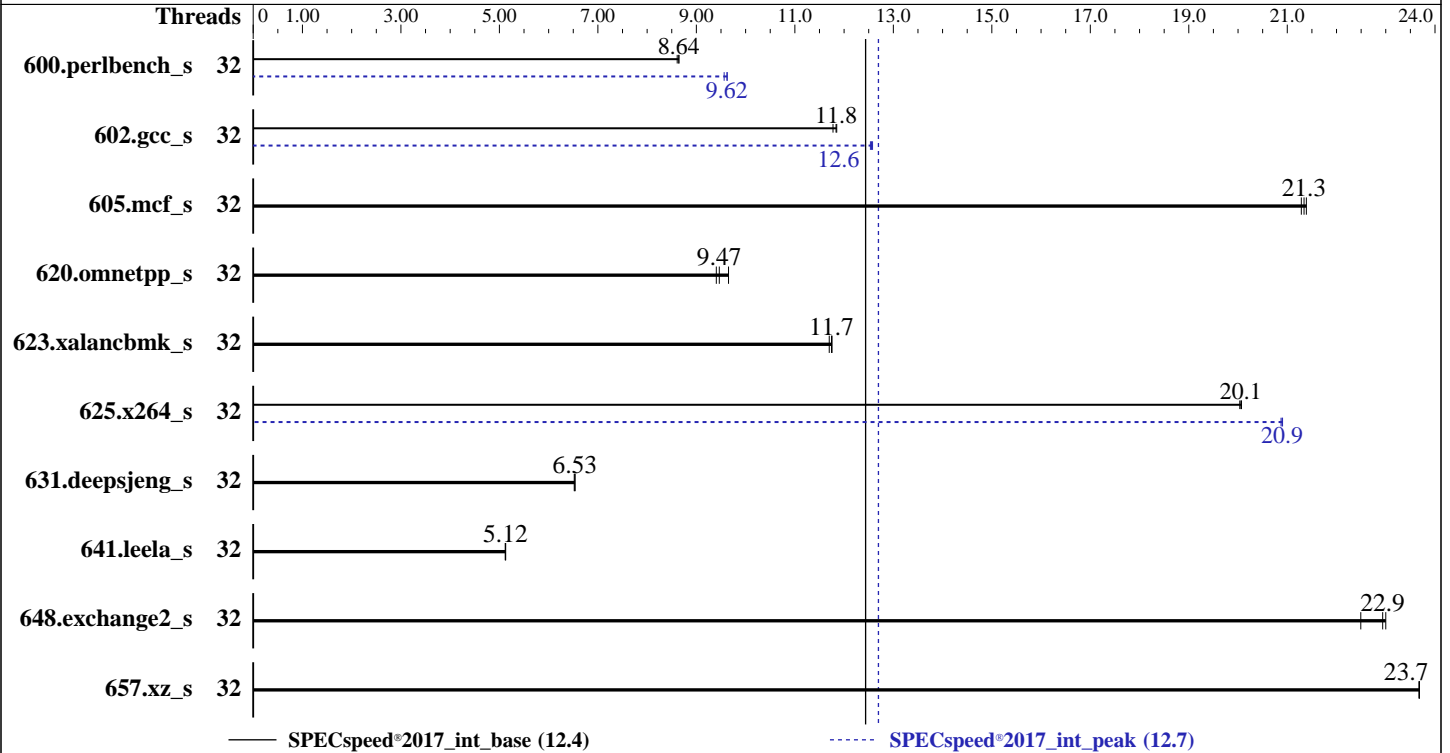
Test Sponsor: xFusion

Tested by: xFusion

Test Date: Jul-2024

Hardware Availability: Dec-2023

Software Availability: Mar-2024



Hardware

CPU Name: Intel Xeon Silver 4514Y
 Max MHz: 3400
 Nominal: 2000
 Enabled: 32 cores, 2 chips
 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: 30 MB I+D on chip per chip
 Other: None
 Memory: 512 GB (16 x 32 GB 2Rx8 PC5-5600B-R, running at 4400)
 Storage: 1 x 960 GB SATA SSD
 Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.2 (Plow)
 5.14.0-284.11.1.el9_2.x86_64
 Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;
 Parallel: Yes
 Firmware: Version 01.01.03.05 Released Apr-2024
 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.



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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	32	206	8.61	205	8.64	205	8.65	32	186	9.56	184	9.63	184	9.62
602.gcc_s	32	336	11.8	338	11.8	336	11.9	32	317	12.6	318	12.5	317	12.6
605.mcf_s	32	221	21.3	222	21.3	221	21.4	32	221	21.3	222	21.3	221	21.4
620.omnetpp_s	32	172	9.47	169	9.65	173	9.40	32	172	9.47	169	9.65	173	9.40
623.xalancbmk_s	32	121	11.8	121	11.7	121	11.7	32	121	11.8	121	11.7	121	11.7
625.x264_s	32	88.0	20.0	87.9	20.1	87.9	20.1	32	84.5	20.9	84.4	20.9	84.4	20.9
631.deepsjeng_s	32	219	6.53	219	6.53	220	6.52	32	219	6.53	219	6.53	220	6.52
641.leela_s	32	333	5.12	333	5.12	333	5.13	32	333	5.12	333	5.12	333	5.13
648.exchange2_s	32	128	22.9	128	23.0	131	22.5	32	128	22.9	128	23.0	131	22.5
657.xz_s	32	261	23.7	261	23.7	261	23.7	32	261	23.7	261	23.7	261	23.7

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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"
Kernel Boot Parameter set with : nohz_full=1-31

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017_new-2024.1/lib/intel64:/home/cpu2017_new-2024.1/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 Redhat 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



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Platform Notes

BIOS configuration:
Performance Profile Set to Load Balance
Enable LP [Global] Set to Single LP
ADDDC Sparing Set to Disabled

Sysinfo program /home/cpu2017_new-2024.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Mon Jul 29 11:58:30 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
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7. lscpu
8. numactl --hardware
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10. who -r
11. Systemd service manager version: systemd 252 (252-13.e19_2)
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. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

```
1. uname -a
Linux localhost.localdomain 5.14.0-284.11.1.e19_2.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 12 10:45:03 EDT
2023 x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
11:58:30 up 1:54, 1 user, load average: 0.04, 0.02, 0.00
USER      TTY      LOGIN@  IDLE   JCPU   PCPU WHAT
root      tty1    10:11   7.00s  1.16s  0.01s sh run_speed.sh
```

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

```
4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size              (blocks, -c) 0
data seg size                (kbytes, -d) unlimited
```

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Platform Notes (Continued)

```

scheduling priority          (-e) 0
file size                    (blocks, -f) unlimited
pending signals              (-i) 2060255
max locked memory            (kbytes, -l) 8192
max memory size              (kbytes, -m) unlimited
open files                   (-n) 1024
pipe size                    (512 bytes, -p) 8
POSIX message queues         (bytes, -q) 819200
real-time priority           (-r) 0
stack size                   (kbytes, -s) unlimited
cpu time                     (seconds, -t) unlimited
max user processes           (-u) 2060255
virtual memory               (kbytes, -v) unlimited
file locks                   (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 31
login -- root
-bash
sh run_speed.sh
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=32 --tune base,peak -o all --define
  intspeedaffinity --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=32 --tune base,peak --output_format all
  --define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed
  intspeed --nopreenv --note-preenv --logfile $$SPEC/tmp/CPU2017.001/templogs/preenv.intspeed.001.0.log
  --lognum 001.0 --from_runcpu 2
specperl $$SPEC/bin/sysinfo
$SPEC = /home/cpu2017_new-2024.1

```

```

-----
6. /proc/cpuinfo
model name      : INTEL(R) XEON(R) SILVER 4514Y
vendor_id      : GenuineIntel
cpu family     : 6
model          : 207
stepping       : 2
microcode      : 0x21000200
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores      : 16
siblings       : 16
2 physical ids (chips)
32 processors (hardware threads)
physical id 0: core ids 0-15
physical id 1: core ids 0-15
physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
physical id 1: apicids 128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158
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 2.37.4:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          46 bits physical, 57 bits virtual
Byte Order:             Little Endian

```

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Platform Notes (Continued)

```

CPU(s): 32
On-line CPU(s) list: 0-31
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: INTEL(R) XEON(R) SILVER 4514Y
BIOS Model name: INTEL(R) XEON(R) SILVER 4514Y
CPU family: 6
Model: 207
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 2
Stepping: 2
Frequency boost: enabled
CPU max MHz: 2001.0000
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 cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
vmmi 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 avx_vnni
avx512_bf16 wbnoinvd dtherm ida arat pln pts hfi 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 ibt amx_bf16
avx512_fp16 amx_tile amx_int8 flush_lld arch_capabilities

Virtualization: VT-x
L1d cache: 1.5 MiB (32 instances)
L1i cache: 1 MiB (32 instances)
L2 cache: 64 MiB (32 instances)
L3 cache: 60 MiB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf: 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
Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSE-eIBRS SW
sequence
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	1.5M	12	Data	1	64	1	64
L1i	32K	1M	8	Instruction	1	64	1	64
L2	2M	64M	16	Unified	2	2048	1	64
L3	30M	60M	15	Unified	3	32768	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: 0-15
node 0 size: 257063 MB
node 0 free: 256323 MB
node 1 cpus: 16-31
node 1 size: 258039 MB
node 1 free: 256202 MB
node distances:
node 0 1
0: 10 21
1: 21 10

```

```

-----
9. /proc/meminfo
MemTotal: 527464936 kB

```

```

-----
10. who -r
run-level 3 Jul 29 10:04

```

```

-----
11. Systemd service manager version: systemd 252 (252-13.el9_2)
Default Target Status
multi-user degraded

```

```

-----
12. Failed units, from systemctl list-units --state=failed
UNIT LOAD ACTIVE SUB DESCRIPTION
* sep5.service loaded failed failed systemd script to load sep5 driver at boot time

```

```

-----
13. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
dbus-broker firewalld getty@ insights-client-boot irqbalance kdump low-memory-monitor
mdmonitor microcode nis-domainname rhsmcertd rsyslog rtkit-daemon selinux-autorelabel-mark
sep5 smartd sshd sssd sysstat systemd-boot-update systemd-network-generator tuned udisks2
upower
enabled-runtime systemd-remount-fs
disabled canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot
chrony-wait console-getty cpupower debug-shell dnf-system-upgrade kvm_stat
man-db-restart-cache-update nftables pesign rdisc rhcd rhsm rhsm-facts rpmdb-rebuild
selinux-check-proper-disable serial-getty@ sshd-keygen@ systemd-boot-check-no-failures
systemd-pstore systemd-sysex
indirect sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate
systemd-sysupdate-reboot

```

```

-----
14. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt5)/boot/vmlinuz-5.14.0-284.11.1.el9_2.x86_64
root=UUID=e7cc1b7d-5946-4ed4-8306-b2d382dc5709
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=UUID=937c2e4e-930c-4489-9a6c-cd05c9a2c08a
nohz_full=1-31

```

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Platform Notes (Continued)

```

15. cpupower frequency-info
    analyzing CPU 0:
        current policy: frequency should be within 800 MHz and 2.00 GHz.
                        The governor "performance" may decide which speed to use
                        within this range.
        boost state support:
            Supported: yes
            Active: yes
  
```

```

16. tuned-adm active
    Current active profile: throughput-performance
  
```

```

17. 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                 40
    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                  10
    vm.watermark_boost_factor     15000
    vm.watermark_scale_factor     10
    vm.zone_reclaim_mode          0
  
```

```

18. /sys/kernel/mm/transparent_hugepage
    defrag          always defer+madvise [madvise] never
    enabled         [always] madvise never
    hpage_pmd_size 2097152
    shmem_enabled  always within_size advise [never] deny force
  
```

```

19. /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
  
```

```

20. OS release
    From /etc/*-release /etc/*-version
    os-release      Red Hat Enterprise Linux 9.2 (Plow)
    redhat-release  Red Hat Enterprise Linux release 9.2 (Plow)
    system-release  Red Hat Enterprise Linux release 9.2 (Plow)
  
```

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Platform Notes (Continued)

21. Disk information

SPEC is set to: /home/cpu2017_new-2024.1

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda5	xf	690G	129G	562G	19%	/

22. /sys/devices/virtual/dmi/id

Product: 2288H V7
Product Family: Eagle Stream

23. 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:

6x Samsung M321R4GA3PB0-CWMCH 32 GB 2 rank 5600, configured at 4400
8x Samsung M321R4GA3PB0-CWMJH 32 GB 2 rank 5600, configured at 4400
2x Samsung M321R4GA3PB0-CWMKH 32 GB 2 rank 5600, configured at 4400

24. BIOS

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

BIOS Vendor: INSYDE Corp.
BIOS Version: 01.01.03.05
BIOS Date: 04/12/2024
BIOS Revision: 3.5

Compiler Version Notes

=====
C | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
| 657.xz_s(base, peak)

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

=====
C++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
| 641.leela_s(base, peak)

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

=====
Fortran | 648.exchange2_s(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.



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Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Base Portability Flags

```
600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
```

Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```



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Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```

600.perlbench_s: -w -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fiopenmp -DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -w -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fiopenmp -DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

```

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SPEC CPU®2017 Integer Speed Result

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xFusion

SPECspeed®2017_int_base = 12.4

FusionServer 2288H V7 (Intel Xeon Silver 4514Y)

SPECspeed®2017_int_peak = 12.7

CPU2017 License: 6488

Test Sponsor: xFusion

Tested by: xFusion

Test Date: Jul-2024

Hardware Availability: Dec-2023

Software Availability: Mar-2024

Peak Optimization Flags (Continued)

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-EMR-V1.1.html>

<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-EMR-V1.1.xml>

<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml>

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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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