



SPEC CPU®2017 Integer Speed Result

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xFusion

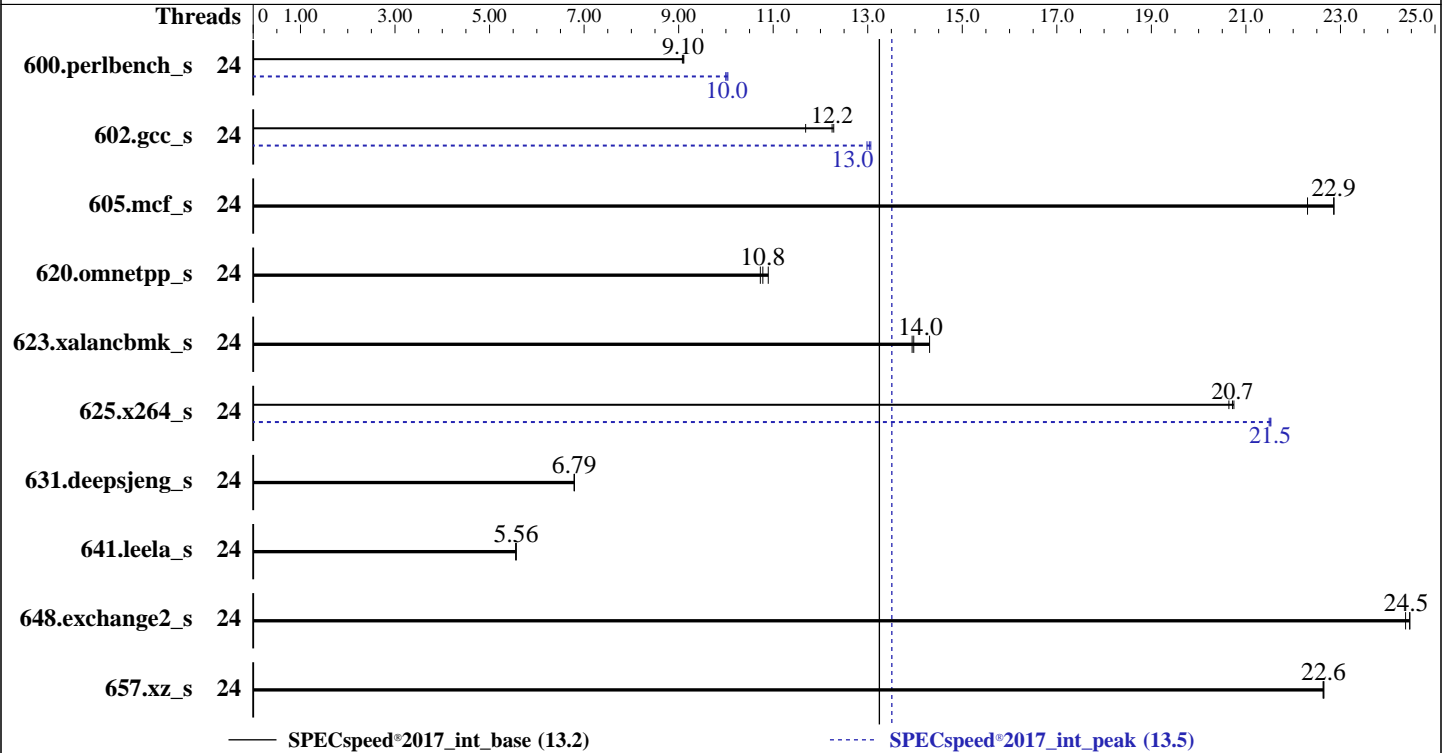
SPECspeed®2017_int_base = 13.2

FusionServer 1288H V7 (Intel Xeon Silver 4510T)

SPECspeed®2017_int_peak = 13.5

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

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



Hardware

CPU Name: Intel Xeon Silver 4510T
 Max MHz: 3700
 Nominal: 2000
 Enabled: 24 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 1.92 TB 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 2024.0.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.0.2 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: 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 | 24 | 195 | 9.10 | 195 | 9.08 | 195 | 9.11 | 24 | 177 | 10.0 | 177 | 10.0 | 178 | 10.0 |
| 602.gcc_s | 24 | 324 | 12.3 | 325 | 12.2 | 341 | 11.7 | 24 | 305 | 13.1 | 307 | 13.0 | 306 | 13.0 |
| 605.mcf_s | 24 | 206 | 22.9 | 207 | 22.9 | 212 | 22.3 | 24 | 206 | 22.9 | 207 | 22.9 | 212 | 22.3 |
| 620.omnetpp_s | 24 | 150 | 10.9 | 151 | 10.8 | 152 | 10.7 | 24 | 150 | 10.9 | 151 | 10.8 | 152 | 10.7 |
| 623.xalancbmk_s | 24 | 102 | 13.9 | 99.0 | 14.3 | 101 | 14.0 | 24 | 102 | 13.9 | 99.0 | 14.3 | 101 | 14.0 |
| 625.x264_s | 24 | 85.5 | 20.6 | 85.2 | 20.7 | 85.0 | 20.7 | 24 | 81.9 | 21.5 | 82.1 | 21.5 | 82.0 | 21.5 |
| 631.deepsjeng_s | 24 | 211 | 6.79 | 211 | 6.79 | 211 | 6.79 | 24 | 211 | 6.79 | 211 | 6.79 | 211 | 6.79 |
| 641.leela_s | 24 | 307 | 5.55 | 307 | 5.56 | 307 | 5.56 | 24 | 307 | 5.55 | 307 | 5.56 | 307 | 5.56 |
| 648.exchange2_s | 24 | 120 | 24.5 | 121 | 24.4 | 120 | 24.5 | 24 | 120 | 24.5 | 121 | 24.4 | 120 | 24.5 |
| 657.xz_s | 24 | 273 | 22.6 | 273 | 22.6 | 273 | 22.6 | 24 | 273 | 22.6 | 273 | 22.6 | 273 | 22.6 |

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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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/Uniautos/speccpu2017/lib/intel64:/home/Uniautos/speccpu2017/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
SNC Set to Disable
Enable LP [Global] Set to Single LP

Sysinfo program /home/Uniautos/speccpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Jun 7 12:04:26 2024

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

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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
12:04:26 up 1 min, 2 users, load average: 0.33, 0.28, 0.11
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root pts/0 12:03 6.00s 0.87s 0.00s -bash
root pts/1 12:04 18.00s 0.06s 0.06s -bash

3. Username
From environment variable \$USER: root

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

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Platform Notes (Continued)

```

data seg size      (kbytes, -d) unlimited
scheduling priority (-e) 0
file size          (blocks, -f) unlimited
pending signals    (-i) 2060245
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) 2060245
virtual memory     (kbytes, -v) unlimited
file locks         (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 31
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@pts/0
-bash
-bash
runcpu --define default-platform-flags -c ic2024.0.2-lin-sapphirerapids-speed-20231213.cfg --define cores=24
--tune base,peak -o all --define intspeedaffinity --define drop_caches intspeed
runcpu --define default-platform-flags --configfile ic2024.0.2-lin-sapphirerapids-speed-20231213.cfg
--define cores=24 --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/CPU2017.079/templogs/preenv.intspeed.079.0.log --lognum 079.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/Uniautos/speccpu2017

```

```

-----
6. /proc/cpuinfo
model name      : INTEL(R) XEON(R) SILVER 4510T
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b000590
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores      : 12
siblings       : 12
2 physical ids (chips)
24 processors (hardware threads)
physical id 0: core ids 0-11
physical id 1: core ids 0-11
physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22
physical id 1: apicids 64,66,68,70,72,74,76,78,80,82,84,86
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

```

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Platform Notes (Continued)

```

Byte Order:                Little Endian
CPU(s):                    24
On-line CPU(s) list:      0-23
Vendor ID:                 GenuineIntel
BIOS Vendor ID:          Intel(R) Corporation
Model name:               INTEL(R) XEON(R) SILVER 4510T
BIOS Model name:         INTEL(R) XEON(R) SILVER 4510T
CPU family:               6
Model:                    143
Thread(s) per core:      1
Core(s) per socket:      12
Socket(s):                2
Stepping:                 8
CPU max MHz:              3700.0000
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 bmlil 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 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_vpoperntdq 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:                1.1 MiB (24 instances)
L1i cache:                768 KiB (24 instances)
L2 cache:                 48 MiB (24 instances)
L3 cache:                 60 MiB (2 instances)
NUMA node(s):             2
NUMA node0 CPU(s):       0-11
NUMA node1 CPU(s):       12-23
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:      Not affected
Vulnerability MDS:       Not affected
Vulnerability Meltdown:  Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed:  Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
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 | 1.1M | 12 | Data | 1 | 64 | 1 | 64 |
| L1i | 32K | 768K | 8 | Instruction | 1 | 64 | 1 | 64 |
| L2 | 2M | 48M | 16 | Unified | 2 | 2048 | 1 | 64 |

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Platform Notes (Continued)

L3 30M 60M 15 Unified 3 32768 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: 0-11
node 0 size: 257102 MB
node 0 free: 250829 MB
node 1 cpus: 12-23
node 1 size: 258001 MB
node 1 free: 256845 MB
node distances:
node  0  1
  0: 10 21
  1: 21 10
```

9. /proc/meminfo

```
MemTotal: 527466460 kB
```

10. who -r

```
run-level 3 Jun 7 12:02
```

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 crond
dbus-broker getty@ insights-client-boot irqbalance kdump lvm2-monitor mdmonitor microcode
nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sep5 sshd sssd
systemd-boot-update systemd-network-generator tuned udisks2
enabled-runtime systemd-remount-fs
disabled blk-availability console-getty cpupower debug-shell dnf-system-upgrade firewalld kvm_stat
man-db-restart-cache-update nftables rdisc rhcd rhsm rhsm-facts rpmdb-rebuild
selinux-check-proper-disable serial-getty@ sshd-keygen@ systemd-boot-check-no-failures
systemd-pstore systemd-sysext
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,gpt2)/vmlinuz-5.14.0-284.11.1.el9_2.x86_64
root=/dev/mapper/rhel-root
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
```

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Platform Notes (Continued)

```

15. cpupower frequency-info
    analyzing CPU 0:
        current policy: frequency should be within 3.70 GHz and 3.70 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/Uniautos/speccpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 1.7T 182G 1.5T 11% /home

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

Vendor: XFUSION
Product: 1288H V7
Product Family: Eagle Stream
Serial: 00000000

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:

2x Samsung M321R4GA3PB0-CWMCH 32 GB 2 rank 5600, configured at 4400
14x Samsung M321R4GA3PB0-CWMXH 32 GB 2 rank 5600, configured at 4400

24. BIOS

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

BIOS Vendor: XFUSION
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 2024.0.2 Build 20231213
Copyright (C) 1985-2023 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 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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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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FusionServer 1288H V7 (Intel Xeon Silver 4510T)

SPECspeed®2017_int_peak = 13.5

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

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

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 = 13.2

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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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