



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.
ASUS RS720-E10-RS12(Z12PP-D32) Server System
(2.10 GHz, Intel Xeon Gold 5318Y)

SPECspeed®2017_int_base = 12.2

SPECspeed®2017_int_peak = 12.4

CPU2017 License: 9016

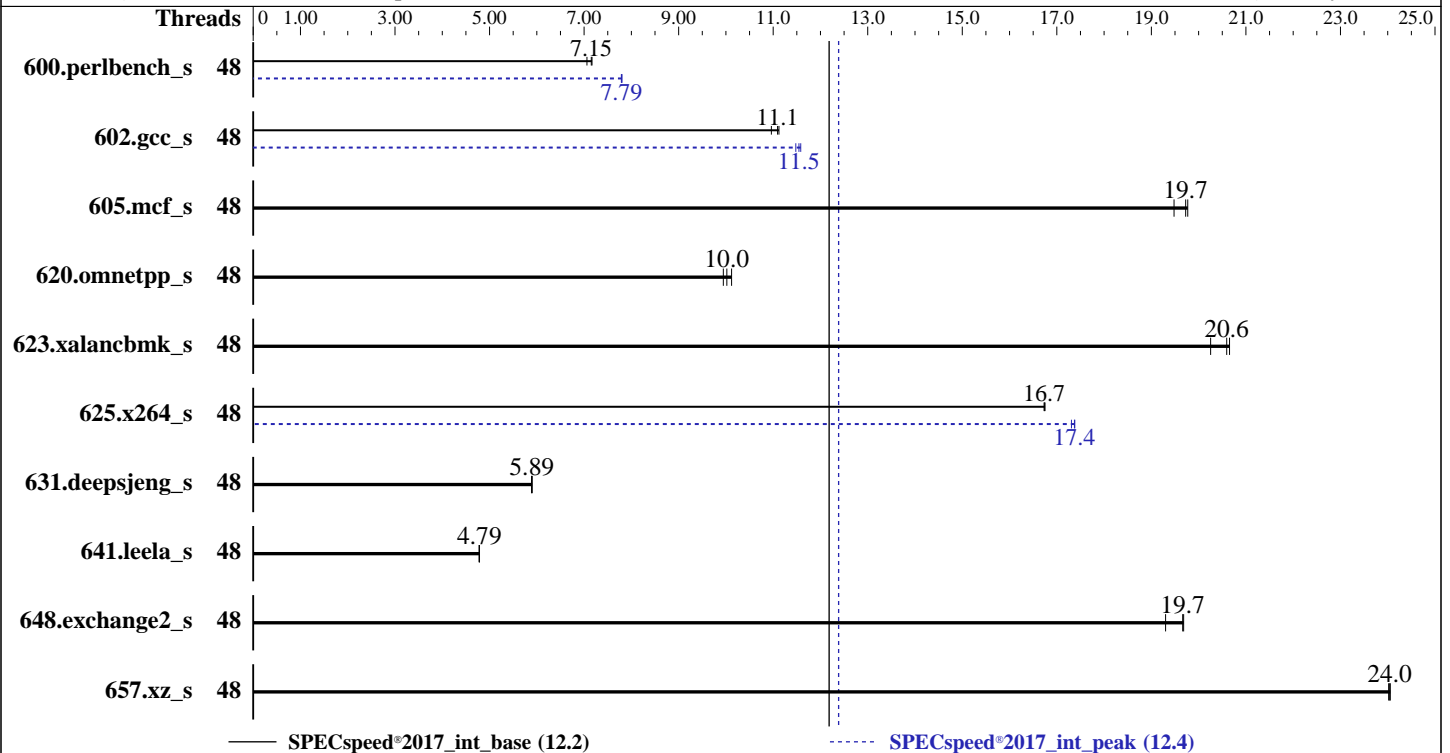
Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Jan-2023

Hardware Availability: Apr-2022

Software Availability: May-2022



Hardware

CPU Name: Intel Xeon Gold 5318Y
 Max MHz: 3400
 Nominal: 2100
 Enabled: 48 cores, 2 chips
 Orderable: 1, 2 chip(s)
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1.25 MB I+D on chip per core
 L3: 36 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)
 Storage: 1 x 1 TB SATA SSD
 Other: None

Software

OS: Red Hat Enterprise Linux release 8.4 (Ootpa) 4.18.0-305.25.1.el8_4.x86_64
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
 Parallel: Yes
 Firmware: Version 0802 released Apr-2022
 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	48	248	7.15	251	7.06	248	7.17	48	228	7.79	228	7.79	228	7.80
602.gcc_s	48	363	11.0	358	11.1	359	11.1	48	347	11.5	344	11.6	345	11.5
605.mcf_s	48	239	19.7	242	19.5	239	19.8	48	239	19.7	242	19.5	239	19.8
620.omnetpp_s	48	163	10.0	161	10.1	164	9.95	48	163	10.0	161	10.1	164	9.95
623.xalancbmk_s	48	70.0	20.3	68.6	20.7	68.8	20.6	48	70.0	20.3	68.6	20.7	68.8	20.6
625.x264_s	48	105	16.7	105	16.8	105	16.7	48	102	17.3	102	17.4	101	17.4
631.deepsjeng_s	48	243	5.89	243	5.89	243	5.90	48	243	5.89	243	5.89	243	5.90
641.leela_s	48	356	4.79	357	4.78	356	4.79	48	356	4.79	357	4.78	356	4.79
648.exchange2_s	48	150	19.7	149	19.7	152	19.3	48	150	19.7	149	19.7	152	19.3
657.xz_s	48	257	24.1	257	24.0	257	24.0	48	257	24.1	257	24.0	257	24.0

SPECspeed®2017_int_base = **12.2**

SPECspeed®2017_int_peak = **12.4**

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

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

Operating System Notes

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

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/ic22u1/lib/intel64:/home/ic22u1/je5.0.1-64"
MALLOCONF = "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

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General Notes (Continued)

Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Platform Notes

BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
Hyper-Threading = Disable
Engine Boost = Aggressive
SR-IOV Support = Disabled
BMC Configuration:
Fan mode = Full speed mode

Sysinfo program /home/ic22ul/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Mon Jan 16 05:00:33 2023

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

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Platform Notes (Continued)

1. `uname -a`
Linux localhost.localdomain 4.18.0-305.25.1.el8_4.x86_64 #1 SMP Mon Oct 18 14:34:11 EDT 2021 x86_64 x86_64 x86_64 GNU/Linux

2. `w`
05:00:33 up 1 min, 1 user, load average: 0.16, 0.07, 0.02
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 - 05:00 9.00s 1.07s 0.00s /bin/bash ./speed.sh

3. Username
From environment variable \$USER: root

4. `ulimit -a`
core file size (blocks, -c) 0
data seg size (kbytes, -d) unlimited
scheduling priority (-e) 0
file size (blocks, -f) unlimited
pending signals (-i) 4126711
max locked memory (kbytes, -l) 64
max memory size (kbytes, -m) unlimited
open files (-n) 1024
pipe size (512 bytes, -p) 8
POSIX message queues (bytes, -q) 819200
real-time priority (-r) 0
stack size (kbytes, -s) unlimited
cpu time (seconds, -t) unlimited
max user processes (-u) 4126711
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

5. `sysinfo process ancestry`
/usr/lib/systemd/systemd --switched-root --system --deserialize 17
login -- root
-bash
/bin/bash ./speed.sh
/bin/bash ./speed.sh
runcpu --nobuild --action validate --define default-platform-flags -c
ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=48 --tune base,peak -o all --define
intspeedaffinity --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=48 --tune base,peak --output_format all
--define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base:peak --size refspped
intspeed --nopreenv --note-preenv --logfile \$SPEC/tmp/CPU2017.292/templogs/preenv.intspeed.292.0.log
--lognum 292.0 --from_runcpu 2
specperl \$SPEC/bin/sysinfo
\$SPEC = /home/ic22u1

6. `/proc/cpuinfo`
model name : Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
vendor_id : GenuineIntel
cpu family : 6
model : 106
stepping : 6
microcode : 0xd000331

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Platform Notes (Continued)

```
bugs           : spectre_v1 spectre_v2 spec_store_bypass swappg
cpu cores      : 24
siblings       : 24
2 physical ids (chips)
48 processors (hardware threads)
physical id 0: core ids 0-23
physical id 1: core ids 0-23
physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46
physical id 1: apicids 64,66,68,70,72,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110
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 2.32.1:
Architecture:      x86_64
CPU op-mode(s):   32-bit, 64-bit
Byte Order:        Little Endian
CPU(s):            48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s):         2
NUMA node(s):     2
Vendor ID:         GenuineIntel
BIOS Vendor ID:   Intel
CPU family:        6
Model:             106
Model name:        Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
BIOS Model name:   Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
Stepping:          6
CPU MHz:           800.238
CPU max MHz:       3400.0000
CPU min MHz:       800.0000
BogoMIPS:          4200.00
Virtualization:    VT-x
L1d cache:         48K
L1i cache:         32K
L2 cache:          1280K
L3 cache:          36864K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
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 vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust
bmi1 hle 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 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
```

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

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Platform Notes (Continued)

```
available: 2 nodes (0-1)
node 0 cpus: 0-23
node 0 size: 515666 MB
node 0 free: 515124 MB
node 1 cpus: 24-47
node 1 size: 516050 MB
node 1 free: 515258 MB
node distances:
node  0  1
  0:  10  20
  1:  20  10
```

```
-----
9. /proc/meminfo
MemTotal:      1056479020 kB
```

```
-----
10. who -r
run-level 3 Jan 16 04:59
```

```
-----
11. Systemd service manager version: systemd 239 (239-45.el8_4.3)
Default Target Status
multi-user      running
```

```
-----
12. Services, from systemctl list-unit-files
STATE      UNIT FILES
enabled    NetworkManager NetworkManager-dispatcher NetworkManager-wait-online atd auditd autovt@ chronyd
           crond firewalld getty@ import-state insights-client-boot irqbalance iscsi iscsi-onboot kdump
           libstoragemgmt lm_sensors loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd
           nvme-fc-boot-connections pmcd pmie pmlogger rhsmcertd rsyslog selinux-autorelabel-mark smartd sshd
           sssd syslog sysstat timedatex tuned udisks2 vdo
disabled   arp-ethers blk-availability chrony-wait console-getty cpupower debug-shell ebttables fancontrol
           grafana-server iprddump iprint iprupdate ipsec iscsid iscsiuiop kpatch kvm_stat ledmon nftables
           nis-domainname nvme-fc-autoconnect oddjobd pmfind pmie_check pmlogger_daily_report
           pmlogger_daily_report-poll pmproxy podman-auto-update postfix powertop psacct ras-mc-ctl
           rasdaemon rdisc rhcd rhsm rhsm-facts rrdcached sasauthd serial-getty@ sshd-keygen@
           systemd-resolved tcsd
indirect   sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
masked     systemd-timedated
```

```
-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-4.18.0-305.25.1.el8_4.x86_64
root=/dev/mapper/rhel-root
ro
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
rhgb
quiet
```

```
-----
14. cpupower frequency-info
analyzing CPU 0:
current policy: frequency should be within 800 MHz and 3.40 GHz.
                 The governor "performance" may decide which speed to use
                 within this range.
boost state support:
```

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Platform Notes (Continued)

Supported: yes
Active: yes

15. tuned-adm active
Current active profile: throughput-performance

16. sysctl
kernel.numa_balancing 1
kernel.randomize_va_space 2
vm.compaction_proactiveness 0
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

17. /sys/kernel/mm/transparent_hugepage
defrag always 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_swap 64
pages_to_scan 4096
scan_sleep_millisecs 10000

19. OS release
From /etc/*-release /etc/*-version
os-release Red Hat Enterprise Linux 8.4 (Ootpa)
redhat-release Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release Red Hat Enterprise Linux release 8.4 (Ootpa)

20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
itlb_multihit Not affected
lltf Not affected
mds Not affected
meltdown Not affected
spec_store_bypass Mitigation: Speculative Store Bypass disabled via prctl and seccomp
spectre_v1 Mitigation: usercopy/swapgs barriers and __user pointer sanitization

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Platform Notes (Continued)

spectre_v2 Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
srbds Not affected
tsx_async_abort Not affected
For more information, see the Linux documentation on hardware vulnerabilities, for example
<https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html>

21. Disk information
SPEC is set to: /home/ic22u1
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 878G 120G 759G 14% /home

22. /sys/devices/virtual/dmi/id
Vendor: ASUSTeK COMPUTER INC.
Product: RS720-E10-RS12
Product Family: Server
Serial: 012345678901

23. dmidecode
Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
16x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2933

24. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends Inc.
BIOS Version: 0802
BIOS Date: 04/29/2022
BIOS Revision: 8.2

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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316

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Compiler Version Notes (Continued)

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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:

-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -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:

-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:

-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-nostandard-realloc-lhs -align array32byte  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profddata(pass 2) -xCORE-AVX512 -O3  
-ffast-math -flto -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: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profddata(pass 2) -xCORE-AVX512 -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
```

```
605.mcf_s: basepeak = yes
```

```
625.x264_s: -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -O3  
-ffast-math -flto -mfpmath=sse -funroll-loops
```

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

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ASUSTeK Computer Inc.
ASUS RS720-E10-RS12(Z12PP-D32) Server System
(2.10 GHz, Intel Xeon Gold 5318Y)

SPECspeed®2017_int_base = 12.2

SPECspeed®2017_int_peak = 12.4

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

Test Date: Jan-2023
Hardware Availability: Apr-2022
Software Availability: May-2022

Peak Optimization Flags (Continued)

625.x264_s (continued):

```
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP  
-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

657.xz_s: basepeak = yes

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/ASUSTekPlatform-Settings-z12-V1.2.html>

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.2022-10-12.html

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

<http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z12-V1.2.xml>

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.2022-10-12.xml

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