



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS300-E12-RS4
(2.80 GHz, Intel Xeon E-2478)

SPECspeed®2017_int_base = 17.5

SPECspeed®2017_int_peak = 17.9

CPU2017 License: 9016

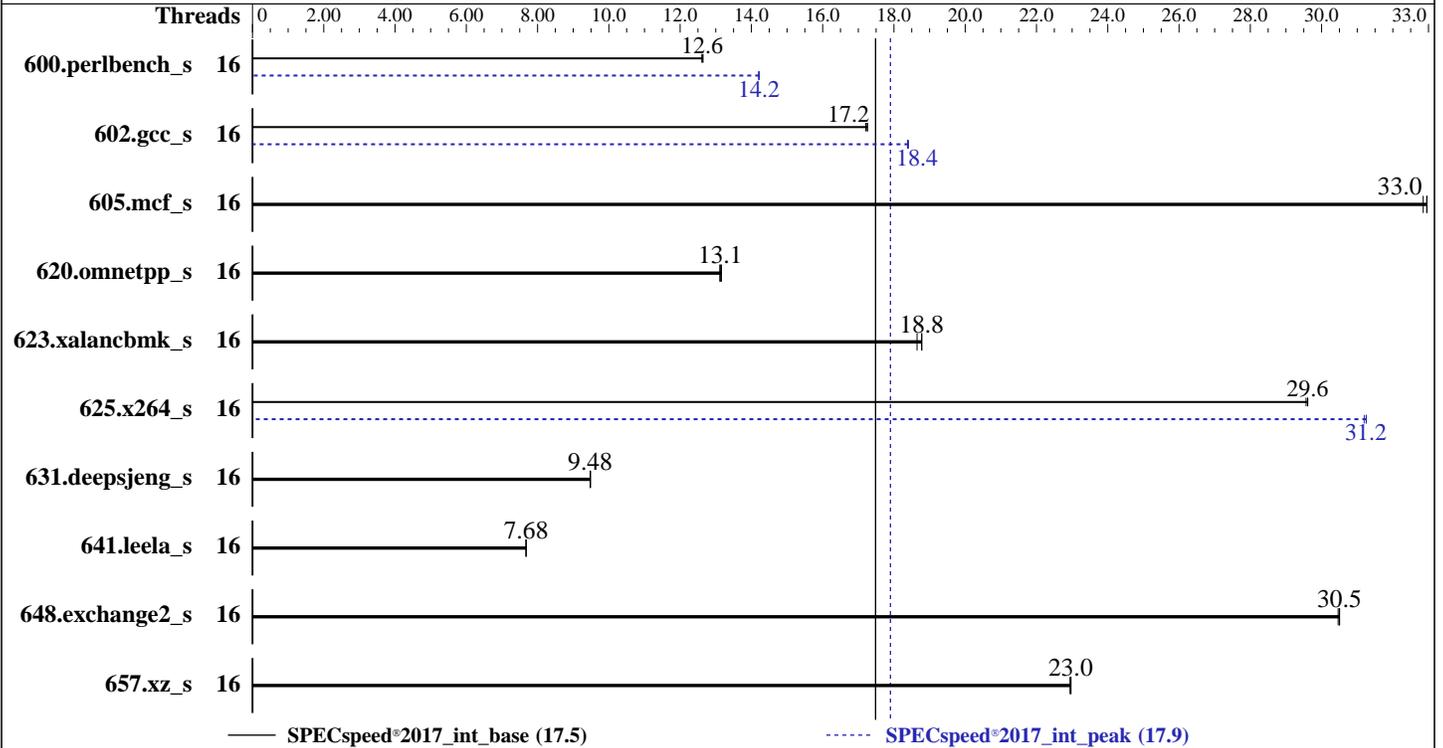
Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2024

Hardware Availability: Dec-2023

Software Availability: Dec-2023



Hardware

CPU Name: Intel Xeon E-2478
 Max MHz: 5200
 Nominal: 2800
 Enabled: 8 cores, 1 chip, 2 threads/core
 Orderable: 1 chip
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 24 MB I+D on chip per chip
 Other: None
 Memory: 64 GB (2 x 32 GB 2Rx8 PC5-4800B-E, running at 4400)
 Storage: 1 x 1 TB SATA SSD
 Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5 (x86_64)
 Kernel 5.14.21-150500.53-default
 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 0502 released Dec-2023
 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	16	141	12.6	140	12.6	141	12.6	16	125	14.2	125	14.2	125	14.2
602.gcc_s	16	231	17.3	231	17.2	231	17.2	16	217	18.4	217	18.4	216	18.4
605.mcf_s	16	143	33.0	143	33.0	144	32.9	16	143	33.0	143	33.0	144	32.9
620.omnetpp_s	16	124	13.1	124	13.1	124	13.2	16	124	13.1	124	13.1	124	13.2
623.xalancbmk_s	16	75.5	18.8	75.5	18.8	76.0	18.6	16	75.5	18.8	75.5	18.8	76.0	18.6
625.x264_s	16	59.7	29.6	59.6	29.6	59.6	29.6	16	56.5	31.2	56.4	31.3	56.4	31.2
631.deepsjeng_s	16	151	9.48	151	9.48	151	9.49	16	151	9.48	151	9.48	151	9.49
641.leela_s	16	222	7.68	222	7.68	222	7.68	16	222	7.68	222	7.68	222	7.68
648.exchange2_s	16	96.4	30.5	96.4	30.5	96.5	30.5	16	96.4	30.5	96.4	30.5	96.5	30.5
657.xz_s	16	269	23.0	269	23.0	269	22.9	16	269	23.0	269	23.0	269	22.9

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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"
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 = "/ic24u0/lib/intel64:/ic24u0/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 Red Hat 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:
VT-d = Disabled
Package C State Limit = C0/C1
AES = Disabled
Engine Boost = Level3(Max)
SR-IOV Support = Disabled
BMC Configuration:
Fan mode = Full speed mode

Sysinfo program /ic24u0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Sat Mar 16 19:33:30 2024

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

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17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

```

1. uname -a
Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
x86_64 x86_64 x86_64 GNU/Linux

```

```

2. w
19:33:30 up 1 day, 4:06, 2 users, load average: 13.61, 15.29, 15.63
USER      TTY      FROM          LOGIN@      IDLE        JCPU      PCPU      WHAT
root     tty1      -              Fri15       28:03m     0.62s    0.00s    /bin/bash ./speed.sh
root     tty2      -              Fri15       27:54m     0.00s    0.00s    -bash

```

```

3. Username
From environment variable $USER: root

```

```

4. ulimit -a

```

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Platform Notes (Continued)

```

core file size      (blocks, -c) unlimited
data seg size      (kbytes, -d) unlimited
scheduling priority (-e) 0
file size          (blocks, -f) unlimited
pending signals    (-i) 256577
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) 256577
virtual memory    (kbytes, -v) unlimited
file locks        (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
/bin/bash ./speed.sh
/bin/bash ./speed.sh
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2024.0.2-lin-core-avx2-speed-20231213.cfg --define cores=16 --tune base,peak -o all --define
  intspeedaffinity --define drop_caches intspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2024.0.2-lin-core-avx2-speed-20231213.cfg --define cores=16 --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/CPU2017.049/templogs/preenv.intspeed.049.0.log
  --lognum 049.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /ic24u0

```

```

-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) E E-2478
vendor_id      : GenuineIntel
cpu family     : 6
model          : 183
stepping       : 1
microcode      : 0x11f
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores      : 8
siblings       : 16
1 physical ids (chips)
16 processors (hardware threads)
physical id 0: core ids 0-7
physical id 0: apicids 0-15
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, 48 bits virtual

```

(Continued on next page)



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Platform Notes (Continued)

```

Byte Order:                Little Endian
CPU(s):                    16
On-line CPU(s) list:      0-15
Vendor ID:                 GenuineIntel
Model name:                Intel(R) Xeon(R) E E-2478
CPU family:                6
Model:                     183
Thread(s) per core:       2
Core(s) per socket:       8
Socket(s):                 1
Stepping:                  1
CPU max MHz:               6700.0000
CPU min MHz:               800.0000
BogoMIPS:                  5606.40
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 sse4_1 sse4_2
                           x2apic movbe popcnt tsc_deadline_timer xsave avx f16c rdrand lahf_lm abm
                           3dnowprefetch cpuid_fault epb invpcid_single ssbd ibrs ibpb stibp
                           ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase
                           tsc_adjust bmi1 avx2 smep bmi2 erms invpcid rdseed adx smap clflushopt
                           clwb intel_pt sha_ni xsaveopt xsavec xgetbv1 xsaves split_lock_detect
                           avx_vnni dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
                           hwp_pkg_req hfi umip pku ospke waitpkg gfni vpcmlmulqdq tme rdpid movdiri
                           movdir64b fsrm md_clear serialize pconfig arch_lbr flush_l1d
                           arch_capabilities

Virtualization:           VT-x
L1d cache:                384 KiB (8 instances)
L1i cache:                256 KiB (8 instances)
L2 cache:                 16 MiB (8 instances)
L3 cache:                 24 MiB (1 instance)
NUMA node(s):             1
NUMA node0 CPU(s):        0-15
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 and seccomp
Vulnerability Spectre v1:  Mitigation; usercopy/swapgs 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	384K	12	Data	1	64	1	64
L1i	32K	256K	8	Instruction	1	64	1	64
L2	2M	16M	16	Unified	2	2048	1	64
L3	24M	24M	12	Unified	3	32768	1	64

8. numactl --hardware

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

available: 1 nodes (0)

node 0 cpus: 0-15

(Continued on next page)



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Platform Notes (Continued)

```
node 0 size: 64174 MB
node 0 free: 61676 MB
node distances:
node 0
0: 10
```

```
-----
9. /proc/meminfo
MemTotal: 65714420 kB
```

```
-----
10. who -r
run-level 3 Mar 15 15:26
```

```
-----
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
Default Target Status
multi-user running
```

```
-----
12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ haveged irqbalance
issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs
disabled autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info
firewallld gpm grub2-once haveged-switch-root ipmi ipmievld issue-add-ssh-keys kexec-load
lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd
serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
systemd-network-generator systemd-sysextd systemd-time-wait-sync systemd-timesyncd udisks2
indirect wickedd
```

```
-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
root=UUID=c7ea704b-969d-4a21-bb75-dacf025811fc
splash=silent
mitigations=auto
quiet
security=apparmor
```

```
-----
14. cpupower frequency-info
analyzing CPU 0:
current policy: frequency should be within 800 MHz and 6.40 GHz.
The governor "performance" may decide which speed to use
within this range.
boost state support:
Supported: yes
Active: yes
```

```
-----
15. sysctl
kernel.numa_balancing 0
kernel.randomize_va_space 2
vm.compaction_proactiveness 20
vm.dirty_background_bytes 0
vm.dirty_background_ratio 10
```

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Platform Notes (Continued)

```

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

```

```

-----
16. /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

```

```

-----
17. /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

```

```

-----
18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP5

```

```

-----
19. Disk information
SPEC is set to: /ic24u0
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda8       xfs   763G  23G  741G  3% /

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:          ASUSTeK COMPUTER INC.
Product:         RS300-E12-RS4
Product Family:  Server
Serial:          865236000406

```

```

-----
21. dmidecode
Additional information from dmidecode 3.4 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:
  1x SK Hynix HMC88MEBEA081N 32 GB 2 rank 4800, configured at 4400
  1x SK Hynix HMC88MEBEA084N 32 GB 2 rank 4800, configured at 4400

```

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Platform Notes (Continued)

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends Inc.
BIOS Version: 0502
BIOS Date: 12/28/2023
BIOS Revision: 5.2

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 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
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

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

(Continued on next page)



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Base Portability Flags (Continued)

```
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 -xCORE-AVX2 -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 -xCORE-AVX2 -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 -xCORE-AVX2 -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
```

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx



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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 -flto
-Ofast(pass 1) -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 -flto
-Ofast(pass 1) -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 -xCORE-AVX2 -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

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



SPEC CPU®2017 Integer Speed Result

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ASUSTeK Computer Inc.

ASUS RS300-E12-RS4
(2.80 GHz, Intel Xeon E-2478)

SPECspeed®2017_int_base = 17.5

SPECspeed®2017_int_peak = 17.9

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2024

Hardware Availability: Dec-2023

Software Availability: Dec-2023

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

<http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-p13-V1.2.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/ASUSTekPlatform-Settings-p13-V1.2.xml>

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

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