



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

Supermicro

GPU SuperServer SYS-522GA-NRT
(X14DBG-AP , Intel Xeon 6980P)

SPECrate®2017_int_base = 2430

SPECrate®2017_int_peak = Not Run

CPU2017 License: 001176

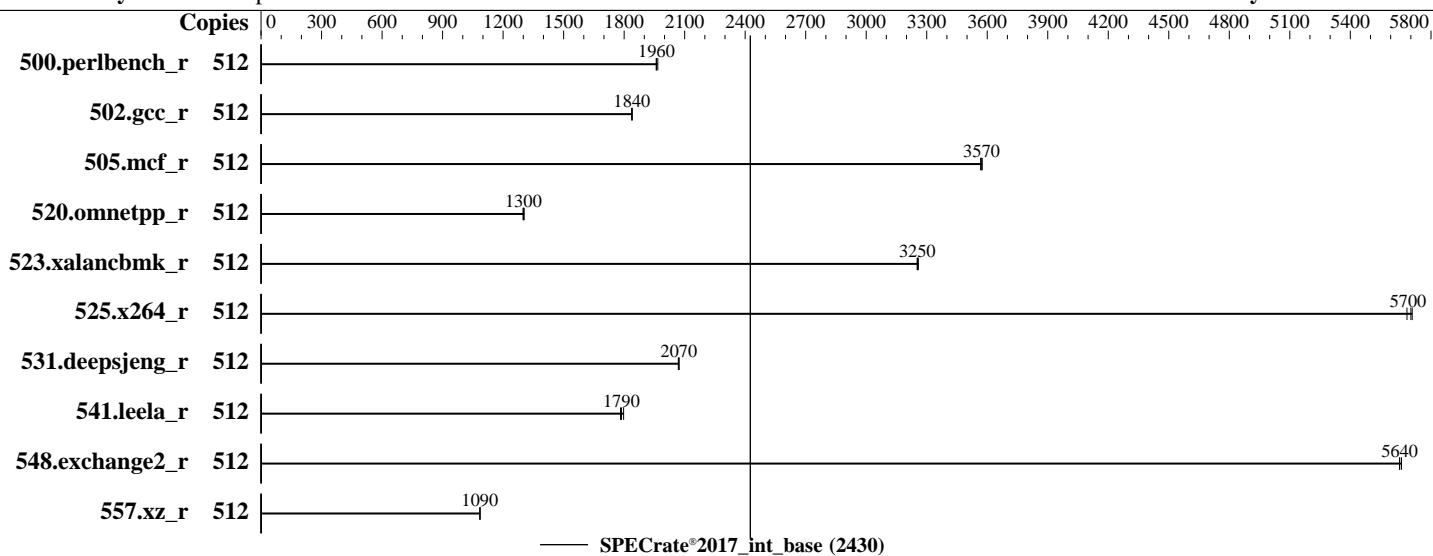
Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Dec-2024

Hardware Availability: Dec-2024

Software Availability: Dec-2024



Hardware

CPU Name: Intel Xeon 6980P
Max MHz: 3900
Nominal: 2000
Enabled: 256 cores, 2 chips, 2 threads/core
Orderable: 2 chips
Cache L1: 64 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 504 MB I+D on chip per chip
Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-11200B-R, running at 8800)
Storage: 1 x 512 GB PCIE M.2 SSD
Other: CPU Cooling: DLC

Software

OS: SUSE Linux Enterprise Server 15 SP6
Compiler: Kernel 6.4.0-150600.21-default
C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 1.0 released Dec-2024
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance at the cost 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	Seconds	Ratio
500.perlbench_r	512	414	1970	416	1960	416	1960									
502.gcc_r	512	394	1840	394	1840	395	1840									
505.mcf_r	512	232	3570	232	3570	231	3580									
520.omnetpp_r	512	516	1300	515	1300	517	1300									
523.xalancbmk_r	512	166	3250	166	3260	166	3250									
525.x264_r	512	158	5680	157	5700	157	5710									
531.deepsjeng_r	512	283	2070	284	2070	283	2070									
541.leela_r	512	475	1790	476	1780	472	1800									
548.exchange2_r	512	238	5640	238	5640	237	5650									
557.xz_r	512	510	1090	510	1090	509	1090									

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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/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
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
```

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.



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Platform Notes

BIOS Settings:

Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Extreme Performance
SNC = Enable
LLC dead line alloc = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Dec 10 00:32:31 2024

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

Table of contents

- 1. uname -a
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- 5. sysinfo process ancestry
- 6. /proc/cpuinfo
- 7. lscpu
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- 9. /proc/meminfo
- 10. who -r
- 11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
- 12. Services, from systemctl list-unit-files
- 13. Linux kernel boot-time arguments, from /proc/cmdline
- 14. cpupower frequency-info
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- 17. /sys/kernel/mm/transparent_hugepage/khugepaged
- 18. OS release
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- 20. /sys/devices/virtual/dmi/id
- 21. dmidecode
- 22. BIOS

1. uname -a
Linux localhost 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
x86_64 x86_64 x86_64 GNU/Linux

2. w
00:32:31 up 2:01, 1 user, load average: 0.00, 0.00, 1.34
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 - 22:40 7.00s 1.27s 0.06s -bash

3. Username
From environment variable \$USER: root

4. ulimit -a
core file size (blocks, -c) unlimited
data seg size (kbytes, -d) unlimited
scheduling priority (-e) 0

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Platform Notes (Continued)

```
file size          (blocks, -f) unlimited
pending signals   (-i) 6188324
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) 6188324
virtual memory      (kbytes, -v) unlimited
file locks          (-x) unlimited
```

```
-----  
5. sysinfo process ancestry  
/usr/lib/systemd/systemd --switched-root --system --deserialize=42  
login -- root  
-bash  
-bash  
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=512 -c  
  ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=256 --define physicalfirst  
  --define invoke_with_interleave --define drop_caches --tune base -o all intrate  
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=512 --configfile  
  ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=256 --define physicalfirst  
  --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode  
  rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile  
  $SPEC/tmp/CPU2017.143/templogs/preenv.intrate.143.0.log --lognum 143.0 --from_runcpu 2  
specperl $SPEC/bin/sysinfo  
$SPEC = /home/cpu2017
```

```
-----  
6. /proc/cpuinfo  
model name      : Intel(R) Xeon(R) 6980P  
vendor_id        : GenuineIntel  
cpu family       : 6  
model           : 173  
stepping         : 1  
microcode        : 0x1000314  
bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi  
cpu cores        : 128  
siblings          : 256  
2 physical ids (chips)  
512 processors (hardware threads)  
physical id 0: core ids 0-42,64-106,128-169  
physical id 1: core ids 0-42,64-106,128-169  
physical id 0: apicids 0-85,128-213,256-339  
physical id 1: apicids 512-597,640-725,768-851  
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 2.39.3:  
Architecture:          x86_64  
CPU op-mode(s):       32-bit, 64-bit  
Address sizes:        52 bits physical, 57 bits virtual  
Byte Order:           Little Endian  
CPU(s):               512
```

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Platform Notes (Continued)

On-line CPU(s) list:

0-511

Vendor ID:

GenuineIntel

BIOS Vendor ID:

Intel(R) Corporation

Model name:

Intel(R) Xeon(R) 6980P

BIOS Model name:

Intel(R) Xeon(R) 6980P CPU @ 2.0GHz

BIOS CPU family:

179

CPU family:

6

Model:

173

Thread(s) per core:

2

Core(s) per socket:

128

Socket(s):

2

Stepping:

1

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 xtTopology nonstop_tsc cpuid aperf mperf tsc_known_freq pn
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_13 cat_12 cdp_13 intel_ppin cdp_12
ssbd mba ibrs ibpb stibrs Enhanced tpr_shadow flexpriority ept
vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid
rtm cqmq rdta avx512f avx512dq rdseed adx smap avx512ifma clflushopt
clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
xgetbv1 xsaves cqmq_llc cqmq_occup_llc cqmq_mbm_total cqmq_mbm_local
split_lock_detect user_shstx avx_vnni avx512_bf16 wbnoinvd dtherm ida
arat pln pts vnmi avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni
vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpocntdq 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_llc arch_capabilities
```

Virtualization:

VT-x

L1d cache:

12 MiB (256 instances)

L1i cache:

16 MiB (256 instances)

L2 cache:

512 MiB (256 instances)

L3 cache:

1008 MiB (2 instances)

NUMA node(s):

6

NUMA node0 CPU(s):

0-42,256-298

NUMA node1 CPU(s):

43-85,299-341

NUMA node2 CPU(s):

86-127,342-383

NUMA node3 CPU(s):

128-170,384-426

NUMA node4 CPU(s):

171-213,427-469

NUMA node5 CPU(s):

214-255,470-511

Vulnerability Gather data sampling:

Not affected

Vulnerability Itlb multihit:

Not affected

Vulnerability Llrf:

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/swapgs barriers and __user pointer sanitization

Vulnerability Spectre v2:

Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling;

PBRSB-eIBRS Not affected; BHI BHI_DIS_S

Vulnerability Srbds:

Not affected

Vulnerability Tsx async abort:

Not affected

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Platform Notes (Continued)

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	12M	12	Data	1	64	1	64
L1i	64K	16M	16	Instruction	1	64	1	64
L2	2M	512M	16	Unified	2	2048	1	64
L3	504M	1008M	16	Unified	3	516096	1	64

8. numactl --hardware

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

available: 6 nodes (0-5)

node 0 cpus: 0-42,256-298

node 0 size: 257516 MB

node 0 free: 255788 MB

node 1 cpus: 43-85,299-341

node 1 size: 258025 MB

node 1 free: 256674 MB

node 2 cpus: 86-127,342-383

node 2 size: 258026 MB

node 2 free: 256722 MB

node 3 cpus: 128-170,384-426

node 3 size: 257986 MB

node 3 free: 256628 MB

node 4 cpus: 171-213,427-469

node 4 size: 258025 MB

node 4 free: 256487 MB

node 5 cpus: 214-255,470-511

node 5 size: 257526 MB

node 5 free: 256236 MB

node distances:

node	0	1	2	3	4	5
0:	10	12	12	21	21	21
1:	12	10	12	21	21	21
2:	12	12	10	21	21	21
3:	21	21	21	10	12	12
4:	21	21	21	12	10	12
5:	21	21	21	12	12	10

9. /proc/meminfo

MemTotal: 1584237968 kB

10. who -r

run-level 3 Dec 9 22:32

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

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 display-manager firewalld getty@ irqbalance issue-generator kbdsettings kdump kdump-early kdump-notify klog lvm2-monitor nsqd nvmefc-boot-connections nvmf-autoconnect 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	

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Platform Notes (Continued)

```
chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info fsidd
gpm grub2-once haveged 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-context systemd-network-generator
systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2 vncserver@
indirect systemd-userdbd wickedd

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=13f7b56f-498b-4e4b-b0b8-ad6ala98224
splash=silent
resume=/dev/disk/by-uuid/f9897165-ddaa-4d2c-a750-9d4bac5bc832
mitigations=auto
quiet
security=apparmor
crashkernel=344M,high
crashkernel=72M,low

-----
14. cpupower frequency-info
analyzing CPU 7:
  Unable to determine current policy
  boost state support:
    Supported: yes
    Active: yes

-----
15. 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

-----
16. /sys/kernel/mm/transparent_hugepage
defrag      always defer 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
```

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Platform Notes (Continued)

```
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 SP6
```

```
-----  
19. Disk information  
SPEC is set to: /home/cpu2017  
Filesystem      Type  Size  Used  Avail Use% Mounted on  
/dev/nvme0n1p7  xfs   483G  170G  313G  36%  /home
```

```
-----  
20. /sys/devices/virtual/dmi/id  
Vendor:          Supermicro  
Product:         Super Server  
Product Family:  SMC X14
```

```
-----  
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:  
24x Samsung M327R8GA0EB0-CLVXB 64 GB 2 rank 11200, configured at 8800
```

```
-----  
22. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor:      American Megatrends International, LLC.  
BIOS Version:     1.0  
BIOS Date:        11/27/2024  
BIOS Revision:    5.35
```

Compiler Version Notes

```
=====  
C      | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)  
=====
```

```
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++    | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)  
=====
```

```
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 | 548.exchange2_r(base)  
=====
```

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Compiler Version Notes (Continued)

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.

Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/opt/intel/oneapi/compiler/2024.1/lib -lqkmalloc

C++ benchmarks:

-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/opt/intel/oneapi/compiler/2024.1/lib -lqkmalloc

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Base Optimization Flags (Continued)

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -fno
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/opt/intel/oneapi/compiler/2024.1/lib -lgkmalloc
```

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

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

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-GNR-revA.html>

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

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

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-GNR-revA.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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