



SPEC CPU®2017 Integer Rate Result

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Supermicro

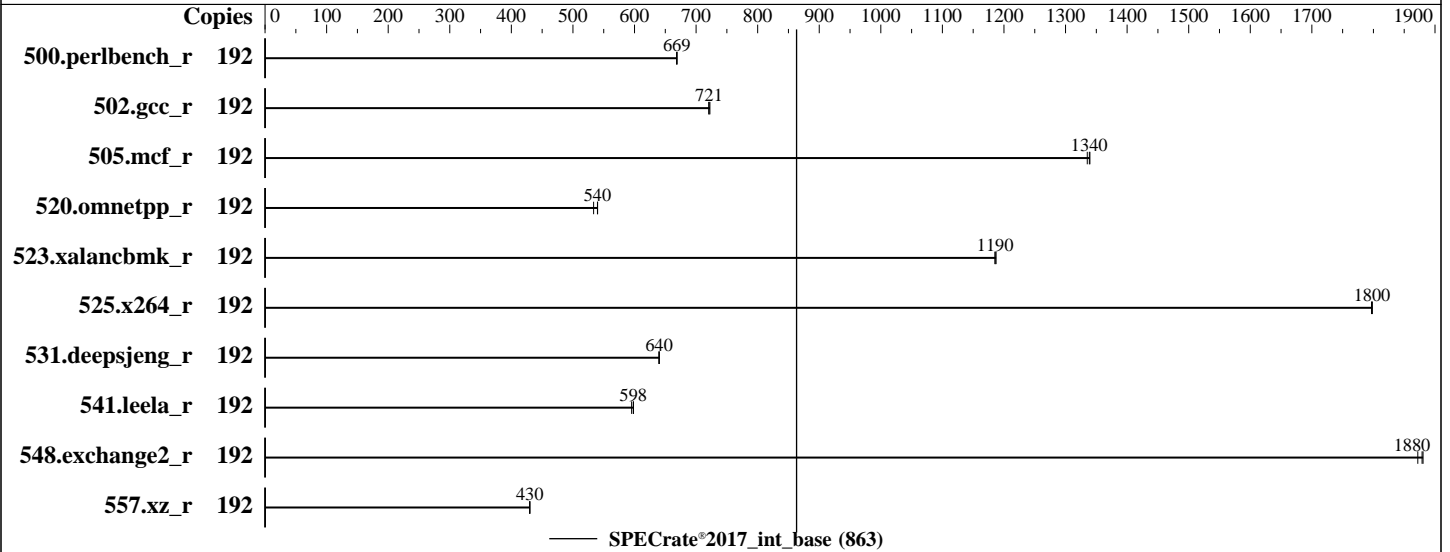
SuperServer SYS-221H-TNR
(X13DEM , Intel Xeon Platinum 8558)

SPECrate®2017_int_base = 863

SPECrate®2017_int_peak = Not Run

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Feb-2025
Hardware Availability: Nov-2023
Software Availability: Jun-2024



Hardware

CPU Name: Intel Xeon Platinum 8558
Max MHz: 4000
Nominal: 2100
Enabled: 96 cores, 2 chips, 2 threads/core
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: 260 MB I+D on chip per chip
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R, running at 5200)
Storage: 1 x 1.6TB NVMe SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6 6.4.0-150600.21-default
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: No
Firmware: Version 2.5 released Feb-2025
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
500.perlbench_r	192	457	669	457	669	457	668							
502.gcc_r	192	377	721	377	721	376	722							
505.mcf_r	192	232	1340	232	1340	232	1340							
520.omnetpp_r	192	472	534	466	540	467	540							
523.xalancbmk_r	192	171	1190	171	1190	171	1190							
525.x264_r	192	187	1800	187	1800	187	1800							
531.deepsjeng_r	192	344	640	344	640	344	640							
541.leela_r	192	534	595	532	598	531	598							
548.exchange2_r	192	267	1880	269	1870	268	1880							
557.xz_r	192	482	430	483	430	482	430							

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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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

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)

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General Notes (Continued)

is mitigated in the system as tested and documented.

Platform Notes

BIOS Settings:

Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Extreme Performance
KTI Prefetch = Enable
SNC = Enable SNC2 (2-clusters)
DCU Streamer Prefetcher = Disable
LLC Dead Line Alloc = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on 161-68 Fri Feb 21 11:27:00 2025

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
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
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. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

1. uname -a
Linux 161-68 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
11:27:00 up 4 min, 1 user, load average: 1.21, 0.41, 0.14
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty2 - 11:26 4.00s 1.10s 0.01s -bash

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Platform Notes (Continued)

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
file size              (blocks, -f) unlimited
pending signals        (-i) 4124933
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) 4124933
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
-runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 -c
  ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=96 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base -o all intrate
-runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 --configfile
  ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=96 --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/CPU2017.010/temlogs/preenv.intrate.010.0.log --lognum 010.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

6. /proc/cpuinfo

```

model name      : INTEL(R) XEON(R) PLATINUM 8558
vendor_id      : GenuineIntel
cpu family      : 6
model          : 207
stepping       : 2
microcode      : 0x21000291
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores      : 48
siblings       : 96
2 physical ids (chips)
192 processors (hardware threads)
physical id 0: core ids 0-47
physical id 1: core ids 0-47
physical id 0: apicids 0-95
physical id 1: apicids 128-223

```

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

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Platform Notes (Continued)

7. lscpu

From lscpu from util-linux 2.39.3:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:         46 bits physical, 57 bits virtual
Byte Order:            Little Endian
CPU(s):                192
On-line CPU(s) list:   0-191
Vendor ID:             GenuineIntel
BIOS Vendor ID:       Intel(R) Corporation
Model name:            INTEL(R) XEON(R) PLATINUM 8558
BIOS Model name:      INTEL(R) XEON(R) PLATINUM 8558  CPU @ 2.1GHz
BIOS CPU family:      179
CPU family:           6
Model:                207
Thread(s) per core:   2
Core(s) per socket:   48
Socket(s):            2
Stepping:              2
BogoMIPS:             4200.00
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 intel_ppin cdp_l2
                    ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept
                    vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid
                    rtm 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 user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida
                    arat pln pts vmmi avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni
                    vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57
                    rdprid 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:            4.5 MiB (96 instances)
L1i cache:            3 MiB (96 instances)
L2 cache:             192 MiB (96 instances)
L3 cache:             520 MiB (2 instances)
NUMA node(s):         4
NUMA node0 CPU(s):    0-23,96-119
NUMA node1 CPU(s):    24-47,120-143
NUMA node2 CPU(s):    48-71,144-167
NUMA node3 CPU(s):    72-95,168-191
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit:      Not affected
Vulnerability L1tf:               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

```

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Platform Notes (Continued)

Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling; PBRBSB-eIBRS SW sequence; BHI BHI_DIS_S
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	4.5M	12	Data	1	64	1	64
L1i	32K	3M	8	Instruction	1	64	1	64
L2	2M	192M	16	Unified	2	2048	1	64
L3	260M	520M	20	Unified	3	212992	1	64

8. numactl --hardware

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

```
available: 4 nodes (0-3)
node 0 cpus: 0-23,96-119
node 0 size: 257599 MB
node 0 free: 256483 MB
node 1 cpus: 24-47,120-143
node 1 size: 257996 MB
node 1 free: 257285 MB
node 2 cpus: 48-71,144-167
node 2 size: 258035 MB
node 2 free: 256428 MB
node 3 cpus: 72-95,168-191
node 3 size: 257631 MB
node 3 free: 256883 MB
node distances:
node 0 1 2 3
0: 10 12 21 21
1: 12 10 21 21
2: 21 21 10 12
3: 21 21 12 10
```

9. /proc/meminfo

MemTotal: 1056012900 kB

10. who -r

run-level 3 Feb 21 11:26 last=5

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

```
Default Target Status
graphical degraded
```

12. Failed units, from systemctl list-units --state=failed

```
UNIT LOAD ACTIVE SUB DESCRIPTION
* udisks2.service loaded failed failed Disk Manager
```

13. Services, from systemctl list-unit-files

```
STATE UNIT FILES
enabled YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth cron
display-manager firewalld getty@ irqbalance issue-generator kbdsettings kdump kdump-early
kdump-notify klog lvm2-monitor nsd nvme-fc-boot-connections nvme-autoconnect postfix
```

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Platform Notes (Continued)

```

enabled-runtime  purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4
disabled        wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
                systemd-remount-fs
accounts-daemon autofs autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl
ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables
exchange-bmc-os-info fsidd gpm grub2-once haveged ipmi ipmievd issue-add-ssh-keys
kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nmb ostree-remount rpcbind
rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd_generate_opts smb snmpd snmptrapd
speech-dispatcherd systemd-boot-check-no-failures systemd-confext
systemd-network-generator systemd-sysexit systemd-time-wait-sync systemd-timesyncd udisks2
update-system-flatpaks upower vncserver@
indirect        systemd-userdbd wickedd

```

```

-----
14. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=6a512dea-97a0-47d9-b3c5-70d54d5dd3bb
splash=silent
resume=/dev/disk/by-uuid/3c06cf11-c9d3-41a7-8d4e-08d2b04c135c
mitigations=auto
quiet
security=apparmor
crashkernel=364M,high
crashkernel=72M,low

```

```

-----
15. cpupower frequency-info
analyzing CPU 115:
Unable to determine current policy
boost state support:
Supported: yes
Active: yes

```

```

-----
16. 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

```

```

-----
17. /sys/kernel/mm/transparent_hugepage
defrag          always defer defer+madvice [madvice] never
enabled        [always] madvice never
hpage_pmd_size 2097152

```

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Platform Notes (Continued)

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_shared 256
max_ptes_swap 64
pages_to_scan 4096
scan_sleep_millisecs 10000
-----
```

```
-----
19. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP6
-----
```

```
-----
20. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p3 xfs 443G 199G 245G 45% /home
-----
```

```
-----
21. /sys/devices/virtual/dmi/id
Vendor: Supermicro
Product: Super Server
Product Family: Family
Serial: 0123456789
-----
```

```
-----
22. 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:
15x Samsung M321R8GA0PB0-CWMKH 64 GB 2 rank 5600, configured at 5200
1x Samsung M321R8GA0PB0-CWMXH 64 GB 2 rank 5600, configured at 5200
-----
```

```
-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 2.5
BIOS Date: 02/05/2025
BIOS Revision: 5.32
-----
```

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.
-----
```

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Compiler Version Notes (Continued)

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)

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 -lqkmallo

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Base Optimization Flags (Continued)

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
```

Fortran benchmarks:

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

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

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SPR-revG.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/Supermicro-Platform-Settings-V1.2-SPR-revG.xml>
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml>

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