



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

New H3C Technologies Co., Ltd.  
H3C UniServer R4900 G6 Ultra (Intel Xeon Platinum 8558P)

SPECrate®2017\_int\_base = 931

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 9066

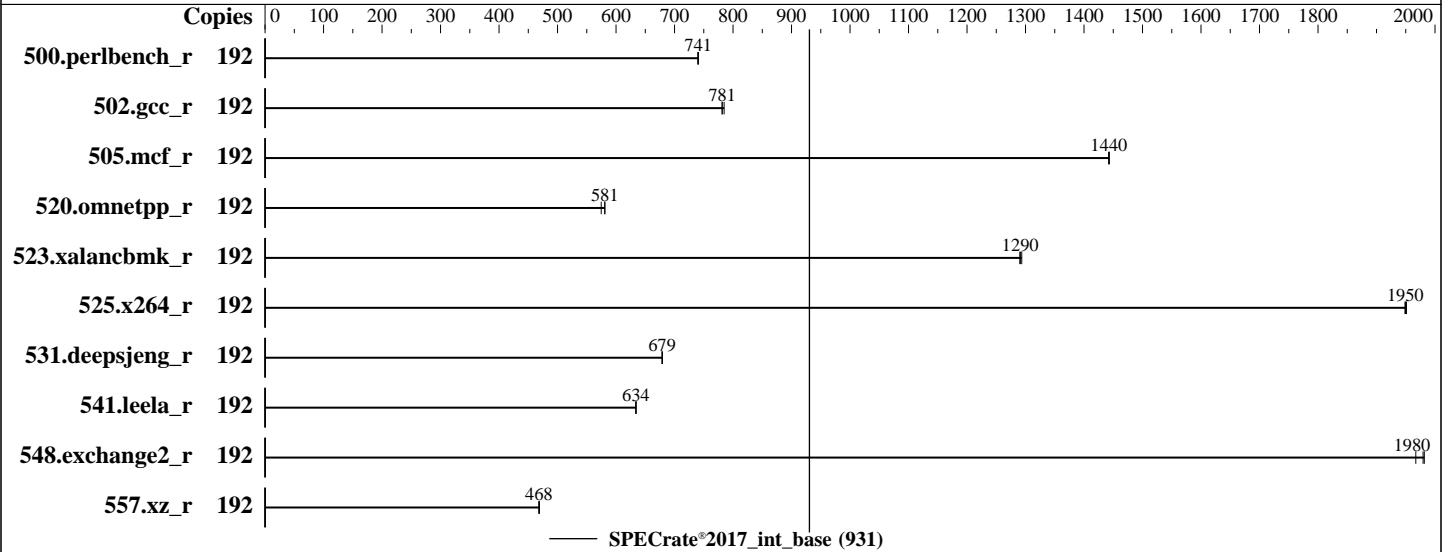
Test Sponsor: New H3C Technologies Co., Ltd.

Tested by: New H3C Technologies Co., Ltd.

Test Date: Sep-2024

Hardware Availability: Oct-2023

Software Availability: Mar-2024



## Hardware

CPU Name: Intel Xeon Platinum 8558P  
 Max MHz: 4000  
 Nominal: 2700  
 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)  
 Storage: 1 x 3.2 TB NVME SSD  
 Other: CPU Cooling: Air

## Software

OS: SUSE Linux Enterprise Server 15 SP5  
 5.14.21-150500.53-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 6.10.43 released Jul-2024 BIOS  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None  
 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	192	413	741	<b>413</b>	<b>741</b>	413	740							
502.gcc_r	192	348	781	346	785	<b>348</b>	<b>781</b>							
505.mcf_r	192	<b>215</b>	<b>1440</b>	215	1440	215	1440							
520.omnetpp_r	192	<b>434</b>	<b>581</b>	434	581	438	575							
523.xalancbmk_r	192	157	1290	<b>157</b>	<b>1290</b>	157	1290							
525.x264_r	192	173	1950	<b>172</b>	<b>1950</b>	172	1950							
531.deepsjeng_r	192	324	679	324	679	<b>324</b>	<b>679</b>							
541.leela_r	192	501	634	502	634	<b>501</b>	<b>634</b>							
548.exchange2_r	192	254	1980	<b>254</b>	<b>1980</b>	256	1970							
557.xz_r	192	443	468	<b>443</b>	<b>468</b>	442	469							

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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/specpunew/lib/intel64:/home/specpunew/lib/ia32:/home/specpunew/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) is mitigated in the system as tested and documented.



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## Platform Notes

### BIOS Settings:

SNC = Enable SNC2 (2-clusters)  
Power Performance Tuning = BIOS Controls EPB  
ENERGY\_PERF\_BIAS\_CFG mode = Performance

Sysinfo program /home/specpunew/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost Thu Sep 12 09:39:17 2024

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 249 (249.16+suse.171.gdad0071f15)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
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 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
09:39:17 up 1 min, 1 user, load average: 1.37, 0.57, 0.21
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU WHAT
root     tty1      -              09:38   13.00s  1.28s  0.01s sh intrate.sh
```

```
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
```

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## Platform Notes (Continued)

```

pending signals                (-i) 4126465
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) 4126465
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
sh intrate.sh
runccpu --nobuild --action validate --define default-platform-flags --define numcopies=192 -c
  ic2024.1-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=96 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base -o all intrate
runccpu --nobuild --action validate --define default-platform-flags --define numcopies=192 --configfile
  ic2024.1-lin-sapphirerapids-rate-20231213.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/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runccpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/specpcunew

```

```

-----
6. /proc/cpuinfo
model name      : INTEL(R) XEON(R) PLATINUM 8558P
vendor_id      : GenuineIntel
cpu family     : 6
model          : 207
stepping      : 2
microcode     : 0x21000200
bugs          : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
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.

```

```

-----
7. lscpu

From lscpu from util-linux 2.37.4:
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): 192
On-line CPU(s) list: 0-191

```

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## Platform Notes (Continued)

```

Vendor ID: GenuineIntel
Model name: INTEL(R) XEON(R) PLATINUM 8558P
CPU family: 6
Model: 207
Thread(s) per core: 2
Core(s) per socket: 48
Socket(s): 2
Stepping: 2
CPU max MHz: 4000.0000
CPU min MHz: 800.0000
BogoMIPS: 5400.00
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 cdp_l2 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 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 avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
        hwp_act_window hwp_epp hwp_pkg_req hfi avx512vbmi umip pku ospke waitpkg
        avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
        avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
        enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16
        amx_tile 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 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 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

```

(Continued on next page)



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## Platform Notes (Continued)

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: 257577 MB
node 0 free: 256668 MB
node 1 cpus: 24-47,120-143
node 1 size: 258035 MB
node 1 free: 257365 MB
node 2 cpus: 48-71,144-167
node 2 size: 258035 MB
node 2 free: 256783 MB
node 3 cpus: 72-95,168-191
node 3 size: 257997 MB
node 3 free: 257230 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: 1056405684 kB
```

10. who -r

```
run-level 3 Sep 12 09:38
```

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 cron display-manager getty@ issue-generator
kbdsettings klog lvm2-monitor nscd nvme-fc-boot-connections purge-kernels rollback rsyslog
smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs
disabled auditd autofs autovast-initscripts blk-availability boot-sysctl ca-certificates
chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables
exchange-bmc-os-info fancontrol firewalld gpm grub2-once haveged haveged-switch-root ipmi
ipmievd irqbalance issue-add-ssh-keys kdump kdump-early kexec-load lm_sensors lunmask
man-db-create multipathd ndctl-monitor nfs nfs-blkmap nmb nvmmf-autoconnect postfix rpcbind
rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts smb snmpd snmptrapd sysstat
systemd-boot-check-no-failures systemd-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesyncd tuned vncserver@
indirect pcsd wickedd
```

13. Linux kernel boot-time arguments, from /proc/cmdline

```
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
root=UUID=befabla9-6492-412a-9d0b-079466ad03eb
splash=silent
resume=/dev/disk/by-uuid/64b85326-8619-4fcb-8127-1e8683bd7471
mitigations=auto
quiet
```

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## Platform Notes (Continued)

```
splash=silent
mitigations=auto
```

```
-----
14. cpupower frequency-info
analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 4.00 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.
  boost state support:
    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   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                  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 defer+madvise [madvise] never
enabled         [always] madvise 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_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 SP5
```

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## Platform Notes (Continued)

-----  
20. Disk information  
SPEC is set to: /home/speccpunew  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/nvme0n1p5 xfs 522G 347G 176G 67% /home  
-----

21. /sys/devices/virtual/dmi/id  
Vendor: New H3C Technologies Co., Ltd.  
Product: H3C UniServer R4900 G6 Ultra  
Product Family: Rack  
Serial: 210235A4CHH244000019  
-----

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:  
16x Hynix HMCG94AGBRA181N 64 GB 2 rank 5600  
-----

23. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: American Megatrends International, LLC.  
BIOS Version: 6.10.43  
BIOS Date: 07/27/2024  
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.  
-----

=====  
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.  
-----





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## 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 -xsapphirerapids -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 -xsapphirerapids -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 -xsapphirerapids -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
```



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**CPU2017 License:** 9066

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**Tested by:** New H3C Technologies Co., Ltd.

**Test Date:** Sep-2024

**Hardware Availability:** Oct-2023

**Software Availability:** Mar-2024

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/New\\_H3C-Platform-Settings-V1.0-SPR-RevE.html](http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.0-SPR-RevE.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/New\\_H3C-Platform-Settings-V1.0-SPR-RevE.xml](http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.0-SPR-RevE.xml)

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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