



# SPEC CPU®2017 Integer Rate Result

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## New H3C Technologies Co., Ltd.

H3C UniServer R4900 G6 (Intel Xeon Platinum 8592V)

SPECrate®2017\_int\_base = 1090

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 9066

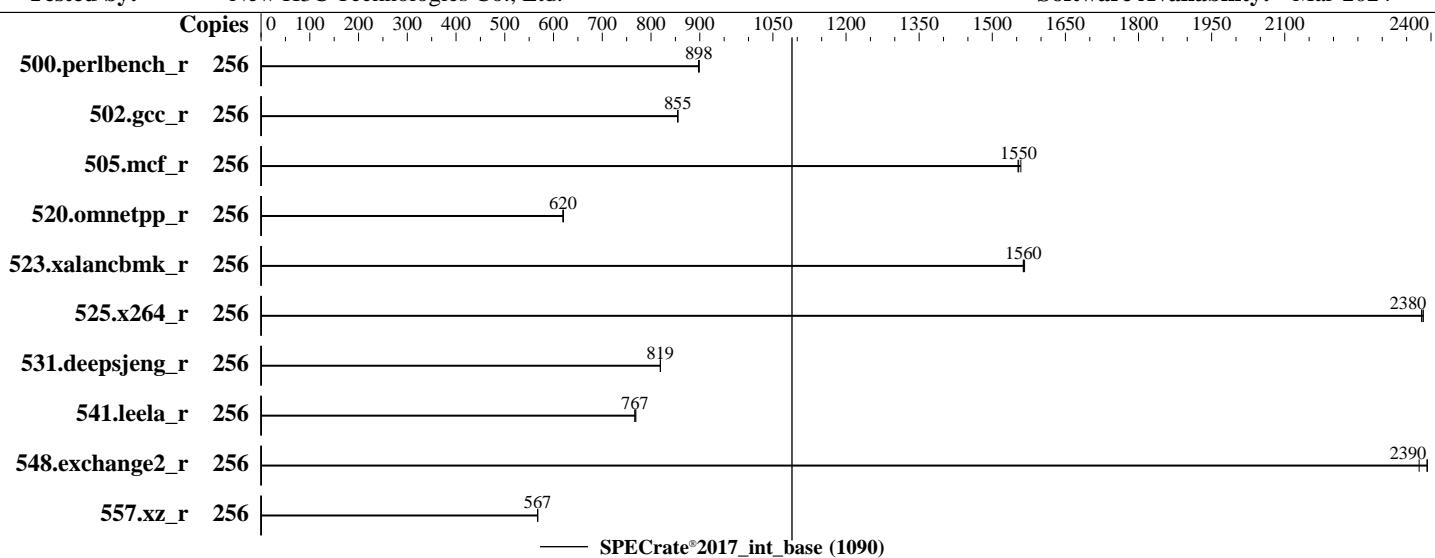
Test Sponsor: New H3C Technologies Co., Ltd.

Tested by: New H3C Technologies Co., Ltd.

Test Date: Nov-2024

Hardware Availability: Oct-2023

Software Availability: Mar-2024



— SPECrate®2017\_int\_base (1090)

### Hardware

CPU Name: Intel Xeon Platinum 8592V  
Max MHz: 3900  
Nominal: 2000  
Enabled: 128 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: 320 MB I+D on chip per chip  
Other: None  
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R, running at 4800)  
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 6.10.45 released Aug-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	Seconds	Ratio
500.perlbench_r	256	<b>454</b>	<b>898</b>	453	899	454	897									
502.gcc_r	256	<b>424</b>	<b>855</b>	424	854	424	855									
505.mcf_r	256	<b>266</b>	<b>1550</b>	266	1550	265	1560									
520.omnetpp_r	256	542	620	<b>542</b>	<b>620</b>	542	619									
523.xalancbmk_r	256	173	1570	173	1560	<b>173</b>	<b>1560</b>									
525.x264_r	256	188	2380	<b>188</b>	<b>2380</b>	188	2380									
531.deepsjeng_r	256	358	819	358	819	<b>358</b>	<b>819</b>									
541.leela_r	256	551	769	553	767	<b>553</b>	<b>767</b>									
548.exchange2_r	256	<b>280</b>	<b>2390</b>	280	2390	282	2380									
557.xz_r	256	487	567	487	568	<b>487</b>	<b>567</b>									

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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/speccpunew/lib/intel64:/home/speccpunew/lib/ia32:/home/speccpunew/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)  
Intel VT for Directed I/O = Disabled  
Package C State = C6(Retention) state

### BMC Settings:

Fan mode = powerful mode

```
Sysinfo program /home/speccpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Nov 20 23:56:51 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
23:56:51 up 1 min, 1 user, load average: 0.23, 0.10, 0.04
USER   TTY      FROM          LOGIN@    IDLE    JCPU   PCPU WHAT
root    ttys1     -           23:56    3.00s  1.21s  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
```

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## Platform Notes (Continued)

```
scheduling priority          (-e) 0
file size                  (blocks, -f) unlimited
pending signals             (-i) 4126479
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) 4126479
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
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 -c
  ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=128 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 --configfile
  ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=128 --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/CPU2017.014/templogs/preenv.intrate.014.0.log --lognum 014.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpunew
```

---

### 6. /proc/cpuinfo

```
model name      : INTEL(R) XEON(R) PLATINUM 8592V
vendor_id       : GenuineIntel
cpu family     : 6
model          : 207
stepping        : 2
microcode       : 0x21000200
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrss_pbrss
cpu cores       : 64
siblings         : 128
2 physical ids (chips)
256 processors (hardware threads)
physical id 0: core ids 0-63
physical id 1: core ids 0-63
physical id 0: apicids 0-127
physical id 1: apicids 128-255
```

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
```

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## Platform Notes (Continued)

```

CPU(s): 256
On-line CPU(s) list: 0-255
Vendor ID: GenuineIntel
Model name: INTEL(R) XEON(R) PLATINUM 8592V
CPU family: 6
Model: 207
Thread(s) per core: 2
Core(s) per socket: 64
Socket(s): 2
Stepping: 2
CPU max MHz: 3900.0000
CPU min MHz: 800.0000
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 xtopology
       nonstop_tsc cpuid aperfmpfper tsc_known_freq pni pclmulqdq dtes64 monitor
       ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xptr 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
       invpcid_single cdp_12 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
       vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmil 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 gfn vaes vpclmulqdq avx512_vnni avx512_bitalg tme
       avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
       enqcmd fsrm md_clear serialize tsxlptrk pconfig arch_lbr avx512_fp16
       amx_tile flush_ll1d arch_capabilities

Virtualization: VT-x
L1d cache: 6 MiB (128 instances)
L1i cache: 4 MiB (128 instances)
L2 cache: 256 MiB (128 instances)
L3 cache: 640 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-31,128-159
NUMA node1 CPU(s): 32-63,160-191
NUMA node2 CPU(s): 64-95,192-223
NUMA node3 CPU(s): 96-127,224-255
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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-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	6M	12	Data	1	64	1	64
L1i	32K	4M	8	Instruction	1	64	1	64
L2	2M	256M	16	Unified	2	2048	1	64
L3	320M	640M	20	Unified	3	262144	1	64

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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: 0-31,128-159
node 0 size: 257663 MB
node 0 free: 256821 MB
node 1 cpus: 32-63,160-191
node 1 size: 257997 MB
node 1 free: 257205 MB
node 2 cpus: 64-95,192-223
node 2 size: 258031 MB
node 2 free: 256741 MB
node 3 cpus: 96-127,224-255
node 3 size: 257957 MB
node 3 free: 256920 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: 1056409296 kB
```

```
10. who -r
run-level 3 Nov 20 23:56
```

```
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 nvmefc-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 autoyaml-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
                ipmievfd irqbalance issue-add-ssh-keys kdump kdump-early kexec-load lm_sensors lunmask
                man-db-create multipathd ndctl-monitor nfs nfs-blkmap nmb nvmf-autoconnect postfix rpcbind
                rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts smb snmpd snmptrapd svnservice
                sysstat systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                systemd-time-wait-sync systemd-timesyncd tuned vncserver@
indirect        pcscd 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/64b85326-8619-4fc8-8127-1e8683bd7471
```

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## Platform Notes (Continued)

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

-----
14. cpupower frequency-info
analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 3.90 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
```

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## Platform Notes (Continued)

From /etc/\*-release /etc/\*-version  
os-release SUSE Linux Enterprise Server 15 SP5

-----  
20. Disk information

SPEC is set to: /home/speccpunew  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/nvme0n1p5 xfs 522G 397G 126G 76% /home

-----  
21. /sys/devices/virtual/dmi/id

Vendor: New H3C Technologies Co., Ltd.  
Product: H3C UniServer R4900 G6  
Product Family: Rack  
Serial: 210235A4HEH242000015

-----  
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, configured at 4800

-----  
23. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: American Megatrends International, LLC.  
BIOS Version: 6.10.45  
BIOS Date: 08/23/2024  
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  
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=====



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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 -lgkmalloc

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 -lgkmalloc

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 -lgkmalloc



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Test Sponsor: New H3C Technologies Co., Ltd.

Hardware Availability: Oct-2023

Tested by: New H3C Technologies Co., Ltd.

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-intel-RevB.html](http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-intel-RevB.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-intel-RevB.xml](http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-intel-RevB.xml)

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