



SPEC CPU®2017 Floating Point Speed Result

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New H3C Technologies Co., Ltd.

SPECspeed®2017_fp_base = 448

H3C UniServer R3900 G7 (Intel Xeon 6980P)

SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9066

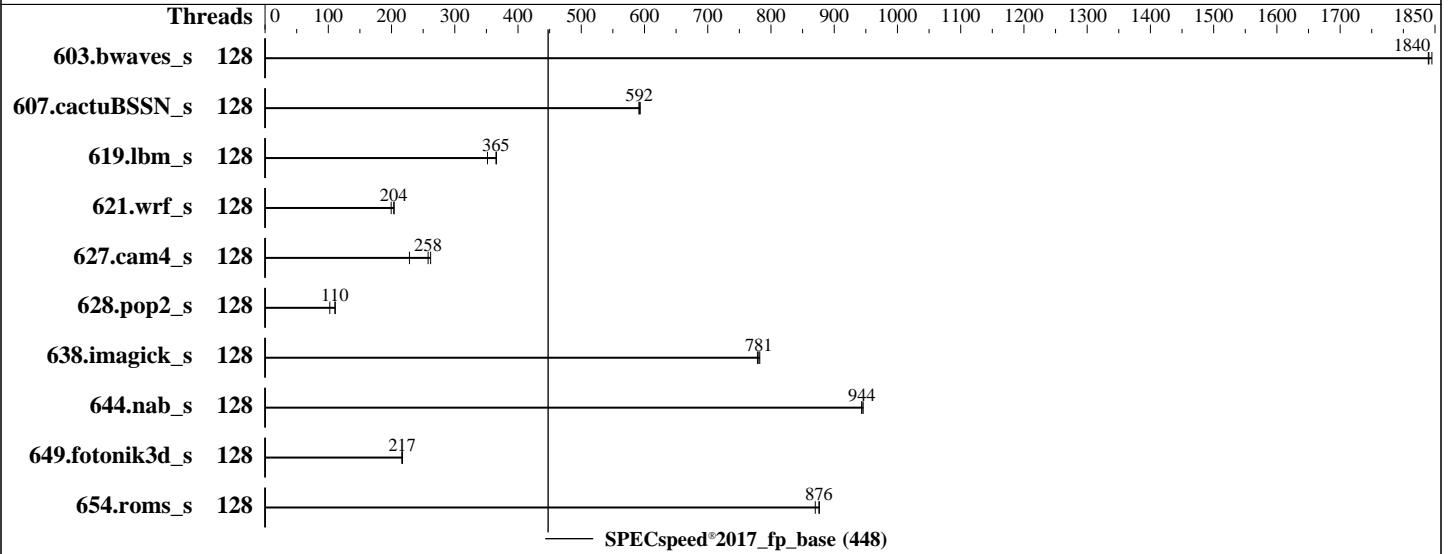
Test Date: Nov-2024

Test Sponsor: New H3C Technologies Co., Ltd.

Hardware Availability: Jan-2025

Tested by: New H3C Technologies Co., Ltd.

Software Availability: Apr-2024



Hardware

CPU Name: Intel Xeon 6980P
 Max MHz: 3900
 Nominal: 2000
 Enabled: 128 cores, 1 chip
 Orderable: 1 chip
 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: 768 GB (12 x 64 GB 4Rx8 PC5-12800B-R, running at 8800)
 Storage: 1 x 3.84 TB NVME SSD
 Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.4 (Plow)
 5.14.0-427.13.1.el9_4.x86_64
 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: Yes
 Firmware: Version 7.10.04 released Oct-2024 BIOS
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 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
603.bwaves_s	128	32.1	1840	32.0	1850	<u>32.1</u>	<u>1840</u>							
607.cactuBSSN_s	128	28.2	591	<u>28.2</u>	<u>592</u>	28.1	593							
619.lbm_s	128	<u>14.3</u>	<u>365</u>	14.3	366	14.9	352							
621.wrf_s	128	<u>65.0</u>	<u>204</u>	66.3	199	64.8	204							
627.cam4_s	128	33.9	262	<u>34.4</u>	<u>258</u>	38.8	228							
628.pop2_s	128	<u>107</u>	<u>110</u>	107	111	116	102							
638.imagick_s	128	18.5	779	18.4	782	<u>18.5</u>	<u>781</u>							
644.nab_s	128	18.5	943	<u>18.5</u>	<u>944</u>	18.5	946							
649.fotonik3d_s	128	<u>42.0</u>	<u>217</u>	41.9	217	42.1	216							
654.roms_s	128	<u>18.0</u>	<u>876</u>	18.1	870	18.0	877							

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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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/speccpu/lib/intel64:/home/speccpu/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 Redhat 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 Settings:

SNC = Enabled
Package C State = C0/C1 state
Enable LP [Global] = Single LP

BMC Settings:

Fan mode = powerful mode

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Sat Nov 30 20:30:49 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 252 (252-32.e19_4)
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.localdomain 5.14.0-427.13.1.el9_4.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 10 10:29:16 EDT
2024 x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
20:30:49 up 57 min, 2 users, load average: 34.36, 89.65, 86.81
USER      TTY      LOGIN@  IDLE   JCPU   PCPU   WHAT
root     tty1      19:33   13.00s  1.14s  0.00s  sh
reportable-ic2024.1-lin-core-avx512-speed-smt-off-20240308.sh
root     pts/0    20:07   23:45   0.01s  0.01s  -bash
```

```
3. Username
From environment variable $USER: root
```

```
4. ulimit -a
```

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Platform Notes (Continued)

```

real-time non-blocking time (microseconds, -R) unlimited
core file size (blocks, -c) 0
data seg size (kbytes, -d) unlimited
scheduling priority (-e) 0
file size (blocks, -f) unlimited
pending signals (-i) 3092042
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) 3092042
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
login -- root
-bash
sh reportable-ic2024.1-lin-core-avx512-speed-smt-off-20240308.sh
runcpu --nobuild --action validate --define default-platform-flags -c
ic2024.1-lin-core-avx512-speed-20240308.cfg --define cores=128 --tune base -o all --define drop_caches
fpspeed -n 3
runcpu --nobuild --action validate --define default-platform-flags --configfile
ic2024.1-lin-core-avx512-speed-20240308.cfg --define cores=128 --tune base --output_format all --define
drop_caches --iterations 3 --nopower --runmode speed --tune base --size refspeed fpspeed --nopreenv
--note-preenv --logfile $SPEC/tmp/CPU2017.060/templogs/preenv.fpspeed.060.0.log --lognum 060.0
--from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpu

```

```

-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) 6980P
vendor_id      : GenuineIntel
cpu family     : 6
model          : 173
stepping       : 1
microcode      : 0x810002e0
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 128
siblings       : 128
1 physical ids (chips)
128 processors (hardware threads)
physical id 0: core ids 0-41,64-106,128-170
physical id 0: apicids
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
,74,76,78,80,82,128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,1
72,174,176,178,180,182,184,186,188,190,192,194,196,198,200,202,204,206,208,210,212,256,258,260,262,264,26
6,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,308,310,312,314,316,318
,320,322,324,326,328,330,332,334,336,338,340
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
virtualized systems. Use the above data carefully.

```

7. lscpu

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Platform Notes (Continued)

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):                128
On-line CPU(s) list:   0-127
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 family:            6
Model:                 173
Thread(s) per core:    1
Core(s) per socket:    128
Socket(s):             1
Stepping:              1
CPU(s) scaling MHz:    82%
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 aperfmperf tsc_known_freq pni pclmulqdq
                    dtes64 ds_cpl 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 cdp_l2
                    ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 avx2
                    smep bmi2 erms invpcid 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 avx_vnni avx512_bf16 wbnoinvd dtherm
                    ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req 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 fstrm md_clear serialize tsxldtrk pconfig
                    arch_lbr ibt amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
                    arch_capabilities
L1d cache:             6 MiB (128 instances)
L1i cache:             8 MiB (128 instances)
L2 cache:              256 MiB (128 instances)
L3 cache:              504 MiB (1 instance)
NUMA node(s):         3
NUMA node0 CPU(s):    0-41
NUMA node1 CPU(s):    42-84
NUMA node2 CPU(s):    85-127
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 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,
                    PBRB-eIBRS Not affected

```

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Platform Notes (Continued)

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	64K	8M	16	Instruction	1	64	1	64
L2	2M	256M	16	Unified	2	2048	1	64
L3	504M	504M	16	Unified	3	516096	1	64

8. numactl --hardware

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

```

available: 3 nodes (0-2)
node 0 cpus: 0-41
node 0 size: 257028 MB
node 0 free: 256062 MB
node 1 cpus: 42-84
node 1 size: 258037 MB
node 1 free: 256349 MB
node 2 cpus: 85-127
node 2 size: 257988 MB
node 2 free: 254124 MB
node distances:
node  0  1  2
  0:  10  12  12
  1:  12  10  12
  2:  12  12  10

```

9. /proc/meminfo

MemTotal: 791606616 kB

10. who -r

run-level 3 Nov 30 19:33

11. Systemd service manager version: systemd 252 (252-32.el9_4)

```

Default Target Status
multi-user      running

```

12. Services, from systemctl list-unit-files

```

STATE UNIT FILES
enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online atd auditd bluetooth
chronyd crond dbus-broker firewalld getty@ insights-client-boot irqbalance iscsi-onboot
iscsi-starter kdump libstoragemgmt lm_sensors low-memory-monitor lvm2-monitor mcelog
mdmonitor microcode multipathd nis-domainname nvme-fc-boot-connections rhsmcertd rsyslog
rtkit-daemon selinux-autorelabel-mark smartd sshd sssd sysstat systemd-boot-update
systemd-network-generator tuned udisks2 upower
enabled-runtime systemd-remount-fs
disabled arp-ethers blk-availability canberra-system-bootup canberra-system-shutdown
canberra-system-shutdown-reboot chrony-wait chronyd-restricted console-getty cpupower
debug-shell dnf-system-upgrade fancontrol ipmi iprdump iprinit iprupdate ipsec iscsi-init
iscsid iscsiuiop kpatch kvm_stat ledmon man-db-restart-cache-update nftables
nvme-autoconnect pesign psacct rdisc rhcd rhsm rhsm-facts rpmdb-rebuild
selinux-check-proper-disable serial-getty@ sshd-keygen@ systemd-boot-check-no-failures
systemd-pstore systemd-sysext
indirect iscsi sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate

```

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Platform Notes (Continued)

systemd-sysupdate-reboot

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-427.13.1.el9_4.x86_64
root=/dev/mapper/rhel-root
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
rhgb
quiet

```

```

-----
14. cpupower frequency-info
analyzing CPU 101:
  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                  40
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

```

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Platform Notes (Continued)

```

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           Red Hat Enterprise Linux 9.4 (Plow)
redhat-release       Red Hat Enterprise Linux release 9.4 (Plow)
system-release       Red Hat Enterprise Linux release 9.4 (Plow)
-----

```

```

-----
20. Disk information
SPEC is set to: /home/speccpu
Filesystem           Type      Size      Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs       3.5T      195G  3.3T   6% /home
-----

```

```

-----
21. /sys/devices/virtual/dmi/id
Vendor:               New H3C Technologies Co., Ltd.
Product:              H3C UniServer R3900 G7
Serial:               210235A526H249000010
-----

```

```

-----
22. dmidecode
Additional information from dmidecode 3.5 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:
  12x Hynix HMC98BDJHA381N 64 GB 4 rank 12800, configured at 8800
-----

```

```

-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:         American Megatrends International, LLC.
BIOS Version:        7.10.04
BIOS Date:           10/18/2024
BIOS Revision:       5.35
Firmware Revision:   1.16
-----

```

Compiler Version Notes

```

=====
C | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(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++, C, Fortran | 607.cactuBSSN_s(base)
-----

```

```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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Compiler Version Notes (Continued)

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 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.

 Fortran | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(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.

 Fortran, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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.
 Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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Base Compiler Invocation

C benchmarks:

icx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
 607.cactuBSSN_s: -DSPEC_LP64
 619.lbm_s: -DSPEC_LP64
 621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
 627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
 -assume byterecl
 638.imagick_s: -DSPEC_LP64
 644.nab_s: -DSPEC_LP64

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_base = 448

H3C UniServer R3900 G7 (Intel Xeon 6980P)

SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9066

Test Date: Nov-2024

Test Sponsor: New H3C Technologies Co., Ltd.

Hardware Availability: Jan-2025

Tested by: New H3C Technologies Co., Ltd.

Software Availability: Apr-2024

Base Portability Flags (Continued)

649.fotonik3d_s: -DSPEC_LP64

654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using both Fortran and C:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using Fortran, C, and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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-BHS-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/New_H3C-Platform-Settings-Intel-BHS-RevA.xml



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