



SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

SPECrate®2017_int_base = 775

H3C UniServer R4900 G7 (Intel Xeon 6781P)

SPECrate®2017_int_peak = Not Run

CPU2017 License: 9066

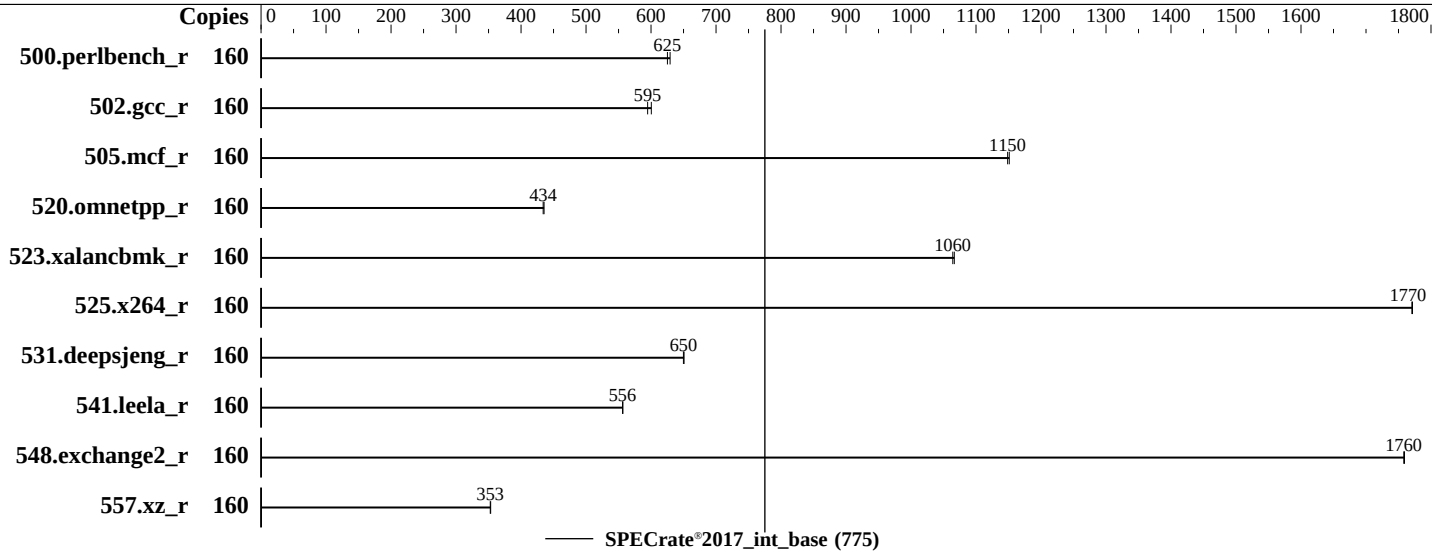
Test Sponsor: New H3C Technologies Co., Ltd.

Tested by: New H3C Technologies Co., Ltd.

Test Date: Jul-2025

Hardware Availability: Mar-2025

Software Availability: Apr-2024



Hardware

CPU Name: Intel Xeon 6781P
Max MHz: 3800
Nominal: 2000
Enabled: 80 cores, 1 chip, 2 threads/core
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: 336 MB I+D on chip per chip
Other: None
Memory: 512 GB (8 x 64 GB 4Rx8 PC5-88/64B-H, running at 8000)
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: No
Firmware: Version 7.00.15 released Jun-2025 BIOS
File System: xfs
System State: Run level 5 (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	160	407	625	405	629									
502.gcc_r	160	381	595	377	600									
505.mcf_r	160	225	1150	225	1150									
520.omnetpp_r	160	484	434	482	435									
523.xalancbmk_r	160	158	1070	159	1060									
525.x264_r	160	158	1770	158	1770									
531.deepsjeng_r	160	282	651	282	650									
541.leela_r	160	476	556	476	557									
548.exchange2_r	160	238	1760	238	1760									
557.xz_r	160	490	353	489	353									

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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/speccpu/lib/intel64:/home/speccpu/lib/ia32:/home/speccpu/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

BMC Settings:

Fan mode = powerful mode

Sysinfo program /home/speccpu/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on localhost.localdomain Thu Jul 31 10:37:37 2025

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

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1. uname -a
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10. who -r
11. Systemd service manager version: systemd 252 (252-32.el9_4)
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. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. 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
10:37:37 up 3 min,  1 user,  load average: 0.07, 0.11, 0.05
USER      TTY      LOGIN@   IDLE   JCPU   PCPU WHAT
root      tty2      10:36    9.00s  1.03s  0.01s -bash
```

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

```
4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size              (blocks, -c) 0
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) 2059783
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) 2059783
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
```

```
-bash
```

```
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 -c
```

```
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=80 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base -o all intrate -n 2
```

```
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=160 --configfile
```

```
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=80 --define physicalfirst
```

```
--define invoke_with_interleave --define drop_caches --tune base --output_format all --iterations 2
```

```
--nopower --runmode rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile
```

```
$SPEC/tmp/CPU2017.056/templots/preenv.intrate.056.0.log --lognum 056.0 --from_runcpu 2
```

```
specperl $SPEC/bin/sysinfo
```

```
$SPEC = /home/speccpu
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) 6781P
```

```
vendor_id       : GenuineIntel
```

```
cpu family      : 6
```

```
model           : 173
```

```
stepping        : 1
```

```
microcode       : 0xa0000c0
```

```
bugs             : spectre_v1 spectre_v2 spec_store_bypass swappg
```

```
cpu cores       : 80
```

```
siblings        : 160
```

```
1 physical ids (chips)
```

```
160 processors (hardware threads)
```

```
physical id 0: core ids 0-39,64-103
```

```
physical id 0: apicids 0-79,128-207
```

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):            160
```

```
On-line CPU(s) list: 0-159
```

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Platform Notes (Continued)

Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) 6781P
BIOS Model name: Intel(R) Xeon(R) 6781P
CPU family: 6
Model: 173
Thread(s) per core: 2
Core(s) per socket: 80
Socket(s): 1
Stepping: 1
CPU(s) scaling MHz: 84%
CPU max MHz: 3800.0000
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 aperfperf 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 cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept vpid ept_ad 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 hfi vnmi 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 ibt amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities
Virtualization: VT-x
L1d cache: 3.8 MiB (80 instances)
L1i cache: 5 MiB (80 instances)
L2 cache: 160 MiB (80 instances)
L3 cache: 336 MiB (1 instance)
NUMA node(s): 2
NUMA node0 CPU(s): 0-39,80-119
NUMA node1 CPU(s): 40-79,120-159
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, PBRSE-eIBRS Not affected
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	3.8M	12	Data	1	64	1	64
L1i	64K	5M	16	Instruction	1	64	1	64

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Platform Notes (Continued)

L2	2M	160M	16 Unified	2	2048	1	64
L3	336M	336M	16 Unified	3	344064	1	64

8. numactl --hardware

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

```
available: 2 nodes (0-1)
node 0 cpus: 0-39,80-119
node 0 size: 256998 MB
node 0 free: 255821 MB
node 1 cpus: 40-79,120-159
node 1 size: 258011 MB
node 1 free: 255620 MB
node distances:
node  0  1
  0:  10  12
  1:  12  10
```

9. /proc/meminfo

MemTotal: 527369908 kB

10. who -r

run-level 5 Jul 31 10:34

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

Default Target	Status
graphical	degraded

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

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
* sep5.service	loaded	failed	failed	systemd script to load sep5 driver at boot time

13. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker firewalld gdm 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 ostree-remount pmcd pmie pmlogger power-profiles-daemon qemu-guest-agent rhsmcertd rpcbind rsyslog rtkit-daemon selinux-autorelabel-mark sep5 smartd sshd sssd switcheroo-control sysstat systemd-boot-update systemd-network-generator tuned udisks2 upower vgauthd virtqemud vmtoolsd
enabled-runtime	systemd-remount-fs
disabled	arp-ethers autofs blk-availability brltty canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait chronyd-restricted cni-dhcp console-getty cpupower cups-browsed dbus-daemon debug-shell dnf-system-upgrade dnsmasq dovecot fancontrol fcoe grafana-server gssproxy httpd httpd@ ibacm iprddump iprinit iprupdate ipsec iscsi-init iscsid iscsiui kpatch kvm_stat ledmon libvirt-guests libvirtld lldpad man-db-restart-cache-update named named-chroot netavark-dhcp-proxy netavark-firewalld-reload nfs-blkmap nfs-server nftables nmb numad nvme-autoconnect ostree-readonly-sysroot-migration ostree-state-overlay@ pesign pmfind pmie_farm pmlogger_farm pmpoxy podman podman-auto-update podman-clean-transient podman-kube@ podman-restart postfix powertop psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts rpmdb-rebuild rrdcached sasauthd selinux-check-proper-disable serial-getty@ smb snmpd

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Platform Notes (Continued)

indirect

snmpttrapd spamassassin speech-dispatcherd srp_daemon srp_daemon_port@ sshd-keygen@
systemd-boot-check-no-failures systemd-nspsawnd systemd-pstore systemd-sysextr target
targetclid tog-pegasus trace-cmd virtinterfaced virtlockd virtlogd virtnetworkd
virtnodevdev virtnwfilterd virtproxyd virtsecret d virtstoraged vsftpd wpa_supplicant
iscsi pcscd spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh
sssd-sudo systemd-sysupdate systemd-sysupdate-reboot vsftpd@

14. 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/snap
rhgb
quiet

15. cpupower frequency-info
analyzing CPU 124:
current policy: frequency should be within 800 MHz and 3.80 GHz.
The governor "performance" may decide which speed to use
within this range.
boost state support:
Supported: yes
Active: yes

16. tuned-adm active
It seems that tuned daemon is not running, preset profile is not activated.
Preset profile: throughput-performance

17. 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

18. /sys/kernel/mm/transparent_hugepage
defrag always defer defer+madvise [madvise] never
enabled [always] madvise never

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Platform Notes (Continued)

hpage_pmd_size 2097152
shmem_enabled always within_size advise [never] deny force

19. /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

20. 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)

21. Disk information
SPEC is set to: /home/speccpu
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 3.5T 388G 3.1T 12% /home

22. /sys/devices/virtual/dmi/id
Vendor: New H3C Technologies Co., Ltd.
Product: H3C UniServer R4900 G7
Product Family: Rack
Serial: 210235A51AH259000015

23. 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:
8x Hynix HMC98BDJHA383N 64 GB 4 rank 8800, configured at 8000

24. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 7.00.15
BIOS Date: 06/03/2025
BIOS Revision: 5.35
Firmware Revision: 2.6

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 -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4

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Base Optimization Flags (Continued)

C benchmarks (continued):

-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

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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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