



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

New H3C Technologies Co., Ltd.

SPECrate®2017_int_base = 1040

H3C UniServer R4900 G7 (Intel Xeon 6746E)

SPECrate®2017_int_peak = Not Run

CPU2017 License: 9066

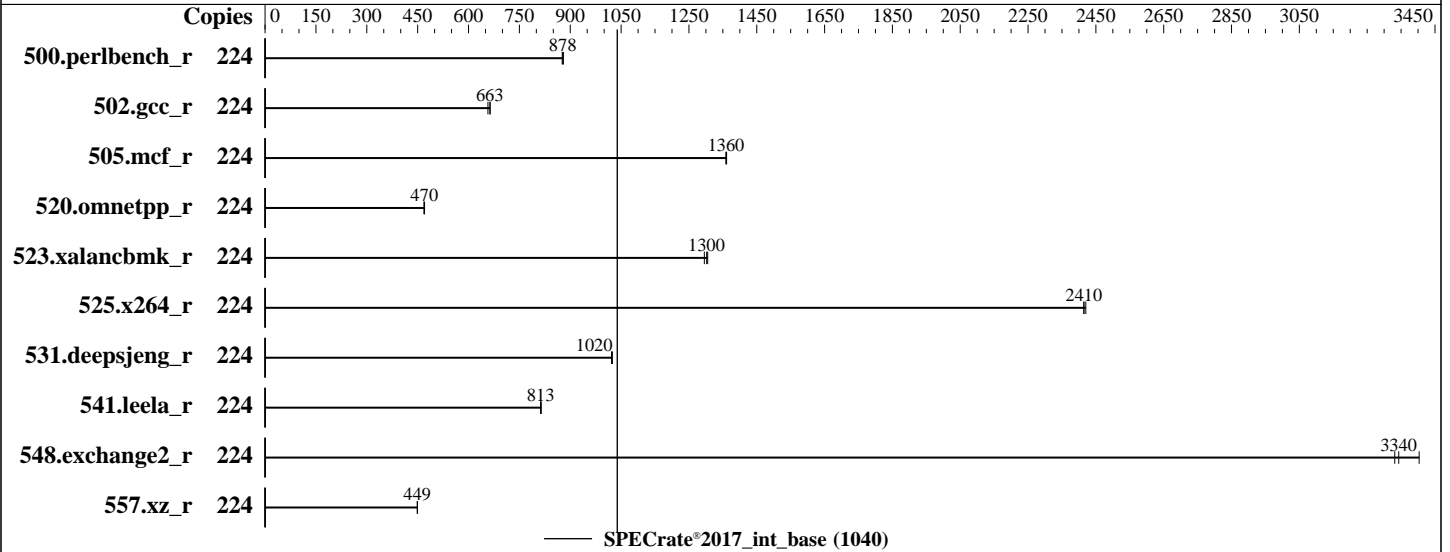
Test Date: Sep-2024

Test Sponsor: New H3C Technologies Co., Ltd.

Hardware Availability: Oct-2024

Tested by: New H3C Technologies Co., Ltd.

Software Availability: Apr-2024



Hardware

CPU Name: Intel Xeon 6746E
 Max MHz: 2700
 Nominal: 2000
 Enabled: 224 cores, 2 chips
 Orderable: 1,2 chips
 Cache L1: 64 KB I + 32 KB D on chip per core
 L2: 4 MB I+D on chip per core
 L3: 96 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-6400B-R, running at 5600)
 Storage: 1 x 6.4 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 7.00.02 released Sep-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 | 224 | 406 | 878 | 407 | 876 | 405 | 880 | | | | | | | |
| 502.gcc_r | 224 | 479 | 663 | 483 | 657 | 478 | 664 | | | | | | | |
| 505.mcf_r | 224 | 266 | 1360 | 266 | 1360 | 266 | 1360 | | | | | | | |
| 520.omnetpp_r | 224 | 625 | 470 | 627 | 469 | 625 | 470 | | | | | | | |
| 523.xalancbmk_r | 224 | 181 | 1310 | 182 | 1300 | 183 | 1300 | | | | | | | |
| 525.x264_r | 224 | 162 | 2420 | 162 | 2410 | 162 | 2410 | | | | | | | |
| 531.deepsjeng_r | 224 | 251 | 1020 | 251 | 1020 | 251 | 1020 | | | | | | | |
| 541.leela_r | 224 | 456 | 814 | 456 | 813 | 457 | 812 | | | | | | | |
| 548.exchange2_r | 224 | 176 | 3330 | 176 | 3340 | 172 | 3400 | | | | | | | |
| 557.xz_r | 224 | 538 | 449 | 539 | 449 | 539 | 449 | | | | | | | |

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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:

LLC dead line alloc = Disabled
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Performance

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Sun Sep 22 04:54:49 2024

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

Table of contents

1. uname -a
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3. Username
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5. sysinfo process ancestry
6. /proc/cpuinfo
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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
04:54:49 up 30 min, 1 user, load average: 3.27, 86.27, 107.07
USER      TTY      LOGIN@  IDLE   JCPU   PCPU WHAT
root     pts/0    04:29   17.00s  1.45s  0.00s sh intrate.sh
```

```
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
scheduling priority (-e) 0
```

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Platform Notes (Continued)

```

file size                (blocks, -f) unlimited
pending signals          (-i) 4124004
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) 4124004
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@pts/0
-bash
sh intrate.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=224 -c
ic2024.1-lin-sierraforest-rate-20240308.cfg --define smt-on --define cores=224 --define physicalfirst
--define invoke_with_interleave --define drop_caches --reportable --tune base -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=224 --configfile
ic2024.1-lin-sierraforest-rate-20240308.cfg --define smt-on --define cores=224 --define physicalfirst
--define invoke_with_interleave --define drop_caches --reportable --tune base --output_format all
--nopower --runmode rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.005/templogs/preenv.intrate.005.0.log --lognum 005.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpu

```

```

-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) 6746E
vendor_id      : GenuineIntel
cpu family     : 6
model          : 175
stepping       : 3
microcode      : 0x13000211
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 112
siblings       : 112
2 physical ids (chips)
224 processors (hardware threads)
physical id 0: core ids 0-111
physical id 1: core ids 0-111
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
,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118,120,122,124,126,128,130,1
32,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,180,182,18
4,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222
physical id 1: apicids
512,514,516,518,520,522,524,526,528,530,532,534,536,538,540,542,544,546,548,550,552,554,556,558,560,562,5
64,566,568,570,572,574,576,578,580,582,584,586,588,590,592,594,596,598,600,602,604,606,608,610,612,614,61
6,618,620,622,624,626,628,630,632,634,636,638,640,642,644,646,648,650,652,654,656,658,660,662,664,666,668
,670,672,674,676,678,680,682,684,686,688,690,692,694,696,698,700,702,704,706,708,710,712,714,716,718,720,
722,724,726,728,730,732,734
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for

```

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Platform Notes (Continued)

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, 48 bits virtual
Byte Order:            Little Endian
CPU(s):                224
On-line CPU(s) list:   0-223
Vendor ID:             GenuineIntel
BIOS Vendor ID:       Intel(R) Corporation
Model name:            Intel(R) Xeon(R) 6746E
BIOS Model name:      Intel(R) Xeon(R) 6746E
CPU family:            6
Model:                 175
Thread(s) per core:    1
Core(s) per socket:    112
Socket(s):             2
Stepping:              3
CPU(s) scaling MHz:    100%
CPU max MHz:           2700.0000
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 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 rdseed adx smap clflushopt clwb intel_pt sha_ni
                    xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                    cqm_mbm_local split_lock_detect avx_vnni lam_wbnoinvd dtherm ida arat
                    pln pts hwp hwp_act_window hwp_epp hwp_pkg_req vnni umip pku ospke
                    waitpkg gfni vaes vpclmulqdq tme rdpid bus_lock_detect cldemote movdiri
                    movdir64b enqcmd fsrm md_clear serialize pconfig arch_lbr ibt flush_l1d
                    arch_capabilities
Virtualization:        VT-x
L1d cache:             7 MiB (224 instances)
L1i cache:             14 MiB (224 instances)
L2 cache:              224 MiB (56 instances)
L3 cache:              192 MiB (2 instances)
NUMA node(s):          2
NUMA node0 CPU(s):    0-111
NUMA node1 CPU(s):    112-223
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/swaps barriers and __user pointer sanitization

```

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Platform Notes (Continued)

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 | 32K | 7M | 8 | Data | 1 | 64 | 1 | 64 |
| L1i | 64K | 14M | 8 | Instruction | 1 | 128 | 1 | 64 |
| L2 | 4M | 224M | 16 | Unified | 2 | 4096 | 1 | 64 |
| L3 | 96M | 192M | 12 | Unified | 3 | 131072 | 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: 0-111
node 0 size: 515052 MB
node 0 free: 513407 MB
node 1 cpus: 112-223
node 1 size: 516012 MB
node 1 free: 514441 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

9. /proc/meminfo

MemTotal: 1055810436 kB

10. who -r

run-level 3 Sep 22 04:25

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 ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker firewallld
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 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 brlty 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 iprdump iprinit iprupdate ipsec
iscsi-init iscsid iscsiui kpatch kvm_stat ledmon libvirt-guests libvirtd 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
```

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Platform Notes (Continued)

```

indirect
pmllogger_farm pmproxy 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 saslauthd selinux-check-proper-disable serial-getty@ smb snmpd
snmptrapd spamassassin speech-dispatcherd srp_daemon srp_daemon_port@ sshd-keygen@
systemd-boot-check-no-failures systemd-nspawn@ systemd-pstore systemd-sysexct target
targetclid tog-pegasus trace-cmd virtinterfaced virtlockd virtlogd virtnetworkd
virtnodevd virtnwfilterd virtproxyd virtsecret d virtstorage d vsftpd wpa_supplicant
iscsi pcsd spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh
sssd-sudo systemd-sysupdate systemd-sysupdate-reboot vsftpd@

```

```

-----
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 71:
  current policy: frequency should be within 800 MHz and 2.70 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

```

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Platform Notes (Continued)

```

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      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  118G  3.4T   4% /home

```

```

-----
21. /sys/devices/virtual/dmi/id
Vendor:         New H3C Technologies Co., Ltd.
Product:        H3C UniServer R4900 G7
Serial:         210235A51GH249000023

```

```

-----
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:
  16x Hynix HMC94AHBRA480N 64 GB 2 rank 6400, configured at 5600

```

```

-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      American Megatrends International, LLC.
BIOS Version:     7.00.02
BIOS Date:        09/14/2024
BIOS Revision:    5.35
Firmware Revision: 1.16

```

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

```

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Compiler Version Notes (Continued)

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
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=====
Fortran | 548.exchange2_r(base)
=====

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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 -xsierraforest -O3 -ffast-math

(Continued on next page)



SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

SPECrate®2017_int_base = 1040

H3C UniServer R4900 G7 (Intel Xeon 6746E)

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-2024

Software Availability: Apr-2024

Base Optimization Flags (Continued)

C benchmarks (continued):

```
-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 -xsierraforest -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 -xsierraforest -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-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

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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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