SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

H3C UniServer R4900 G6 (Intel Xeon Gold 6530)

$SPECrate^®2017\_int\_base =$ 278

$SPECrate^®2017\_int\_peak =$ Not Run

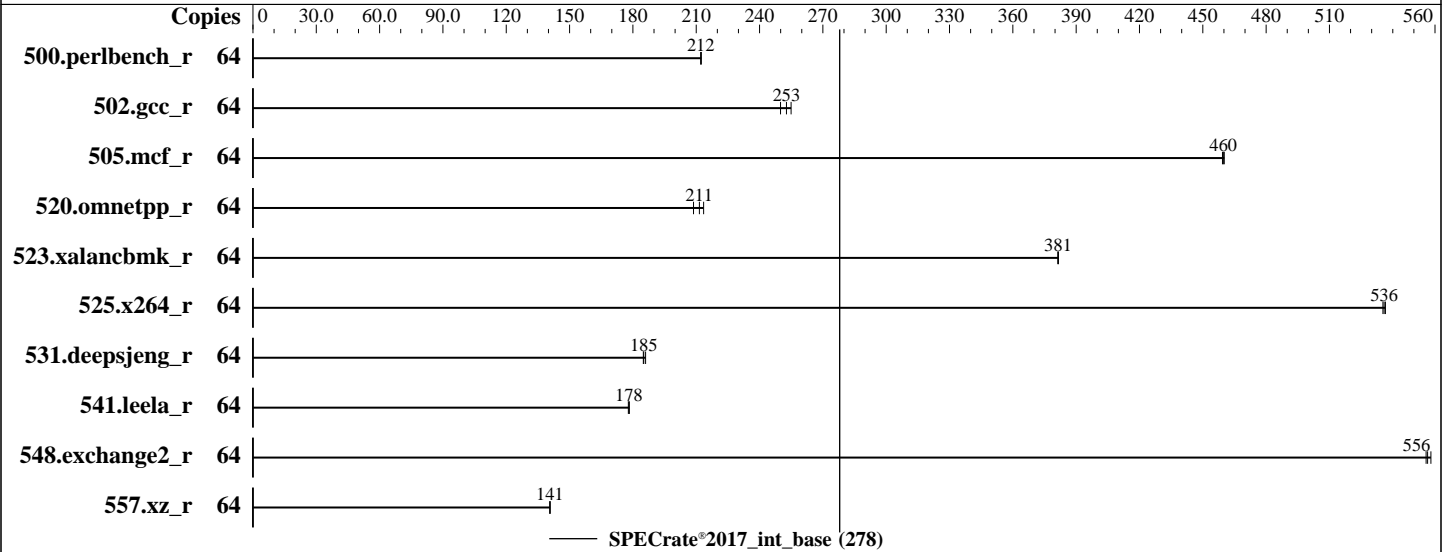|	
CPU2017 License: 9066	**Test Date:** Sep-2024
Test Sponsor: New H3C Technologies Co., Ltd.	**Hardware Availability:** Oct-2023
Tested by: New H3C Technologies Co., Ltd.	**Software Availability:** Mar-2024

Copies
0   30.0   60.0   90.0   120   150   180   210   240   270   300   330   360   390   420   450   480   510   560

- 500.perlbench_r 64 — 212
- 502.gcc_r 64 — 253
- 505.mcf_r 64 — 460
- 520.omnetpp_r 64 — 211
- 523.xalancbmk_r 64 — 381
- 525.x264_r 64 — 536
- 531.deepsjeng_r 64 — 185
- 541.leela_r 64 — 178
- 548.exchange2_r 64 — 556
- 557.xz_r 64 — 141

SPECrate®2017_int_base (278)

Hardware

CPU Name: Intel Xeon Gold 6530
  Max MHz: 4000
  Nominal: 2100
Enabled: 32 cores, 1 chip, 2 threads/core
Orderable: 1 chips
Cache L1: 32 KB I + 48 KB D on chip per core
  L2: 2 MB I+D on chip per core
  L3: 160 MB I+D on chip per chip
  Other: None
Memory: 512 GB (8 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 6.10.43 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	64	480	212	480	212	**480**	**212**							
502.gcc_r	64	**359**	**253**	363	250	355	255							
505.mcf_r	64	225	460	**225**	**460**	225	459							
520.omnetpp_r	64	393	214	402	209	**397**	**211**							
523.xalancbmk_r	64	177	381	**177**	**381**	177	382							
525.x264_r	64	209	535	209	537	**209**	**536**							
531.deepsjeng_r	64	**396**	**185**	397	185	394	186							
541.leela_r	64	**595**	**178**	595	178	596	178							
548.exchange2_r	64	**301**	**556**	300	558	302	556							
557.xz_r	64	491	141	492	141	**491**	**141**							
SPECrate®2017_int_base =		**278**												
SPECrate®2017_int_peak =		**Not Run**												

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)
 Power Performance Tuning = BIOS Controls EPB
 ENERGY_PERF_BIAS_CFG mode = Performance

 Sysinfo program /home/speccpunew/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Sep 19 20:03:51 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
    20:03:51 up  1:09,  2 users,  load average: 0.21, 16.95, 40.76
    USER     TTY       FROM              LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1      -                 18:55    7.00s  1.85s  0.04s sh intrate.sh
    root     pts/0     172.16.27.225     20:02    1:16   0.07s  0.07s -bash


 ------------------------------------------------------------
 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
```

(Continued on next page)

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Hardware Availability: Oct-2023

Software Availability: Mar-2024

Platform Notes (Continued)

```
  file size               (blocks, -f) unlimited
  pending signals               (-i) 2062282
  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) 2062282
  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=64 -c
    ic2024.1-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=32 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base -o all intrate
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=64 --configfile
    ic2024.1-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=32 --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/CPU2017.006/templogs/preenv.intrate.006.0.log --lognum 006.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/speccpunew


  ---------------------------------------------------------
  6. /proc/cpuinfo
     model name       : INTEL(R) XEON(R) GOLD 6530
     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        : 32
     siblings         : 64
     1 physical ids (chips)
     64 processors (hardware threads)
     physical id 0: core ids 0-31
     physical id 0: apicids 0-63
   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):                       64
   On-line CPU(s) list:          0-63
   Vendor ID:                    GenuineIntel
```

(Continued on next page)

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Test Date: Sep-2024
Hardware Availability: Oct-2023
Software Availability: Mar-2024

Platform Notes (Continued)

```
  Model name:                   INTEL(R) XEON(R) GOLD 6530
  CPU family:                   6
  Model:                        207
  Thread(s) per core:           2
  Core(s) per socket:           32
  Socket(s):                    1
  Stepping:                     2
  CPU max MHz:                  4000.0000
  CPU min MHz:                  800.0000
  BogoMIPS:                    4200.00
  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 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_l1d arch_capabilities
  Virtualization:               VT-x
  L1d cache:                    1.5 MiB (32 instances)
  L1i cache:                    1 MiB (32 instances)
  L2 cache:                     64 MiB (32 instances)
  L3 cache:                     160 MiB (1 instance)
  NUMA node(s):                 2
  NUMA node0 CPU(s):            0-15,32-47
  NUMA node1 CPU(s):            16-31,48-63
  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, 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     1.5M   12 Data           1      64       1              64
    L1i      32K       1M    8 Instruction    1      64       1              64
    L2        2M      64M   16 Unified        2    2048       1              64
    L3      160M     160M   20 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)
```

(Continued on next page)

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Platform Notes (Continued)

```
  node 0 cpus: 0-15,32-47
  node 0 size: 257615 MB
  node 0 free: 249086 MB
  node 1 cpus: 16-31,48-63
  node 1 size: 257984 MB
  node 1 free: 250751 MB
  node distances:
  node   0   1
    0:  10  12
    1:  12  10


  --------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       527974792 kB


  --------------------------------------------------------------
10. who -r
   run-level 3 Sep 19 18:55


  --------------------------------------------------------------
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 autoyast-initscripts blk-availability boot-sysctl ca-certificates
                   chrony-wait chronyd console-getty cups cups-browsed debug-shell ebtables
                   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 nvmf-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        pcscd wickedd

  --------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
   root=UUID=befab1a9-6492-412a-9d0b-079466ad03eb
   splash=silent
   resume=/dev/disk/by-uuid/64b85326-8619-4fcb-8127-1e8683bd7471
   mitigations=auto
   quiet
   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 "powersave" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
```

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Platform Notes (Continued)

```
      Active: yes


    -----------------------------------------------------------
    15. tuned-adm active
      It seems that tuned daemon is not running, preset profile is not activated.
      Preset 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                  60
      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


    -----------------------------------------------------------
    20. Disk information
    SPEC is set to: /home/speccpunew
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/nvme0n1p5 xfs   522G  349G  174G  67% /home


    -----------------------------------------------------------
    21. /sys/devices/virtual/dmi/id
        Vendor:         New H3C Technologies Co., Ltd.
```

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Platform Notes (Continued)

```
    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:
     8x 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:     6.10.43
   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.
----------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

(Continued on next page)

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Base Compiler Invocation (Continued)

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
```

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

SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

H3C UniServer R4900 G6 (Intel Xeon Gold 6530)

SPECrate®2017_int_base =   278

SPECrate®2017_int_peak = Not Run

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

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