SPEC CPU®2017 Floating Point Rate Result

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New H3C Technologies Co., Ltd.

H3C UniServer R4900 G6 Ultra (Intel Xeon Silver 4516Y+)

SPECrate®2017_fp_base =   584
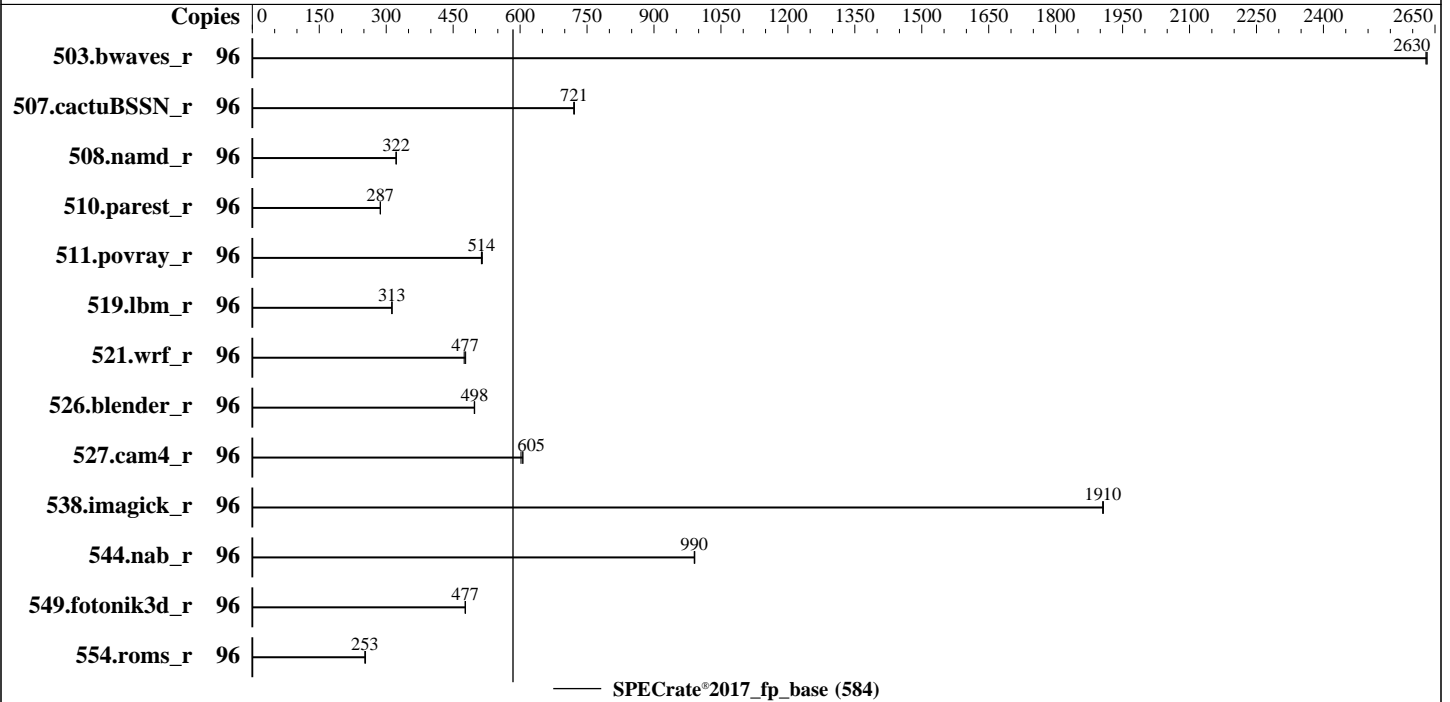
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

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

Copies		
503.bwaves_r	96	2630
507.cactuBSSN_r	96	721
508.namd_r	96	322
510.parest_r	96	287
511.povray_r	96	514
519.lbm_r	96	313
521.wrf_r	96	477
526.blender_r	96	498
527.cam4_r	96	605
538.imagick_r	96	1910
544.nab_r	96	990
549.fotonik3d_r	96	477
554.roms_r	96	253

SPECrate®2017_fp_base (584)

Hardware

CPU Name: Intel Xeon Silver 4516Y+
 Max MHz: 3700
 Nominal: 2200
Enabled: 48 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: 45 MB I+D on chip per chip
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-5600B-R, running at 4400)
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 6.10.38P60 released Apr-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.

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	96	**366**	**2630**	366	2630	366	2630							
507.cactuBSSN_r	96	**169**	**721**	168	722	169	720							
508.namd_r	96	283	322	**283**	**322**	283	322							
510.parest_r	96	876	287	**876**	**287**	874	287							
511.povray_r	96	435	515	**436**	**514**	437	513							
519.lbm_r	96	324	313	**324**	**313**	323	313							
521.wrf_r	96	453	475	450	478	**451**	**477**							
526.blender_r	96	**294**	**498**	293	498	294	497							
527.cam4_r	96	279	602	277	607	**278**	**605**							
538.imagick_r	96	125	1910	**125**	**1910**	125	1910							
544.nab_r	96	**163**	**990**	163	991	163	990							
549.fotonik3d_r	96	783	478	**784**	**477**	785	477							
554.roms_r	96	604	252	601	254	**604**	**253**							

SPECrate®2017_fp_base =	**584**
SPECrate®2017_fp_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/je5.0.1-64"
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.

(Continued on next page)

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CPU2017 License: 9066

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General Notes (Continued)

```
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
```

Platform Notes

```
BIOS Settings:
 SNC = Enable SNC2 (2-clusters)
 Power Performance Tuning = BIOS Controls EFB
 ENERGY_PERF_BIAS_CFG mode = Performance

 Sysinfo program /home/speccpunew/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Wed Jul 10 23:54:47 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. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. 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
    23:54:47 up 23:03,  2 users,  load average: 3.33, 48.71, 76.63
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                00:52   22.00s  1.17s  0.00s sh intrate.sh
    root     pts/0    172.16.27.225    04:37   39.00s  0.05s  0.05s -bash
```

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SPECrate®2017_fp_base = 584

SPECrate®2017_fp_peak = Not Run

Platform Notes (Continued)

```
    ----------------------------------------------------------
    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
      file size               (blocks, -f) unlimited
      pending signals                 (-i) 2060347
      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) 2060347
      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=96 -c
       ic2024.1-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=48 --define physicalfirst
       --define invoke_with_interleave --define drop_caches --tune base -o all fprate
     runcpu --nobuild --action validate --define default-platform-flags --define numcopies=96 --configfile
       ic2024.1-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=48 --define physicalfirst
       --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
       rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
       $SPEC/tmp/CPU2017.006/templogs/preenv.fprate.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) SILVER 4516Y+
        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       : 24
        siblings        : 48
        2 physical ids (chips)
        96 processors (hardware threads)
        physical id 0: core ids 0-23
        physical id 1: core ids 0-23
        physical id 0: apicids 0-47
        physical id 1: apicids 128-175
      Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
      virtualized systems.  Use the above data carefully.
```

(Continued on next page)

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Platform Notes (Continued)

```
          -----------------------------------------------------------
          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):                   96
            On-line CPU(s) list:      0-95
            Vendor ID:                GenuineIntel
            Model name:               INTEL(R) XEON(R) SILVER 4516Y+
            CPU family:               6
            Model:                    207
            Thread(s) per core:       2
            Core(s) per socket:       24
            Socket(s):                2
            Stepping:                 2
            CPU max MHz:              3700.0000
            CPU min MHz:              800.0000
            BogoMIPS:                 4400.00
            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 hfi 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:                2.3 MiB (48 instances)
            L1i cache:                1.5 MiB (48 instances)
            L2 cache:                 96 MiB (48 instances)
            L3 cache:                 90 MiB (2 instances)
            NUMA node(s):             4
            NUMA node0 CPU(s):        0-11,48-59
            NUMA node1 CPU(s):        12-23,60-71
            NUMA node2 CPU(s):        24-35,72-83
            NUMA node3 CPU(s):        36-47,84-95
            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
```

(Continued on next page)

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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     2.3M   12 Data            1    64        1             64
    L1i       32K     1.5M    8 Instruction     1    64        1             64
    L2         2M      96M   16 Unified         2  2048        1             64
    L3        45M      90M   15 Unified         3 49152        1             64


    ------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0-11,48-59
  node 0 size: 128486 MB
  node 0 free: 118255 MB
  node 1 cpus: 12-23,60-71
  node 1 size: 129017 MB
  node 1 free: 121422 MB
  node 2 cpus: 24-35,72-83
  node 2 size: 129017 MB
  node 2 free: 121276 MB
  node 3 cpus: 36-47,84-95
  node 3 size: 128594 MB
  node 3 free: 120547 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:      527479340 kB


    ------------------------------------------------------------
10. who -r
   run-level 3 Jul 10 00:52


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

(Continued on next page)

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Platform Notes (Continued)

```
                     systemd-time-wait-sync systemd-timesyncd 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
  security=apparmor
  crashkernel=403M,high
  crashkernel=72M,low


   ----------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
     current policy: frequency should be within 800 MHz and 3.70 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
       Active: yes


   ----------------------------------------------------------
15. 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

   ----------------------------------------------------------
16. /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


   ----------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_shared           256
```

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Platform Notes (Continued)

```
    max_ptes_swap             64
    pages_to_scan           4096
    scan_sleep_millisecs   10000


  ----------------------------------------------------------
  18. OS release
    From /etc/*-release /etc/*-version
    os-release SUSE Linux Enterprise Server 15 SP5


  ----------------------------------------------------------
  19. Disk information
  SPEC is set to: /home/speccpunew
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p5 xfs   522G  357G  166G  69% /home


  ----------------------------------------------------------
  20. /sys/devices/virtual/dmi/id
      Vendor:         N/A
      Product:        N/A
      Product Family: Rack
      Serial:         N/A


  ----------------------------------------------------------
  21. 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 Samsung M321R4GA3PB0-CWMCH 32 GB 2 rank 5600, configured at 4400
      8x Samsung M321R4GA3PB0-CWMXH 32 GB 2 rank 5600, configured at 4400


  ----------------------------------------------------------
  22. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       American Megatrends International, LLC.
    BIOS Version:      6.10.38P60
    BIOS Date:         04/03/2024
    BIOS Revision:     5.32
```

Compiler Version Notes

```
==============================================================================
C           | 519.lbm_r(base) 538.imagick_r(base) 544.nab_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++         | 508.namd_r(base) 510.parest_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++, C      | 511.povray_r(base) 526.blender_r(base)
```

(Continued on next page)

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Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------------
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.
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 | 507.cactuBSSN_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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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         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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================================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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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
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

Benchmarks using both C and C++:
```
icpx icx
```

Benchmarks using Fortran, C, and C++:
```
icpx icx ifx
```

New H3C Technologies Co., Ltd.

H3C UniServer R4900 G6 Ultra (Intel Xeon Silver 4516Y+)

SPECrate®2017_fp_base =   584

SPECrate®2017_fp_peak = Not Run

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

Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
`-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:
`-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

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

Benchmarks using both Fortran and C:
`-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs`
`-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
`-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512`

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SPECrate®2017_fp_base = 584

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CPU2017 License: 9066		**Test Date:**	Jul-2024
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Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:
```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

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-RevD.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-RevD.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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