SPEC CPU®2017 Floating Point Speed Result

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New H3C Technologies Co., Ltd.

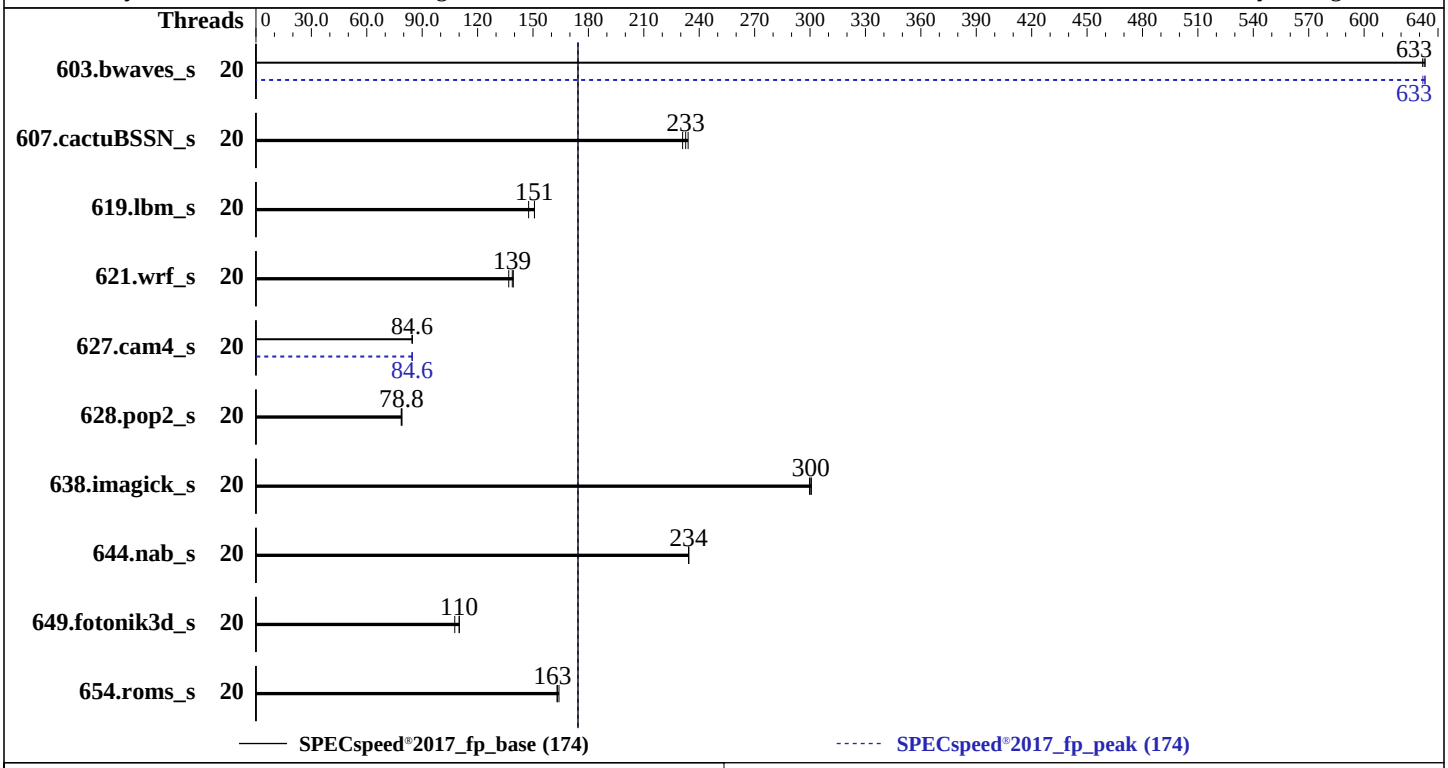
H3C UniServer R4900 G6 (Intel Xeon Silver 4410T)

SPECspeed®2017_fp_base = 174

SPECspeed®2017_fp_peak = 174

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

Test Date: Feb-2023
Hardware Availability: Jan-2023
Software Availability: Aug-2022



Hardware

CPU Name:	Intel Xeon Silver 4410T
Max MHz:	4000
Nominal:	2700
Enabled:	20 cores, 2 chips
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:	26.25 MB I+D on chip per chip
Other:	None
Memory:	1 TB (16 x 64 GB 2Rx8 PC5-4800B-R, running at 4000)
Storage:	1 x 480GB SATA SSD
Other:	None

Software

OS:	Red Hat Enterprise Linux 9.0 (Plow) 5.14.0-70.22.1.el9_0.x86_64
Compiler:	C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
Parallel:	Yes
Firmware:	Version 5.29 released Dec-2022 BIOS
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other:	jemalloc memory allocator V5.0.1
Power Management:	BIOS and OS set to prefer performance at the cost of additional power usage.

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	20	93.4	632	93.2	633	**93.3**	**633**	20	93.4	632	**93.2**	**633**	93.2	633
607.cactuBSSN_s	20	**71.6**	**233**	71.2	234	72.2	231	20	**71.6**	**233**	71.2	234	72.2	231
619.lbm_s	20	34.7	151	35.5	148	**34.7**	**151**	20	34.7	151	35.5	148	**34.7**	**151**
621.wrf_s	20	94.9	139	**95.3**	**139**	96.6	137	20	94.9	139	**95.3**	**139**	96.6	137
627.cam4_s	20	105	84.6	**105**	**84.6**	105	84.7	20	105	84.5	105	84.6	**105**	**84.6**
628.pop2_s	20	**151**	**78.8**	151	78.6	150	79.1	20	**151**	**78.8**	151	78.6	150	79.1
638.imagick_s	20	**48.0**	**300**	48.1	300	48.0	301	20	**48.0**	**300**	48.1	300	48.0	301
644.nab_s	20	**74.6**	**234**	74.6	234	74.6	234	20	**74.6**	**234**	74.6	234	74.6	234
649.fotonik3d_s	20	84.7	108	**82.8**	**110**	82.8	110	20	84.7	108	**82.8**	**110**	82.8	110
654.roms_s	20	96.0	164	**96.5**	**163**	96.6	163	20	96.0	164	**96.5**	**163**	96.6	163

SPECspeed®2017_fp_base = 174

SPECspeed®2017_fp_peak = 174

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/speccpu/lib/intel64:/home/speccpu/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Redhat Enterprise Linux 8.0
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.
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
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
```

(Continued on next page)

General Notes (Continued)

sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

Platform Notes

```
BIOS Settings:
 Set Enable LP [Global] to Single LP
 Set Patrol Scrub to Disabled

 Sysinfo program /home/speccpu/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Thu Feb  9 02:29:01 2023

 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 250 (250-11.el9)
 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.localdomain 5.14.0-70.22.1.el9_0.x86_64 #1 SMP PREEMPT Tue Aug 2 10:02:12 EDT 2022 x86_64
    x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
------------------------------------------------------------
2. w
   02:29:01 up 4 min,  2 users,  load average: 0.01, 0.07, 0.03
  USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1      02:25   13.00s  0.81s  0.00s -bash
  h3c      pts/0     02:26    1:01   0.01s  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
  scheduling priority                 (-e) 0
  file size                   (blocks, -f) unlimited
  pending signals                     (-i) 4124587
  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) 4124587
  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 -c
   ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=20 --tune base,peak -o all --define drop_caches
    fpspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=20 --tune base,peak --output_format all
   --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed fpspeed --nopreenv
   --note-preenv --logfile $SPEC/tmp/CPU2017.001/templogs/preenv.fpspeed.001.0.log --lognum 001.0
    --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpu
```

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Platform Notes (Continued)

```
------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Silver 4410T
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 7
    microcode       : 0x2b000111
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 10
    siblings        : 10
    2 physical ids (chips)
    20 processors (hardware threads)
    physical id 0: core ids 0-9
    physical id 1: core ids 0-9
    physical id 0: apicids 0,2,4,6,8,10,12,14,16,18
    physical id 1: apicids 128,130,132,134,136,138,140,142,144,146
  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):                          20
  On-line CPU(s) list:             0-19
  Vendor ID:                       GenuineIntel
  BIOS Vendor ID:                  Intel(R) Corporation
  Model name:                      Intel(R) Xeon(R) Silver 4410T
  BIOS Model name:                 Intel(R) Xeon(R) Silver 4410T
  CPU family:                      6
  Model:                           143
  Thread(s) per core:              1
  Core(s) per socket:              10
  Socket(s):                       2
  Stepping:                        7
  CPU max MHz:                     4000.0000
  CPU min MHz:                     800.0000
  BogoMIPS:                        5400.00
  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
```

(Continued on next page)

Platform Notes (Continued)

```
                    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 intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                   tpr_shadow vnmi 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 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:                       960 KiB (20 instances)
  L1i cache:                       640 KiB (20 instances)
  L2 cache:                        40 MiB (20 instances)
  L3 cache:                        52.5 MiB (2 instances)
  NUMA node(s):                    2
  NUMA node0 CPU(s):               0-9
  NUMA node1 CPU(s):               10-19
  Vulnerability Itlb multihit:     Not affected
  Vulnerability L1tf:              Not affected
  Vulnerability Mds:               Not affected
  Vulnerability Meltdown:          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 IBRS, IBPB conditional, RSB filling
  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     960K   12 Data            1    64        1             64
     L1i       32K     640K    8 Instruction     1    64        1             64
     L2         2M      40M   16 Unified         2  2048        1             64
     L3      26.3M    52.5M   15 Unified         3 28672        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: 0-9
  node 0 size: 515161 MB
  node 0 free: 514127 MB
```

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Platform Notes (Continued)

```
  node 1 cpus: 10-19
  node 1 size: 516046 MB
  node 1 free: 515405 MB
  node distances:
  node   0   1
    0:  10  21
    1:  21  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1055956444 kB

------------------------------------------------------------
10. who -r
  run-level 3 Feb 9 02:25

------------------------------------------------------------
11. Systemd service manager version: systemd 250 (250-11.el9)
  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 firewalld
                  gdm getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt
                  low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
                 nvmefc-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rhsmcertd
                  rsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd switcheroo-control
                     systemd-network-generator udisks2 upower vgauthd vmtoolsd
  enabled-runtime  systemd-remount-fs
  disabled         arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown
                 canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
                 dbus-daemon debug-shell dnsmasq iprdump iprinit iprupdate iscsid iscsiuio kpatch kvm_stat
                  ledmon man-db-restart-cache-update ndctl-monitor nftables numad nvmf-autoconnect podman
                  podman-auto-update podman-restart psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts
                 rpmdb-rebuild serial-getty@ speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures
                     systemd-pstore systemd-sysext wpa_supplicant
  indirect         spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.22.1.el9_0.x86_64
  root=/dev/mapper/rhel-root
  ro
  crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
```

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Platform Notes (Continued)

```
   resume=/dev/mapper/rhel-swap
   rd.lvm.lv=rhel/root
   rd.lvm.lv=rhel/swap
   rhgb
   quiet

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 4.00 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
```

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Platform Notes (Continued)

```
  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

------------------------------------------------------------
18. OS release
  From /etc/*-release /etc/*-version
  os-release     Red Hat Enterprise Linux 9.0 (Plow)
  redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
  system-release Red Hat Enterprise Linux release 9.0 (Plow)

------------------------------------------------------------
19. Disk information
SPEC is set to: /home/speccpu
  Filesystem            Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs   372G   24G  349G   7% /home

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Product Family: Rack

------------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.3 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 Micron MTC40F2046S1RC48BA1 64 GB 2 rank 4800, configured at 4000


------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      6.00.07
   BIOS Date:         12/23/2022
   BIOS Revision:     5.29
```

Compiler Version Notes

```
==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
                | 644.nab_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                | 654.roms_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                | 628.pop2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

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

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

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp

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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

(Continued on next page)

Peak Optimization Flags (Continued)

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

649.fotonik3d_s: `basepeak = yes`

654.roms_s: `basepeak = yes`

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`

627.cam4_s: `-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

628.pop2_s: `basepeak = yes`

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html`
`http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.0-SPR-RevA.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml`
`http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.0-SPR-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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