SPEC CPU®2017 Floating Point Rate Result

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xFusion

FusionServer 2488H V7 (Intel Xeon Gold 6416H)

$SPECrate^{®}2017_fp_base = $ 943

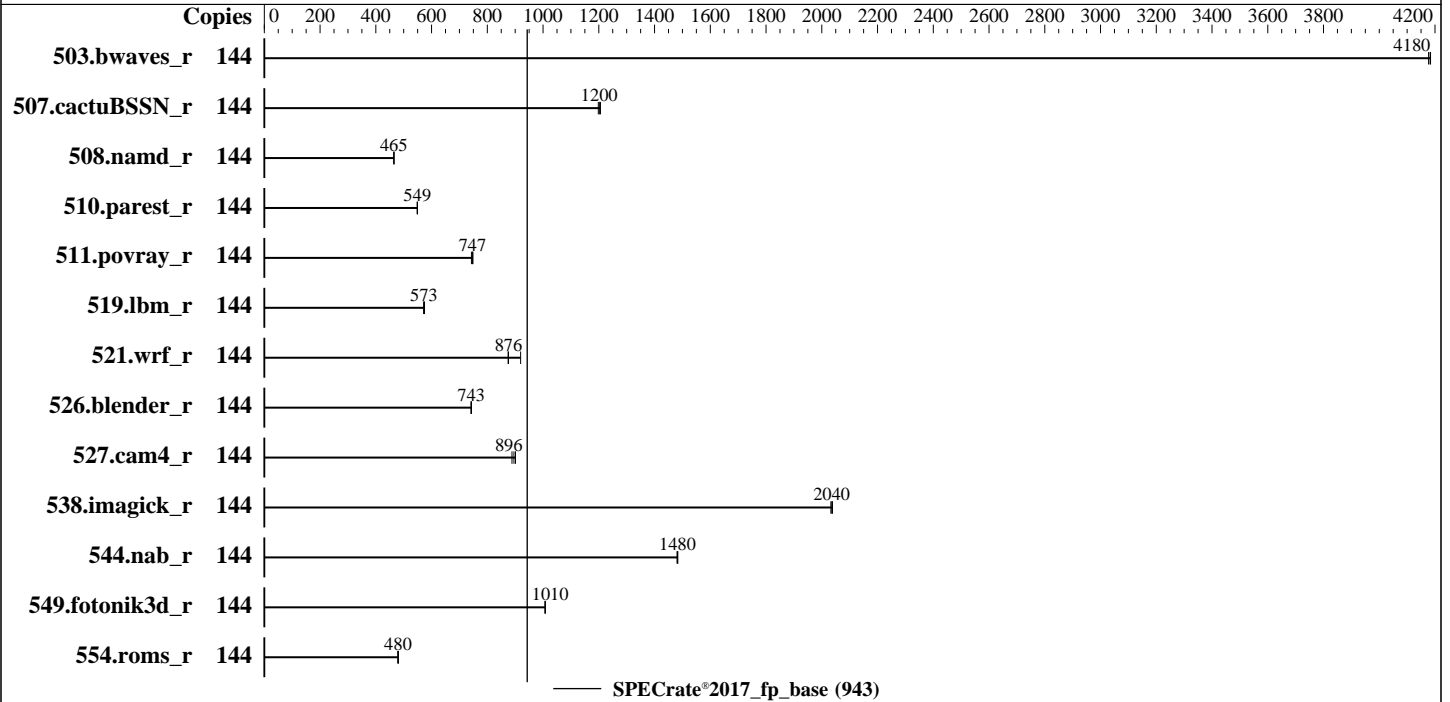$SPECrate^{®}2017_fp_peak = $ Not Run

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Apr-2024
Hardware Availability: Jul-2023
Software Availability: Dec-2023

Copies	
503.bwaves_r	144	4180
507.cactuBSSN_r	144	1200
508.namd_r	144	465
510.parest_r	144	549
511.povray_r	144	747
519.lbm_r	144	573
521.wrf_r	144	876
526.blender_r	144	743
527.cam4_r	144	896
538.imagick_r	144	2040
544.nab_r	144	1480
549.fotonik3d_r	144	1010
554.roms_r	144	480

SPECrate®2017_fp_base (943)

Hardware

CPU Name: Intel Xeon Gold 6416H
 Max MHz: 4200
 Nominal: 2200
Enabled: 72 cores, 4 chips, 2 threads/core
Orderable: 1,2,4 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: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB SATA SSD
Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
 5.14.0-70.13.1.el9_0.x86_64
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2023.2.3 of Intel Fortran
 Compiler for Linux;
Parallel: No
Firmware: Version 01.02.01.04 Released Jan-2024
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

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Results Table

Benchmark	Base Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
503.bwaves_r	144	345	4180	346	4180	**345**	**4180**							
507.cactuBSSN_r	144	152	1200	151	1210	**152**	**1200**							
508.namd_r	144	294	465	**294**	**465**	294	465							
510.parest_r	144	686	549	687	549	**686**	**549**							
511.povray_r	144	453	743	449	748	**450**	**747**							
519.lbm_r	144	**265**	**573**	264	575	266	572							
521.wrf_r	144	**368**	**876**	369	875	351	920							
526.blender_r	144	**295**	**743**	295	743	296	741							
527.cam4_r	144	279	901	**281**	**896**	283	889							
538.imagick_r	144	**176**	**2040**	176	2030	176	2040							
544.nab_r	144	**163**	**1480**	164	1480	163	1480							
549.fotonik3d_r	144	557	1010	**557**	**1010**	557	1010							
554.roms_r	144	476	481	478	479	**477**	**480**							

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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/Uniautos/cpu2017/lib/intel64:/home/Uniautos/cpu2017/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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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 configuration:
Performance Profile Set to Performance
SNC Set to Enable SNC2 (2-clusters)

Sysinfo program /home/Uniautos/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Apr 19 14:18:43 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 250 (250-6.el9_0)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
  x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   14:18:43 up 1 min,  1 user,  load average: 2.62, 1.80, 0.72
   USER     TTY      LOGIN@   IDLE   JCPU   PCPU WHAT
   root     pts/0    14:17   27.00s  1.09s  0.04s -bash
```

(Continued on next page)

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Platform Notes (Continued)

```
        ----------------------------------------------------------
        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) 8253962
          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) 8253962
          virtual memory              (kbytes, -v) unlimited
          file locks                          (-x) unlimited


        ----------------------------------------------------------
        5. sysinfo process ancestry
         /usr/lib/systemd/systemd --switched-root --system --deserialize 30
         sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
         sshd: root [priv]
         sshd: root@pts/0
         -bash
         /bin/sh ./test-rate-cpu2017.sh
         runcpu --define default-platform-flags --define numcopies=144 -c
           ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=72 --define physicalfirst
           --define invoke_with_interleave --define drop_caches --tune base -o all fprate
         runcpu --define default-platform-flags --define numcopies=144 --configfile
           ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=72 --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/CPU2017.119/templogs/preenv.fprate.119.0.log --lognum 119.0 --from_runcpu 2
         specperl $SPEC/bin/sysinfo
        $SPEC = /home/Uniautos/cpu2017


        ----------------------------------------------------------
        6. /proc/cpuinfo
            model name      : Intel(R) Xeon(R) Gold 6416H
            vendor_id       : GenuineIntel
            cpu family      : 6
            model           : 143
            stepping        : 8
            microcode       : 0x2b0004d0
            bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
            cpu cores       : 18
            siblings        : 36
            4 physical ids (chips)
            144 processors (hardware threads)
            physical id 0: core ids 0-17
            physical id 1: core ids 0-17
            physical id 2: core ids 0-17
```

(Continued on next page)

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CPU2017 License:	6488	**Test Date:**	Apr-2024
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Platform Notes (Continued)

```
      physical id 3: core ids 0-17
      physical id 0: apicids 0-35
      physical id 1: apicids 128-163
      physical id 2: apicids 256-291
      physical id 3: apicids 384-419
   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:               46 bits physical, 57 bits virtual
     Byte Order:                  Little Endian
     CPU(s):                      144
     On-line CPU(s) list:         0-143
     Vendor ID:                   GenuineIntel
     BIOS Vendor ID:              Intel(R) Corporation
     Model name:                  Intel(R) Xeon(R) Gold 6416H
     BIOS Model name:             Intel(R) Xeon(R) Gold 6416H
     CPU family:                  6
     Model:                       143
     Thread(s) per core:          2
     Core(s) per socket:          18
     Socket(s):                   4
     Stepping:                    8
     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 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 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:                   3.4 MiB (72 instances)
     L1i cache:                   2.3 MiB (72 instances)
     L2 cache:                    144 MiB (72 instances)
     L3 cache:                    180 MiB (4 instances)
     NUMA node(s):                8
     NUMA node0 CPU(s):           0-8,72-80
     NUMA node1 CPU(s):           9-17,81-89
     NUMA node2 CPU(s):           18-26,90-98
     NUMA node3 CPU(s):           27-35,99-107
     NUMA node4 CPU(s):           36-44,108-116
     NUMA node5 CPU(s):           45-53,117-125
     NUMA node6 CPU(s):           54-62,126-134
     NUMA node7 CPU(s):           63-71,135-143
```

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Platform Notes (Continued)

```
   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     3.4M   12 Data              1    64        1             64
     L1i       32K     2.3M    8 Instruction       1    64        1             64
     L2         2M     144M   16 Unified           2  2048        1             64
     L3        45M     180M   15 Unified           3 49152        1             64

  --------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 8 nodes (0-7)
   node 0 cpus: 0-8,72-80
   node 0 size: 257276 MB
   node 0 free: 256691 MB
   node 1 cpus: 9-17,81-89
   node 1 size: 258043 MB
   node 1 free: 257569 MB
   node 2 cpus: 18-26,90-98
   node 2 size: 258043 MB
   node 2 free: 257640 MB
   node 3 cpus: 27-35,99-107
   node 3 size: 258007 MB
   node 3 free: 257573 MB
   node 4 cpus: 36-44,108-116
   node 4 size: 258043 MB
   node 4 free: 257112 MB
   node 5 cpus: 45-53,117-125
   node 5 size: 258043 MB
   node 5 free: 257330 MB
   node 6 cpus: 54-62,126-134
   node 6 size: 258043 MB
   node 6 free: 257627 MB
   node 7 cpus: 63-71,135-143
   node 7 size: 258024 MB
   node 7 free: 257633 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  12  21  21  21  21  21  21
     1:  12  10  21  21  21  21  21  21
     2:  21  21  10  12  21  21  21  21
     3:  21  21  12  10  21  21  21  21
     4:  21  21  21  21  10  12  21  21
     5:  21  21  21  21  12  10  21  21
     6:  21  21  21  21  21  21  10  12
     7:  21  21  21  21  21  21  12  10

  --------------------------------------------------------------
 9. /proc/meminfo
   MemTotal:       2113052388 kB
```

(Continued on next page)

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Platform Notes (Continued)

```
-------------------------------------------------------------
10. who -r
   run-level 3 Apr 19 14:17


-------------------------------------------------------------
11. Systemd service manager version: systemd 250 (250-6.el9_0)
   Default Target  Status
   multi-user      degraded


-------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT          LOAD   ACTIVE SUB    DESCRIPTION
   * sep5.service loaded failed failed systemd script to load sep5 driver at boot time


-------------------------------------------------------------
13. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond
                    dbus-broker firewalld getty@ irqbalance kdump mdmonitor microcode nis-domainname rhsmcertd
                    rsyslog selinux-autorelabel-mark sep5 sshd sssd systemd-network-generator tuned udisks2
   enabled-runtime  systemd-remount-fs
   disabled         console-getty cpupower debug-shell kvm_stat man-db-restart-cache-update nftables rdisc
                    rhsm rhsm-facts rpmdb-rebuild serial-getty@ sshd-keygen@ systemd-boot-check-no-failures
                    systemd-pstore systemd-sysext
   indirect         sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo


-------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=(hd2,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
   root=UUID=fc5aaa98-7763-4e7f-8371-1b1810d17883
   ro
   crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
   resume=UUID=62bda881-0d36-43ce-826e-76cb2ea35911
   nohz_full=1-143


-------------------------------------------------------------
15. cpupower frequency-info
   analyzing CPU 0:
     Unable to determine current policy
     boost state support:
       Supported: yes
       Active: yes


-------------------------------------------------------------
16. tuned-adm active
   Current active profile: throughput-performance


-------------------------------------------------------------
17. sysctl
   kernel.numa_balancing            1
   kernel.randomize_va_space        2
   vm.compaction_proactiveness      20
   vm.dirty_background_bytes        0
   vm.dirty_background_ratio        10
   vm.dirty_bytes                   0
   vm.dirty_expire_centisecs        3000
   vm.dirty_ratio                   40
   vm.dirty_writeback_centisecs     500
   vm.dirtytime_expire_seconds      43200
   vm.extfrag_threshold             500
```

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Platform Notes (Continued)

```
  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


  ----------------------------------------------------------
18. /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


  ----------------------------------------------------------
19. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_shared           256
  max_ptes_swap              64
  pages_to_scan            4096
  scan_sleep_millisecs    10000


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


  ----------------------------------------------------------
21. Disk information
SPEC is set to: /home/Uniautos/cpu2017
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/sdc3       xfs   272G   45G  227G  17% /home


  ----------------------------------------------------------
22. /sys/devices/virtual/dmi/id
    Vendor:         XFUSION
    Product:        2488H V7
    Product Family: EagleStream


  ----------------------------------------------------------
23. 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:
    1x Hynix HMCG94AEBRA102N 64 GB 2 rank 4800
    22x Hynix HMCG94AEBRA108N 64 GB 2 rank 4800
    8x Hynix HMCG94AEBRA109N 64 GB 2 rank 4800
    1x Hynix HMCG94AEBRA123N 64 GB 2 rank 4800



  ----------------------------------------------------------
  24. BIOS
```

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Platform Notes (Continued)

```
   (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        XFUSION
      BIOS Version:       01.02.01.04
      BIOS Date:          01/15/2024
```

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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C++, C         | 511.povray_r(base) 526.blender_r(base)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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==============================================================================================
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 2023.2.3 Build x
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----------------------------------------------------------------------------------------------


==============================================================================================
Fortran, C     | 521.wrf_r(base) 527.cam4_r(base)
----------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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```

SPEC CPU®2017 Floating Point Rate Result

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xFusion

FusionServer 2488H V7 (Intel Xeon Gold 6416H)

SPECrate®2017_fp_base = 943

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 6488	**Test Date:** Apr-2024
Test Sponsor: xFusion	**Hardware Availability:** Jul-2023
Tested by: xFusion	**Software Availability:** Dec-2023

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`

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`

(Continued on next page)

xFusion

FusionServer 2488H V7 (Intel Xeon Gold 6416H)

SPECrate®2017_fp_base = 943

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CPU2017 License:	6488	**Test Date:**	Apr-2024
Test Sponsor:	xFusion	**Hardware Availability:**	Jul-2023
Tested by:	xFusion	**Software Availability:**	Dec-2023

Base Optimization Flags (Continued)

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
-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-ic2023p2-official-linux64.html
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-SPR-V1.1-revC.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-SPR-V1.1-revC.xml

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

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