SPEC CPU®2017 Floating Point Rate Result

xFusion

FusionServer 1288H V7 (Intel Xeon Gold 6448H)

$SPECrate^®2017\_fp\_base = 751$

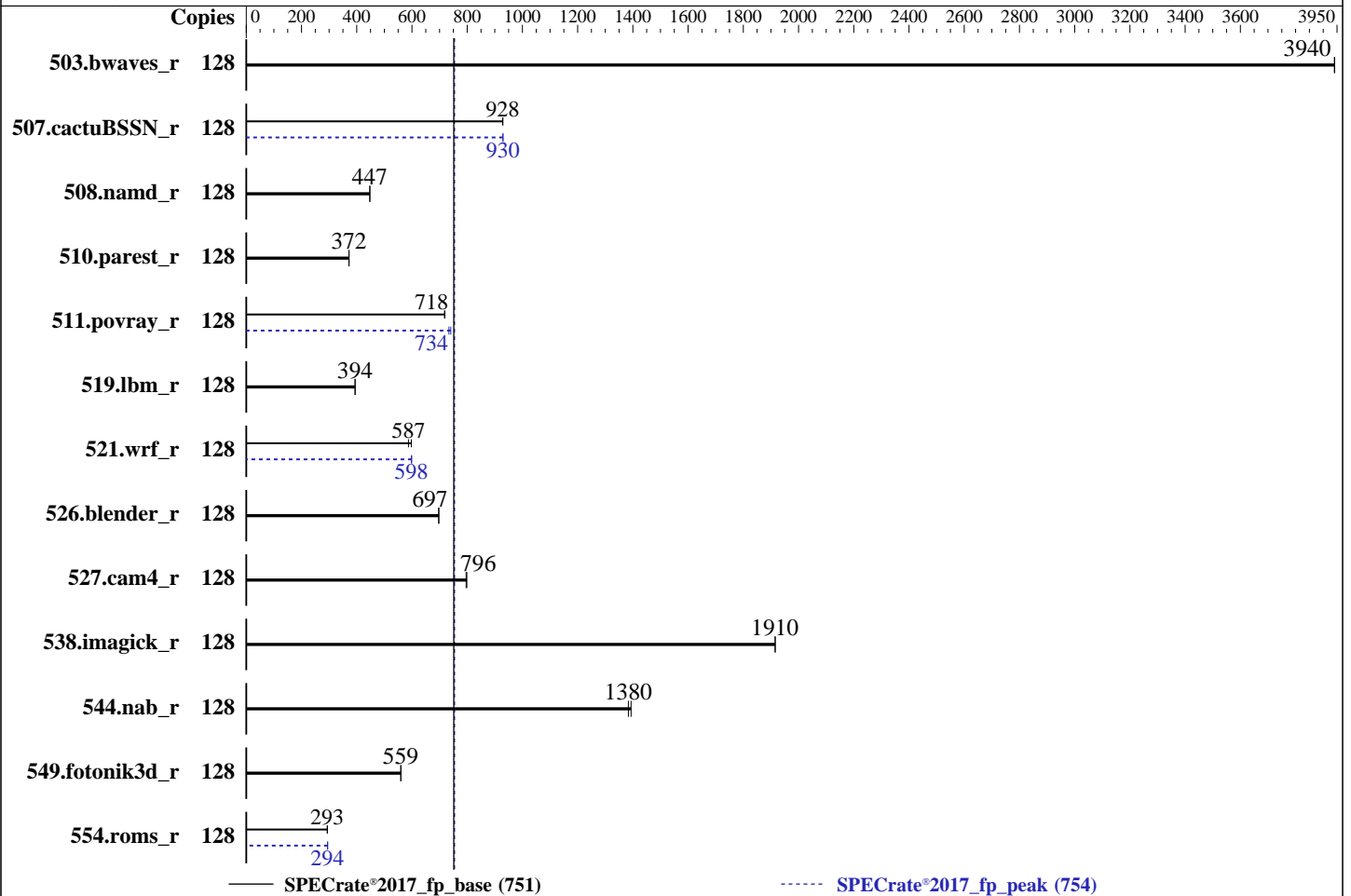$SPECrate^®2017\_fp\_peak = 754$

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

Test Date: Jun-2023
Hardware Availability: Jan-2023
Software Availability: Dec-2022

Copies	
503.bwaves_r	**128** 3940
507.cactuBSSN_r	**128** 928 / 930
508.namd_r	**128** 447
510.parest_r	**128** 372
511.povray_r	**128** 718 / 734
519.lbm_r	**128** 394
521.wrf_r	**128** 587 / 598
526.blender_r	**128** 697
527.cam4_r	**128** 796
538.imagick_r	**128** 1910
544.nab_r	**128** 1380
549.fotonik3d_r	**128** 559
554.roms_r	**128** 293 / 294

Scale: 0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3950

—— SPECrate®2017_fp_base (751)   ------ SPECrate®2017_fp_peak (754)

Hardware

CPU Name: Intel Xeon Gold 6448H
 Max MHz: 4100
 Nominal: 2400
Enabled: 64 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: 60 MB I+D on chip per chip
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 1920 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 9.0 (Plow)
 5.14.0-70.13.1.el9_0.x86_64
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2023.0 of Intel Fortran Compiler
 for Linux;
Parallel: No
Firmware: Version 2.00.55 Released Mar-2023
File System: xfs
System State: Run level 5 (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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	**326**	**3940**	326	3940			128	**326**	**3940**	326	3940		
507.cactuBSSN_r	128	**175**	**928**	174	929			128	**174**	**930**	174	930		
508.namd_r	128	**272**	**447**	272	448			128	**272**	**447**	272	448		
510.parest_r	128	899	372	**901**	**372**			128	899	372	**901**	**372**		
511.povray_r	128	416	719	**416**	**718**			128	404	741	**407**	**734**		
519.lbm_r	128	**342**	**394**	342	394			128	**342**	**394**	342	394		
521.wrf_r	128	480	598	**488**	**587**			128	**480**	**598**	478	599		
526.blender_r	128	**280**	**697**	279	698			128	**280**	**697**	279	698		
527.cam4_r	128	**281**	**796**	280	799			128	**281**	**796**	280	799		
538.imagick_r	128	**166**	**1910**	166	1920			128	**166**	**1910**	166	1920		
544.nab_r	128	155	1390	**156**	**1380**			128	155	1390	**156**	**1380**		
549.fotonik3d_r	128	891	560	**892**	**559**			128	891	560	**892**	**559**		
554.roms_r	128	693	294	**694**	**293**			128	689	295	**691**	**294**		

SPECrate®2017_fp_base =	**751**
SPECrate®2017_fp_peak =	**754**

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 = "/spec2017-icc2023.0/lib/intel64:/spec2017-icc2023.0/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 /spec2017-icc2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Thu Jun 29 18:01:48 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 (250-6.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. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS
-----------------------------------------------------------


-----------------------------------------------------------
1. uname -a
  Linux localhost.localdomain 5.14.0-70.13.1.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
   18:01:48 up  2:47,  3 users,  load average: 99.59, 120.74, 124.41
  USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty2       15:16    2:44m  1.15s  0.05s -bash
  root     tty3       15:20    2:41m  0.11s  0.11s -bash
```

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$SPECrate^{®}2017\_fp\_base = 751$

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Platform Notes (Continued)

```
   root     pts/0     15:20   2:40m  0.11s  0.11s -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) 2060103
     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) 2060103
     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 --define default-platform-flags --copies 128 -c ic2023.0-lin-sapphirerapids-rate-20221201.cfg
      --define smt-on --define cores=64 --define physicalfirst --define invoke_with_interleave --define
      drop_caches --tune base,peak --iterations 2 -o all fprate
    runcpu --define default-platform-flags --copies 128 --configfile
      ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
      --define invoke_with_interleave --define drop_caches --tune base,peak --iterations 2 --output_format all
      --nopower --runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.056/templogs/preenv.fprate.056.0.log --lognum 056.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
   $SPEC = /spec2017-icc2023.0


   ------------------------------------------------------------
   6. /proc/cpuinfo
       model name      : Intel(R) Xeon(R) Gold 6448H
       vendor_id       : GenuineIntel
       cpu family      : 6
       model           : 143
       stepping        : 7
       microcode       : 0x2b000111
       bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
       cpu cores       : 32
       siblings        : 64
       2 physical ids (chips)
       128 processors (hardware threads)
       physical id 0: core ids 0-31
       physical id 1: core ids 0-31
       physical id 0: apicids 0-63
       physical id 1: apicids 128-191
```

(Continued on next page)

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Platform Notes (Continued)

```
   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):                        128
     On-line CPU(s) list:           0-127
     Vendor ID:                     GenuineIntel
     BIOS Vendor ID:                Intel(R) Corporation
     Model name:                    Intel(R) Xeon(R) Gold 6448H
     BIOS Model name:               Intel(R) Xeon(R) Gold 6448H
     CPU family:                    6
     Model:                         143
     Thread(s) per core:            2
     Core(s) per socket:            32
     Socket(s):                     2
     Stepping:                      7
     BogoMIPS:                      4800.00
     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 MiB (64 instances)
     L1i cache:                     2 MiB (64 instances)
     L2 cache:                      128 MiB (64 instances)
     L3 cache:                      120 MiB (2 instances)
     NUMA node(s):                  4
     NUMA node0 CPU(s):             0-15,64-79
     NUMA node1 CPU(s):             16-31,80-95
     NUMA node2 CPU(s):             32-47,96-111
     NUMA node3 CPU(s):             48-63,112-127
     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
```

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Platform Notes (Continued)

```
From lscpu --cache:
    NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL  SETS PHY-LINE COHERENCY-SIZE
    L1d      48K       3M   12 Data            1     64       1             64
    L1i      32K       2M    8 Instruction     1     64       1             64
    L2        2M     128M   16 Unified         2   2048       1             64
    L3       60M     120M   15 Unified         3  65536       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: 0-15,64-79
  node 0 size: 128079 MB
  node 0 free: 119198 MB
  node 1 cpus: 16-31,80-95
  node 1 size: 129017 MB
  node 1 free: 121957 MB
  node 2 cpus: 32-47,96-111
  node 2 size: 128980 MB
  node 2 free: 121255 MB
  node 3 cpus: 48-63,112-127
  node 3 size: 129006 MB
  node 3 free: 121949 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:      527445260 kB


----------------------------------------------------------------
10. who -r
  run-level 5 Jun 29 15:15


----------------------------------------------------------------
11. Systemd service manager version: systemd 250 (250-6.el9_0)
  Default Target  Status
  graphical       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          ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                   accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker 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 ostree-remount power-profiles-daemon qemu-guest-agent rhsmcertd
                   rsyslog rtkit-daemon selinux-autorelabel-mark sep5 smartd sshd sssd switcheroo-control
                   sysstat systemd-network-generator udisks2 upower vgauthd vmtoolsd
  enabled-runtime  systemd-remount-fs
```

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Platform Notes (Continued)

```
   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 firewalld iprdump iprinit iprupdate iscsid iscsiuio kpatch
                      kvm_stat ledmon man-db-restart-cache-update nftables 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

   ----------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt3)/boot/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
    root=UUID=cc4bab05-907e-44ef-b818-2b2874390234
    ro
    crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
    resume=UUID=5ba347ca-8beb-4f6e-9c11-de63dc4ddf5f
    rhgb
    quiet

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

   ----------------------------------------------------------------
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_milliseconds   60000
    defrag                     1
```

(Continued on next page)

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Platform Notes (Continued)

```
   max_ptes_none              511
   max_ptes_shared            256
   max_ptes_swap               64
   pages_to_scan             4096
   scan_sleep_millisecs     10000


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


   --------------------------------------------------------------
   20. Disk information
   SPEC is set to: /spec2017-icc2023.0
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda3      xfs   420G   86G  335G  21% /


   --------------------------------------------------------------
   21. /sys/devices/virtual/dmi/id
       Vendor:        XFUSION
       Product:       1288H V7
       Product Family: Eagle Stream
       Serial:        serial


   --------------------------------------------------------------
   22. 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 Samsung M321R4GA3BB6-CQKDG 32 GB 2 rank 4800



   --------------------------------------------------------------
   23. BIOS
   (This section combines info from /sys/devices and dmidecode.)
       BIOS Vendor:       XFUSION
       BIOS Version:      2.00.55
       BIOS Date:         03/07/2023
       BIOS Revision:     0.55
```

Compiler Version Notes

```
==============================================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------
```

(Continued on next page)

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Compiler Version Notes (Continued)

```
==============================================================================
C++, C        | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
Fortran       | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
Fortran, C    | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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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
```

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

xFusion

SPECrate®2017_fp_base = 751

FusionServer 1288H V7 (Intel Xeon Gold 6448H)

SPECrate®2017_fp_peak = 754

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

Test Date: Jun-2023
Hardware Availability: Jan-2023
Software Availability: Dec-2022

Base Compiler Invocation (Continued)

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
```

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
```

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xFusion

FusionServer 1288H V7 (Intel Xeon Gold 6448H)

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CPU2017 License: 6488		**Test Date:**	Jun-2023
Test Sponsor: xFusion		**Hardware Availability:** Jan-2023
Tested by: xFusion		**Software Availability:** Dec-2022

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
```
-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
```

Peak 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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

xFusion

FusionServer 1288H V7 (Intel Xeon Gold 6448H)

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SPECrate®2017_fp_peak = 754

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Tested by: xFusion

Test Date: Jun-2023
Hardware Availability: Jan-2023
Software Availability: Dec-2022

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: -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:

521.wrf_r: -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

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast -xCORE-AVX512 -ffast-math -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

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xFusion

FusionServer 1288H V7 (Intel Xeon Gold 6448H)

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CPU2017 License: 6488
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Test Date: Jun-2023
Hardware Availability: Jan-2023
Software Availability: Dec-2022

Peak Optimization Flags (Continued)

526.blender_r: basepeak = yes

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-ic2023-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-ic2023-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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