xFusion
FusionServer 1288H V7 (Intel Xeon Gold 5420+)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 611</th>
<th>SPECrate®2017_fp_peak = 613</th>
</tr>
</thead>
</table>

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

| Copies | 0 | 150 | 300 | 450 | 600 | 750 | 900 | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 | 1950 | 2100 | 2250 | 2400 | 2550 | 2700 | 2850 | 3000 | 3150 | 3200 |
|--------|---|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 503.bwaves_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 507.cactuBSSN_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 508.namd_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 510.parest_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 511.povray_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 519.lbm_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 521.wrf_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 526.blender_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 527.cam4_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 538.imagick_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 544.nab_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 549.fotonik3d_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 554.roms_r | 112 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**SPECrate®2017_fp_base (611)**  **SPECrate®2017_fp_peak (613)**

**Hardware**

- **CPU Name:** Intel Xeon Gold 5420+
- **Max MHz:** 4100
- **Nominal:** 2000
- **Enabled:** 56 cores, 2 chips, 2 threads/core
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **Cache L2:** 2 MB I+D on chip per core
- **Cache L3:** 52.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4400)
- **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
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>112</td>
<td>356</td>
<td>3160</td>
<td>355</td>
<td>3160</td>
<td>112</td>
<td>355</td>
<td>3160</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>112</td>
<td>184</td>
<td>772</td>
<td>184</td>
<td>769</td>
<td>112</td>
<td>184</td>
<td>769</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>112</td>
<td>314</td>
<td>339</td>
<td>313</td>
<td>339</td>
<td>112</td>
<td>313</td>
<td>339</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>112</td>
<td>923</td>
<td>317</td>
<td>924</td>
<td>317</td>
<td>112</td>
<td>924</td>
<td>317</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>112</td>
<td>483</td>
<td>542</td>
<td>483</td>
<td>541</td>
<td>112</td>
<td>469</td>
<td>557</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>112</td>
<td>342</td>
<td>346</td>
<td>342</td>
<td>346</td>
<td>112</td>
<td>342</td>
<td>346</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>112</td>
<td>469</td>
<td>535</td>
<td>472</td>
<td>532</td>
<td>112</td>
<td>469</td>
<td>535</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>112</td>
<td>322</td>
<td>530</td>
<td>323</td>
<td>528</td>
<td>112</td>
<td>322</td>
<td>530</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>112</td>
<td>310</td>
<td>631</td>
<td>314</td>
<td>624</td>
<td>112</td>
<td>310</td>
<td>631</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>112</td>
<td>193</td>
<td>1440</td>
<td>193</td>
<td>1440</td>
<td>112</td>
<td>193</td>
<td>1440</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>112</td>
<td>180</td>
<td>1040</td>
<td>181</td>
<td>1040</td>
<td>112</td>
<td>180</td>
<td>1040</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>112</td>
<td>872</td>
<td>500</td>
<td>872</td>
<td>500</td>
<td>112</td>
<td>872</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>112</td>
<td>686</td>
<td>260</td>
<td>687</td>
<td>259</td>
<td>112</td>
<td>686</td>
<td>260</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)
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.


Platform Notes

BIOS configuration:
Performance Profile Set to Performance
SNC Set to Enable SNC2 (2-clusters)

Sysinfo program /spec2017-lcc2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Jun 13 17:44:42 2023

SUT (System Under Test) info as seen by some common utilities.

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. dmdidecode
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 GNU/Linux

2. ```w```
   17:44:42 up 3:10, 2 users, load average: 75.06, 102.87, 108.27
   USER TTY LOGNAME IDLE JCPU PCPU WHAT
   root tty1 14:34 3:09m 1.30s 0.07s 0.00s -bash

(Continued on next page)
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) 2060116
   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) 2060116
   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 112 -- ic2023.0-lin-sapphirerapids-rate-20221201.cfg
            --define smt-on --define cores=56 --define physicalfirst --define invoke_with_interleave --define
            drop_caches -- tune base,peak -- iterations 2 -- o all fprate
   runcpu --define default-platform-flags --copies 112 -- configfile
            ic2023.0-lin-sapphirerapids-rate-20221201.cfg -- define smt-on -- define cores=56 -- define physicalfirst
            -- define invoke_with_interleave -- define drop_caches -- tune base,peak -- iterations 2 -- output_format all
            -- no power -- runmode rate -- tune base,peak -- size rate fprate -- no preenv -- note preenv -- log file
            $SPEC/tmp/CPU2017.009/templogs/preenv.fprate.009.0.log -- lognum 009.0 -- from runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /spec2017-icc2023.0

6. /proc/cpuinfo
   model name : Intel(R) Xeon(R) Gold 5420+
   vendor_id : GenuineIntel
   cpu family : 6
   model : 143
   stepping : 7
   microcode : 0x2b000111
   bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores : 28
   siblings : 56
   2 physical ids (chips)
   112 processors (hardware threads)
   physical id 0: core ids 0-27
   physical id 1: core ids 27-55
   physical id 0: apicids 0-55
   physical id 1: apicids 128-183
   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)
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:              46 bits physical, 57 bits virtual
Byte Order:                 Little Endian
CPU(s):                     112
On-line CPU(s) list:        0-111
Vendor ID:                  GenuineIntel
BIOS Vendor ID:             Intel(R) Corporation
Model name:                 Intel(R) Xeon(R) Gold 5420+
BIOS Model name:            Intel(R) Xeon(R) Gold 5420+
CPU family:                6
Model:                      143
Thread(s) per core:         2
Core(s) per socket:         28
Socket(s):                  2
Stepping:                   7
BogoMIPS:                   4000.00
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 rdtsdp
  lm constant_tsc 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 rdrcr lahf_lm
  abm 3dnop prefetch cpuid_fault epb cat_l3 cat_l2 cdp_l1 cdp_l3 invpcid_single
  intel_pinn cpd_l2 ssbd mba ibrs ibpb stibp ibrs_halted tpr_shadow vnmi
  flexpriority ept vpid ept_ad fsgsbase tsc_adjust tso1 avx2 smep bmi2 erms
  invpcid cqm rdt_a avx12f16 avx12dqq rdseed adx smap avx12ifma clflushopt
  clwb intel_pt avx12cd sha_ni avx12bw avx12vli xsaveopt xsaveopt xgetbv1
  xsavec cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect
  avx_vnni avx12bf16 wmbnoivd dtherm ida arat pin pts avx12vbi umip pk
  ospeke waitpkg avx12vbiem gfi vaes vpcmulelg dtes64q avx12_vnni avx12_bitalg
  tme avx12_vpopcntdq la57 rdpid bus_lock_detect cidemove movdir64b
  enqcmd fasm_md_clear serialize tsxtdtrk pconf arch_lbr avx12_fp16
  amx_tile flush_lid arch_capabilities

Virtualization:             VT-x
L1d cache:                  2.6 MiB (56 instances)
L1i cache:                  1.8 MiB (56 instances)
L2 cache:                   112 MiB (56 instances)
L3 cache:                   105 MiB (2 instances)
NUMA node(s):               4
NUMA node0 CPU(s):          0-13,56-69
NUMA node1 CPU(s):          14-27,70-83
NUMA node2 CPU(s):          28-41,84-97
NUMA node3 CPU(s):          42-55,98-111
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; userspace/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:

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

xFusion

FusionServer 1288H V7 (Intel Xeon Gold 5420+)

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

SPECrate®2017_fp_base = 611
SPECrate®2017_fp_peak = 613

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

Platform Notes (Continued)

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>2.6M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>1.8M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>112M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>52.5M</td>
<td>105M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>57344</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

8. `numactl --hardware`
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0-13,56-69
node 0 size: 128043 MB
node 0 free: 119889 MB
node 1 cpus: 14-27,70-83
node 1 size: 129017 MB
node 1 free: 122661 MB
node 2 cpus: 28-41,84-97
node 2 size: 129017 MB
node 2 free: 122102 MB
node 3 cpus: 42-55,98-111
node 3 size: 129007 MB
node 3 free: 122638 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: 527485656 kB

10. who -r
run-level 3 Jun 13 14:34 last=5

11. Systemd service manager version: systemd 250 (250-6.e19_0)
Default Target Status
graphical degraded

12. Failed units, from systemctl list-units --state=failed
UNIT LOAD ACTIVE SUB DESCRIPTION
* packagekit.service loaded failed failed PackageKit Daemon

13. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled ModernManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
accounts-daemon atd auditd avahi-daemon bluetooth chronyd crocd cups dbus-broker gdm
getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt
low-memory-monitor lvm2-monitor mcelog mdmonitor multipathd nis-domainname
nvme-fc-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rkhunter
tsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd swPPPsystemd-network-generator udisks2 udev udevadm
vauthd vmtoolad
enabled-runtime systemd-remount-fs

disabled arp-ethers blk-availability britty canberra-system-bootup canberra-system-shutdown
canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
IEEE SPEC® CPU2017 Floating Point Rate Result

xFusion
FusionServer 1288H V7 (Intel Xeon Gold 5420+)

SPECRate®2017_fp_base = 611
SPECRate®2017_fp_peak = 613

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

Platform Notes (Continued)

dbus-daemon debug-shell dnsmasq firewallld iprdump iprintrun iprupdate iscsid iscsiui0 kpatch
kvm_stat ledmon man-db-restart-cache-update nftables nvme-autoconnect pcman
podman-auto-update podman-restart psacct ras-mc-ctl rasdaemon rdac rhcd rhsm rhsm-facts
rpmdb-rebuild serial-getty@ speech-dispatcher@ systemd-boot-check-no-failures
systemd-pstore systemd-sysext wpa_supplicant
indirect

------------------------------------------------------------
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
rescue=UUID=5ba347ca-8beb-4f6e-9c11-de65dc4dd5f
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
vm.nr_hugepages_mempolicy
vm.nr_overcommit_hugepages
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+advise [advise] never
enabled [always] advise never
hpage_pmd_size 2097152
shmem_enabled always within_size advise [never] deny force

------------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage/hugepaged
alloc_sleep_millisecs 60000
defrag 1
max_ptes_num 511
max_ptes_shared 256
SPEC CPU®2017 Floating Point Rate Result

xFusion
FusionServer 1288H V7 (Intel Xeon Gold 5420+)

SPECrate®2017_fp_base = 611
SPECrate®2017_fp_peak = 613

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

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

Platform Notes (Continued)

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 51G 370G 13% /

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, configured at 4400

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

<table>
<thead>
<tr>
<th>Compiler</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>C++</td>
<td>508.namd_r(base, peak) 510.parest_r(base, peak)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>
**SPEC CPU®2017 Floating Point Rate Result**

FusionServer 1288H V7 (Intel Xeon Gold 5420+)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>6488</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>xFusion</td>
</tr>
<tr>
<td>Tested by:</td>
<td>xFusion</td>
</tr>
</tbody>
</table>

---

## Compiler Version Notes (Continued)

### C++, C

<table>
<thead>
<tr>
<th>511.povray_r(base, peak)</th>
<th>526.blender_r(base, peak)</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>507.cactuBSSN_r(base, peak)</th>
</tr>
</thead>
</table>

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.

### Fortran

<table>
<thead>
<tr>
<th>503.bwaves_r(base, peak)</th>
<th>549.fotonik3d_r(base, peak)</th>
<th>554.roms_r(base, peak)</th>
</tr>
</thead>
</table>

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201 Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

### Fortran, C

<table>
<thead>
<tr>
<th>521.wrf_r(base, peak)</th>
<th>527.cam4_r(base, peak)</th>
</tr>
</thead>
</table>

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201 Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

---

## 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

---

(Continued on next page)
xFusion
FusionServer 1288H V7 (Intel Xeon Gold 5420+)

SPECrate®2017_fp_base = 611
SPECrate®2017_fp_peak = 613

CPU2017 License: 6488
Test Sponsor: xFusion
Test Date: Jun-2023
Tested by: xFusion
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

(Continued on next page)
xFusion
FusionServer 1288H V7 (Intel Xeon Gold 5420+)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>611</td>
<td>613</td>
</tr>
</tbody>
</table>

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

**Base Optimization Flags (Continued)**

Benchmarks using both Fortran and C (continued):

```shell
-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++:

```shell
-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++:

```shell
-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
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: -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:

503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes
554.roms_r: basepeak = yes

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes
527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs
-pprofile-generate(pass 1)
-pprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-fflags -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

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

(Continued on next page)
xFusion
FusionServer 1288H V7 (Intel Xeon Gold 5420+)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>= 611</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>= 613</td>
</tr>
</tbody>
</table>

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

---

### Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `-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/Intel-ic2023-official-linux64.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/Intel-ic2023-official-linux64.xml)  