xFusion

FusionServer 1288H V7 (Intel Xeon Gold 6438Y+)

SPECr幕®2017_int_base = 578

SPECr幕®2017_int_peak = 595

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

Hardware

CPU Name: Intel Xeon Gold 6438Y+
Max MHz: 4000
Nominal: 2000
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 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage
## SPEC CPU®2017 Integer Rate Result

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### Results Table

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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>504</td>
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<td>504</td>
<td>274</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 578**  
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

### 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/spec2017-1.1.9-ic2023/lib/intel64:/home/spec2017-1.1.9-ic2023/lib/ia32:/home/spec2017-1.1.9-ic2023/jet6.0.1-32" 
MALLOCONF = "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
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>
NR: 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
Performance Profile Set to Performance
SNC Set to Enable SNC2 (2-clusters)
Sysinfo program /home/spec2017-1.1.9-ic2023/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Wed Sep  6 09:49:30 2023
SUT (System Under Test) info as seen by some common utilities.

(Continued on next page)
Platform Notes (Continued)

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`
   ```
   09:49:30 up 5 min,  1 user, load average: 0.01, 0.15, 0.09
   USER  TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   root  tty1      09:47    1:06   1.33s  0.06s -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) 2060170
   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) 2060170
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited
   ```

5. `sysinfo`
   ```
   /usr/lib/systemd/systemd --switched-root --system --deserialize 18
   login -- root
   -bash
   ```

6. `/proc/cpuinfo`
   ```
   model name : Intel(R) Xeon(R) Gold 6438Y+
   vendor_id : GenuineIntel
   cpu family : 6
   model : 143
   stepping : 7
   microcode : 0x2b000111
   ```
(Continued on next page)
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SPECratenew

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Platform Notes (Continued)

bugs
    : spectre_v1 spectre_v2 spec_store_bypass

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: apic ids 0-63
physical id 1: apic ids 128-191

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 6438Y+
BIOS Model name: Intel(R) Xeon(R) Gold 6438Y+
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
Stepping: 7
BogoMIPS: 4000.00

Flags:
    fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pmr pse36
    clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb
    rdtsdp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
    nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64
    mcmpymts db xpred mmxexcmppre-fetching cpuid_fault ebcat_l3 cat_l2
    cpd_l3 cpuid_cpuid_single
    intel_pni cpdp_l2 asbd mba ibrs ibpb stibp ibrs_enhanced
    tpr_shadow vmx
    flexpriority ept vpid ept_ad fsqbsebase tsc_adjust bmon avx2 smep
    bmi2 erms
    invpcid cqm rdt_a avx512f
    avx512dq rdseed adx smap
    avx512ifma clflushopt
    clwb intel_pt avx512cd sha_ni avx512bw avx512vl
    xsaveopt xsaveopt xsaves
    cpq _l1c cpq _occup _l1c cpq _mbm _total cpq _mbm _local
    split _lock _detect
    avx_vnni avx512Ћf16 wbinvd dtherm ids arat pln pts avx512vbmi umip
    pku
    ospke waitpkg avx512בעלי gfni vaes vpclmulqdq avx512_vnni
    avx512_bitalg
    tme avx512_vfvpconfld tqa57 rdpid bus_lock _detect cidemote
    movdiri movdiri64b
    enqcmd fmm_md_clear serialize tssidtrk pconf 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

(Continued on next page)
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Platform Notes (Continued)

Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: 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:

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<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>
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<tr>
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<td>48K</td>
<td>3M</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>2M</td>
<td>8</td>
<td>Instruction</td>
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<td>64</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L2</td>
<td>2M</td>
<td>128M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L3</td>
<td>60M</td>
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<td>Unified</td>
<td>3</td>
<td>65536</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: 0-15,64-79
node 0 size: 128078 MB
node 0 free: 127240 MB
node 1 cpus: 16-31,80-95
node 1 size: 129017 MB
node 1 free: 126152 MB
node 2 cpus: 32-47,96-111
node 2 size: 129017 MB
node 2 free: 128526 MB
node 3 cpus: 48-63,112-127
node 3 size: 128969 MB
node 3 free: 125344 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: 527444768 kB

10. who -r

run-level 3 Sep 6 09:44

11. systemd service manager version: systemd 250 (250-6.e19_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

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spec

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</table>

Platform Notes (Continued)

<table>
<thead>
<tr>
<th>STATE</th>
<th>UNIT FILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>enabled</td>
<td>NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond dbus-broker getty@ irqbalance kdump lvm2-monitor mdmonitor microcode nis-domainname rsysmgrtd rsyslog selinux-autorelabel-mark sep5 sshd sssd sysstat systemd-network-generator tuned udisks2 upower</td>
</tr>
<tr>
<td>enabled-runtime</td>
<td>systemd-remount-fs</td>
</tr>
<tr>
<td>indirect</td>
<td></td>
</tr>
</tbody>
</table>

14. Linux kernel boot-time arguments, from /proc/cmdline

```
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
root=/dev/mapper/rhel-root
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=/dev/mapper/rhel-swap
dd.lvm.lv=rhel/root
```

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.dirtyexpire_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                  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
```

(Continued on next page)
**Platform Notes (Continued)**

```
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/spec2017-1.1.9-ic2023
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   1.7T  147G  1.6T   9% /home

---

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

---

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:
      16x Samsung M321R4GA3BB6-CQXDG 32 GB 2 rank 4800

---

24. 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       | 502.gcc_r(peak)
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

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Compiler Version Notes (Continued)

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<th>C benchmarks</th>
<th>C++ benchmarks</th>
<th>Fortran benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>icx</td>
<td>icpx</td>
<td>ifx</td>
</tr>
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</table>

Base Compiler Invocation

C benchmarks:
icx
C++ benchmarks:
icpx
Fortran benchmarks:
ifx
xFusion

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Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx
**SPEC CPU®2017 Integer Rate Result**

xFusion

FusionServer 1288H V7 (Intel Xeon Gold 6438Y+)

<table>
<thead>
<tr>
<th>CPU2017 License: 6488</th>
<th>Test Date: Sep-2023</th>
</tr>
</thead>
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<tr>
<td>Test Sponsor: xFusion</td>
<td>Hardware Availability: Jan-2023</td>
</tr>
<tr>
<td>Tested by: xFusion</td>
<td>Software Availability: Dec-2022</td>
</tr>
</tbody>
</table>

### Peak Portability Flags

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -D_FILE_OFFSET_BITS=64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64
- 541.leela_r: -DSPEC_LP64
- 548.exchange2_r: -DSPEC_LP64
- 557.xz_r: -DSPEC_LP64

### Peak Optimization Flags

#### C benchmarks:

- 500.perlbench_r: -w -std=c11 -m64 -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
- fno-strict-overflow
- L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
- lqkmalloc

- 502.gcc_r: -m32
- L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/ia32_lin
- std=gnu89 -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
- L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

- 505.mcf_r: basepeak = yes

- 525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
- -ffast-math -flto -mfpmath=sse -funroll-loops
- -qopt-mem-layout-trans=4 -fno-alias
- L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
- lqkmalloc

- 557.xz_r: basepeak = yes

#### C++ benchmarks:

(Continued on next page)
**Peak Optimization Flags (Continued)**

520.omnetpp_r: basepeak = yes
523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

Fortran benchmarks:
548.exchange2_r: basepeak = yes

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.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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