## xFusion

**xFusion CH121 V5 (Intel Xeon Silver 4210R)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
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</tbody>
</table>

**CPU2017 License:** 6488  
**Test Sponsor:** xFusion  
**Tested by:** xFusion  
**Test Date:** Jan-2023  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2022

### Hardware

<table>
<thead>
<tr>
<th>Test</th>
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<td>40</td>
<td>251</td>
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<td>531.deepsjeng_r</td>
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</tr>
<tr>
<td>557.xz_r</td>
<td>40</td>
<td>76.1</td>
</tr>
</tbody>
</table>

### Software

**OS:** Red Hat Enterprise Linux release 8.4 (Ootpa)  
4.18.0-305.el8.x86_64  
**Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;  
**Parallel:** No  
**Firmware:** Version 8.37 Released Aug-2022  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** None  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

### CPU Specifications

- **CPU Name:** Intel Xeon Silver 4210R
- **Max MHz:** 3200
- **Nominal:** 2400
- **Enabled:** 20 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 13.75 MB I+D on chip per chip
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Other

- **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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**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 = "/spec2017/lib/intel64:/spec2017/lib/ia32:/spec2017/je5.0.1-32"
MALLOCC_CONF = "retain:true"
```
## SPEC CPU®2017 Integer Rate Result

### xFusion CH121 V5 (Intel Xeon Silver 4210R)

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### 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.
- 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:
  - Power Policy Set to Performance
  - XPT Prefetch set to Enabled

- Sysinfo program /spec2017/bin/sysinfo
- Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
- running on localhost.localdomain Thu Jan 12 21:27:41 2023

- SUT (System Under Test) info as seen by some common utilities.
  - For more information on this section, see https://www.spec.org/cpu2017/Docs/config.html#sysinfo

- From /proc/cpuinfo
  - model name: Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
  - 2 "physical id"s (chips)
  - 40 "processors"
  - cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
    - `cpu cores`: 10
    - `siblings`: 20
    - `physical 0: cores 0 1 2 3 4 8 9 10 11 12`
    - `physical 1: cores 0 1 2 3 4 8 9 10 11 12`

- From lscpu from util-linux 2.32.1:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 40
  - On-line CPU(s) list: 0-39
  - Thread(s) per core: 2
  - Core(s) per socket: 10
  - Socket(s): 2
  - NUMA node(s): 2
  - Vendor ID: GenuineIntel
  - BIOS Vendor ID: Intel(R) Corporation
  - CPU family: 6
  - Model: 85
  - Model name: Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
  - BIOS Model name: Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
  - Stepping: 7
  - CPU MHz: 2900.067
  - CPU max MHz: 3200.0000

(Continued on next page)
**SPEC CPU®2017 Integer Rate Result**

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xFusion CH121 V5 (Intel Xeon Silver 4210R)

**CPU2017 License:** 6488  
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</table>

**SPECrate®2017_int_base = 135**

**SPECrate®2017_int_peak = Not Run**

### Platform Notes (Continued)

```
CPU min MHz:         1000.0000  
BogoMIPS:            4800.00  
Virtualization:     VT-x  
L1d cache:           32K  
L1i cache:           32K  
L2 cache:            1024K  
L3 cache:            14080K  
NUMA node0 CPU(s):   0-9,20-29  
NUMA node1 CPU(s):   10-19,30-39  
Flags:               fpu vme de pse tsc msr pae mce cmov  
                      pat pse36 ceflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdsc  
                      lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid  
                      aperfmerf pni pclmulqdq dtes64 msr wm xsm est tm2 ssse3 sdbg fma cx16 xtpr pdcm  
                      pcid dca sse1_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx1 avx2  
                      rdseed fsgsbase tsc_adjust bbr1 hle avx2 smep bmi2  
microarchitecture :  
                      ibrs ibrd ibpb stibp ibrs_enhanced trp_shadow vnmi flexpriority ept vpd ept_ad  
                      fsgsbase tsc_adjust hle avx2 smep bmi2  
from /proc/cpuinfo cache data  
  cache size : 14080 KB  

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 2 nodes (0-1)  
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29  
  node 0 size: 385244 MB  
  node 0 free: 378376 MB  
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39  
  node 1 size: 387029 MB  
  node 1 free: 383555 MB  
  node distances:  
  node 0 1  
  0: 10 21  
  1: 10 21  

From /proc/meminfo  
  MemTotal: 790809188 kB  
  Hugene Pages_Total: 0  
  Hugene Pagesize: 2048 KB  

/sbin/tuned-adm active  
  Current active profile: throughput-performance  

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance  

From /etc/*release*/etc/*version*  
  os-release:  
    NAME="Red Hat Enterprise Linux"  
    VERSION="8.4 (Ootpa)"  
    ID=rhel  
    ID_LIKE="fedora"  
    VERSION_ID="8.4"  
    PLATFORM_ID="platform:el8"  
    PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"  
    ANSI_COLOR="0;31"  
  redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
```
(Continued on next page)
xFusion CH121 V5 (Intel Xeon Silver 4210R)

CPU2017 License: 6488
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Test Date: Jan-2023
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Platform Notes (Continued)

system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:
Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): KVM: Mitigation: Split huge pages
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapsgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected

run-level 3 Jan 12 21:20

SPEC is set to: /spec2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   859G   36G  824G   5% /

From /sys/devices/virtual/dmi/id
Vendor: XFUSION
Product: CH121 V5
Product Family: Purley
Serial: Serial

Additional information from dmidecode 3.2 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:
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2400

BIOS:
BIOS Vendor: XFUSION
BIOS Version: 8.37
BIOS Date: 08/25/2022
BIOS Revision: 8.37

(End of data from sysinfo program)

Compiler Version Notes

(Continued on next page)
Compiler Version Notes (Continued)

C++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
============================================================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------------------------
Fortran | 548.exchange2_r(base)
----------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

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 -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4

(Continued on next page)
xFusion

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Base Optimization Flags (Continued)

C benchmarks (continued):
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-CSL-V1.1.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-CSL-V1.1.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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