**xFusion**

xFusion 1288H V6 (Intel Xeon Platinum 8352S)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>447</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 6488  
**Test Sponsor:** xFusion  
**Tested by:** xFusion  
**Test Date:** Apr-2022  
**Hardware Availability:** Apr-2021  
**Software Availability:** Sep-2021  

**Copies**

<table>
<thead>
<tr>
<th>SpecTool</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>128</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>128</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>128</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>128</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>128</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>128</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>128</td>
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<tr>
<td>526.blender_r</td>
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<tr>
<td>527.cam4_r</td>
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<td>538.imagick_r</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>128</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>128</td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base (447)**

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8352S  
- **Max MHz:** 3400  
- **Nominal:** 2200  
- **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:** 1.25 MB I+D on chip per core  
- **L3:** 48 MB I+D on chip per core  
- **Other:** None  
- **Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None  

**Software**

- **OS:** Red Hat Enterprise Linux release 8.4 (Ootpa) 4.18.0-305.el8.x86_64  
- **Compiler:** C/C++: Version 2021.4.0 of Intel oneAPI DPC++/C++ Compiler Build 20210924 for Linux;  
  Fortran: Version 2021.4.0 of Intel Fortran Compiler Classic Build 20210910 for Linux  
- **Parallel:** No  
- **Firmware:** Version 0.95 Released Dec-2021  
- **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
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>526.blender_r</td>
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<tr>
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<td>1225</td>
<td>166</td>
</tr>
</tbody>
</table>

**SPECratenfp_base = 447**

**SPECratenfp_peak = Not Run**

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/lib/intel64:/spec2017/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:

`(Continued on next page)`
General Notes (Continued)

sync; echo 3 > /proc/sys/vm/drop_caches
runcpu command invoked through numacl i.e.: 
numactl --interleave=all runcpu <etc>
NA: The test sponsor atest, as of date of publication, that CVE-2017-5754 (Meltdown) 
is mitigated in the system as tested and documented.
Yes: The test sponsor atest, 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 atest, 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 Enabled SNC2 (2-clusters)

Sysinfo program /spec2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Tue Apr 19 03:56:03 2022

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) Platinum 8352S CPU @ 2.20GHz
  2 "physical id"s (chips)
  128 "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 : 32
siblings : 64
physical 0: cores 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 30 31
physical 1: cores 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 30 31

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): 128
On-line CPU(s) list: 0-127

(Continued on next page)
Platform Notes (Continued)

Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8352S CPU @ 2.20GHz
BIOS Model name: Intel(R) Xeon(R) Platinum 8352S CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2800.000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
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
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf 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 eb kt_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erd invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsave xsavec xsaveopt xsaves cqm_llc cqm_occ bunch cqm_mbb bmb bs mb bmb local split_lock detect wbinvd dtherm ida arat pln pts hwp epp avx12vbmi umip pku ospe avx512_vbmi2 gfn vaes vpclmulqd eqv512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid fslr md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 49152 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 65 66 67 68 69 70 71 72 73 74 75
  76 77 78 79
node 0 size: 128024 MB
node 0 free: 119732 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88

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

xFusion

xFusion 1288H V6 (Intel Xeon Platinum 8352S)

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CPU2017 License: 6488
Test Sponsor: xFusion
Test Date: Apr-2022
Hardware Availability: Apr-2021
Tested by: xFusion
Software Availability: Sep-2021

Platform Notes (Continued)

89 90 91 92 93 94 95
node 1 size: 129017 MB
dnode 1 free: 122446 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111
node 2 size: 129017 MB
node 2 free: 122383 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
node 3 size: 128977 MB
node 3 free: 121982 MB
node distances:
nnode 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 527397084 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release* /etc/*version*

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)
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): Not affected

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

xFusion

xFusion 1288H V6 (Intel Xeon Platinum 8352S)

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

Test Date: Apr-2022
Hardware Availability: Apr-2021
Software Availability: Sep-2021

Platform Notes (Continued)

- 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/swapgs 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
- CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 19 00:04

SPEC is set to: /spec2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>xfs</td>
<td>859G</td>
<td>116G</td>
<td>744G</td>
<td>14%</td>
<td>/</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

Vendor: XFUSION
Product: 1288H V6
Product Family: Whitley
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:
16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

BIOS:

<table>
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<tr>
<th>BIOS Vendor: INSYDE Corp.</th>
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<tbody>
<tr>
<td>BIOS Version: 0.95</td>
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<tr>
<td>BIOS Date: 12/22/2021</td>
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<tr>
<td>BIOS Revision: 0.95</td>
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(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
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<th>C</th>
<th>519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)</th>
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(Continued on next page)
## SPEC CPU®2017 Floating Point Rate Result

**xFusion**

**xFusion 1288H V6 (Intel Xeon Platinum 8352S)**

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**Test Sponsor:** xFusion  
**Test Date:** Apr-2022  
**Tested by:** xFusion  
**Hardware Availability:** Apr-2021  
**Software Availability:** Sep-2021

### Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2021.4.0 Build 20210924  
Copyright (C) 1985-2021 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 2021.4.0 Build 20210924  
Copyright (C) 1985-2021 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 2021.4.0 Build 20210924  
Copyright (C) 1985-2021 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 2021.4.0 Build 20210924  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2021.4.0 Build 20210924  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
```

```
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.4.0 Build 20210910_000000  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
```

```
Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
```

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.4.0 Build 20210910_000000  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
**Compiler Version Notes (Continued)**

| Fortran, C | 521.wrf_r(base) 527.cam4_r(base) |

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.4.0 Build 20210910_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.4.0 Build 20210924
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

---

**Base Compiler Invocation**

**C benchmarks:**
<icx>

**C++ benchmarks:**
<icpx>

**Fortran benchmarks:**
<ifort>

**Benchmarks using both Fortran and C:**
<ifort icx>

**Benchmarks using both C and C++:**
<icpx icx>

**Benchmarks using Fortran, C, and C++:**
<icpx icx ifort>

---

**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.ibm_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

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

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xFusion 1288H V6 (Intel Xeon Platinum 8352S)

SPECrate®2017_fp_base = 447
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CPU2017 License: 6488
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Base Portability Flags (Continued)

549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-ipo -ffinite-math-only
-qopt-prefetch -ffinite-math-only
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -m64 -std=c11 -Wl,-z muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles

(Continued on next page)
## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- mbranches-within-32B-boundaries
- 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

You can also download the XML flags sources by saving the following links: