xFusion
FusionServer 2288H V7 (Intel Xeon Platinum 8490H)

**SPEC CPU®2017 Floating Point Speed Result**

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

**Tested by:** xFusion
**Hardware Availability:** May-2022

**Software Availability:**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
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<tbody>
<tr>
<td>0</td>
<td>48</td>
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</tr>
<tr>
<td>120</td>
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**Hardware**

**CPU Name:** Intel Xeon Platinum 8490H
**Max MHz:** 3500
**Nominal:** 1900
**Enabled:** 120 cores, 2 chips
**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:** 112.5 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 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
**Parallel:** Yes
**Firmware:** Version 2.00.35 Released Nov-2022
**File System:** xfs
**System State:** Run level 5 (multi-user)
**Base Pointers:** 64-bit
**Peak Pointers:** Not Applicable
**Other:** jemalloc memory allocator V5.0.1
**Power Management:** OS set to prefer performance at the cost of additional power usage

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<td>534</td>
<td>534</td>
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### 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:
- KMP_AFFINITY = "granularity=fine,compact"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

### General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Redhat Enterprise Linux 8.0

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
```

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.

jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
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<tr>
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</tr>
</tbody>
</table>

**General Notes (Continued)**


**Platform Notes**

BIOS configuration:
Performance Profile Set to Load Balance
Enable LP [Global] Set to Single LP

Sysinfo program /spec2017-2022.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d46
running on localhost.localdomain Mon Dec 5 21:49:25 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 8490H
  2 "physical id"s (chips)
  120 "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 : 60
siblings : 60
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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59
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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59

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): 120
On-line CPU(s) list: 0-119
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) Platinum 8490H
BIOS Model name: Intel(R) Xeon(R) Platinum 8490H
CPU family: 6
Model: 143
Thread(s) per core: 1
Core(s) per socket: 60

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

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**Tested by:** xFusion  
**Test Date:** Dec-2022  
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**Software Availability:** May-2022

**Platform Notes (Continued)**

- **Socket(s):** 2
- **Stepping:** 6
- **Frequency boost:** enabled
- **CPU max MHz:** 1901.0000
- **CPU min MHz:** 800.0000
- **BogoMIPS:** 3800.00
- **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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor 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_pdpin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr Shadow vmmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bni avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaves cqm_pll cqm_occip_pll cqm_mbb_total cqm_mbb_local split_lock_detect avx_vnni avx512_bf16 wbinvd dtcbranch ida arat pin pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfnf gfnf vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdir movdir64b enqcmd fsc md_clear serialize tsxldtrk pconf config arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities

- **Virtualization:** VT-x

From `lscpu --cache`:

<table>
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<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
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<th>TYPE</th>
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<td>32K</td>
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<td>8</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>240M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
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Platform Notes (Continued)

L3  112.5M  225M  15 Unified  3 122880  1  64

/proc/cpuinfo cache data
  cache size : 115200 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
  node 0 size: 257060 MB
  node 0 free: 254034 MB
  node 1 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84
  node 1 size: 258024 MB
  node 1 free: 257269 MB
  node distances:
  node 0 size: 257060 MB
  node 0 free: 254034 MB
  node 1 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84
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          node 1 size: 258024 MB
          node 1 free: 257269 MB
          node distances:

From /proc/meminfo
MemTotal: 527447180 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
It seems that tuned daemon is not running, preset profile is not activated.
Preset 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="9.0 (Plow)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="9.0"
    PLATFORM_ID="platform:el9"
    PRETTY_NAME="Red Hat Enterprise Linux 9.0 (Plow)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 9.0 (Plow)
system-release: Red Hat Enterprise Linux release 9.0 (Plow)
(Continued on next page)
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Platform Notes (Continued)

```bash
system-release-cpe: cpe:/o:redhat:enterprise_linux:9::baseos

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

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass):
    Mitigation: Speculative Store Bypass disabled via prctl
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitation
CVE-2017-5715 (Spectre variant 2):
    Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Dec 5 21:18

SPEC is set to: /spec2017-2022.1
    Filesystem Type  Size  Used Avail Use% Mounted on
    /dev/sda3      xfs  420G  142G  278G  34% /

From /sys/devices/virtual/dmi/id
    Product: 2288H V7
    Product Family: Eagle Stream

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 Hynix HMCG88AEBA107N 32 GB 2 rank 4800

BIOS:
    BIOS Vendor:
    BIOS Version: 2.00.35
    BIOS Date: 11/30/2022
    BIOS Revision: 0.35

(End of data from sysinfo program)
## Compiler Version Notes

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### Base Compiler Invocation

C benchmarks:

```bash
icx
```

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Base Compiler Invocation (Continued)

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

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

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

**xFusion**

### FusionServer 2288H V7 (Intel Xeon Platinum 8490H)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 365</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak = Not Run</td>
</tr>
</tbody>
</table>

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

| Test Date: Dec-2022 |
| Hardware Availability: Jan-2023 |
| Software Availability: May-2022 |

### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

- `-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto`  
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -flopenmp`  
- `-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto`  
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

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:

- [http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-SPR-V1.0-revB.xml](http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-SPR-V1.0-revB.xml)

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.8 on 2022-12-05 21:49:24-0500.  
Report generated on 2023-01-10 19:01:12 by CPU2017 PDF formatter v6442.  
Originally published on 2023-01-10.