**SPEC CPU®2017 Integer Rate Result**  
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### xFusion

xFusion 2288H V6 (Intel Xeon Platinum 8351N)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base =</th>
<th>246</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_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

**Operating System:**  
**OS:** Red Hat Enterprise Linux release 8.4 (Ootpa)  
**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:** None  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

---

**Hardware**

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Platinum 8351N</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3500</td>
</tr>
<tr>
<td>Nominal</td>
<td>2400</td>
</tr>
<tr>
<td>Enabled</td>
<td>36 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>54 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (8 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
</tbody>
</table>

---

**Software**

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Red Hat Enterprise Linux release 8.4 (Ootpa) 4.18.0-305.el8.x86_64</td>
</tr>
<tr>
<td>Compiler</td>
<td></td>
</tr>
</tbody>
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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>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>72</td>
<td>639</td>
<td>179</td>
<td>636</td>
<td>180</td>
<td>639</td>
<td>179</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>72</td>
<td>549</td>
<td>186</td>
<td>549</td>
<td>186</td>
<td>550</td>
<td>185</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>72</td>
<td>301</td>
<td>387</td>
<td>303</td>
<td>384</td>
<td>301</td>
<td>386</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>72</td>
<td>691</td>
<td>137</td>
<td>888</td>
<td>137</td>
<td>690</td>
<td>137</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>72</td>
<td>246</td>
<td>309</td>
<td>245</td>
<td>310</td>
<td>245</td>
<td>311</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>72</td>
<td>241</td>
<td>524</td>
<td>240</td>
<td>526</td>
<td>240</td>
<td>526</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>72</td>
<td>418</td>
<td>198</td>
<td>416</td>
<td>198</td>
<td>415</td>
<td>199</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>72</td>
<td>615</td>
<td>194</td>
<td>619</td>
<td>193</td>
<td>620</td>
<td>192</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>72</td>
<td>347</td>
<td>543</td>
<td>347</td>
<td>544</td>
<td>347</td>
<td>544</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>72</td>
<td>564</td>
<td>138</td>
<td>566</td>
<td>137</td>
<td>568</td>
<td>137</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/lib/intel64:/spec2017/lib/ia32:/spec2017/je5.0.1-32"
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
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.:
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| SPECrate®2017_int_base = 246 |
| SPECrate®2017_int_peak = Not Run |

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

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

General Notes (Continued)

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:
Performance Profile Set to Performance
SNC Set to Enabled SNC2 (2-clusters)

Sysinfo program /spec2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aaca6d4
running on localhost.localdomain Wed Apr 27 04:42:50 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 8351N CPU @ 2.40GHz
  1 "physical id"s (chips)
  72 "processors"
core, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 36
siblings : 72
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

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): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 36
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6

(Continued on next page)
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Platform Notes (Continued)

Model: 106
Model name: Intel(R) Xeon(R) Platinum 8351N CPU @ 2.40GHz
BIOS Model name: Intel(R) Xeon(R) Platinum 8351N CPU @ 2.40GHz
Stepping: 6
CPU MHz: 799.971
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 55296K
NUMA node0 CPU(s): 0-17,36-53
NUMA node1 CPU(s): 18-35,54-71
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 art 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 xtrm pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx fl64c rdrand lahf_lm abm 3drnowprefetch cpuid_fault epb cat13 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmrd_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xsavec xsaveopt xsavec xsaveopt xsavec xsaveopt xsaves cmq_llc cmq_occucc llc cmq mbm total cmq mbm local split_lock detect wbinvd dtherm ida arat pln pts hwp epp avx512vbmi umip pku ospke avx512_vbmi12 gfn vaes vpcmtdq avx512_vnni avx512_bitalg tme avx512_vvpopcntdq la57 rdpid fscr md clear pconfig flush_lld arch_capabilities

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 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
node 0 size: 128112 MB
node 0 free: 127380 MB
node 1 cpus: 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
node 1 size: 129013 MB
node 1 free: 128009 MB
node distances:
node 0 1
0: 10 11
1: 11 10

(Continued on next page)
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**Test Sponsor:** xFusion  
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**Platform Notes (Continued)**

MemTotal: 263297356 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/sbin/tuned-adm active

Current active profile: throughput-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)
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
- **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 and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swaps barriers and __user pointer sanitization
- **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 3 Apr 27 04:41

SPEC is set to: /spec2017

```
Filesystem  Type  Size  Used  Avail  Use% Mounted on
/dev/sda3    xfs  420G  99G  322G   24%  /
```

(Continued on next page)
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Tested by: xFusion

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
Vendor: XFUSION
Product: 2288H V6
Product Family: Whitley
Serial: 1234567

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:
8x Samsung M393A4G43AB3-CWE 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: INSYDE Corp.
BIOS Version: 0.95
BIOS Date: 12/22/2021
BIOS Revision: 0.95

(End of data from sysinfo program)

Compiler Version Notes

C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
   525.x264_r(base) 557.xz_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++ | 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 2021.4.0 Build 20210924
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on

(Continued on next page)
xFusion

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Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.4.0 Build 20210910_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

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
-mbranches-within-32B-boundaries
-L/usr/local/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin
-1qkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries

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### Base Optimization Flags (Continued)

- **C++ benchmarks (continued):**
  - `-L/usr/local/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin`
  - `-lqkmalloc`

- **Fortran benchmarks:**
  - `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`
  - `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
  - `-auto -mbranches-within-32B-boundaries`
  - `-L/usr/local/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin`
  - `-lqkmalloc`

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:


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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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