Supermicro
SuperServer SYS-211E-FRD2N2T
(X13SEM-TF, Intel Xeon Platinum 8490H)

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Intel Supermicro

Hardware
CPU Name: Intel Xeon Platinum 8490H
Max MHz: 3500
Nominal: 1900
Enabled: 60 cores, 1 chip
Orderable: 1 chip
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
(8 x 64 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 600 GB SATA III SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 15 SP4
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 1.0c released Jan-2023 tested as Nov-2022
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 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 Speed Result
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SPECspeed®2017_int_base = 13.5
SPECspeed®2017_int_peak = 13.7

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Hardware Availability: Jan-2023
Tested by: Intel Supermicro
Software Availability: Sep-2022

600.perlbench_s 60
602.gcc_s 60
605.mcf_s 60
620.omnetpp_s 60
623.xalancbmk_s 60
625.x264_s 60
631.deepsjeng_s 60
641.leela_s 60
648.exchange2_s 60
657.xz_s 60

Threads

<table>
<thead>
<tr>
<th>Test</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tr>
<td>perlbench</td>
<td>8.49</td>
<td>9.51</td>
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<tr>
<td>gcc</td>
<td>11.4</td>
<td>21.3</td>
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<tr>
<td>mcf</td>
<td>11.9</td>
<td>25.9</td>
</tr>
<tr>
<td>omnetpp</td>
<td>11.0</td>
<td>19.8</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>6.62</td>
<td>20.4</td>
</tr>
<tr>
<td>x264</td>
<td>5.20</td>
<td>20.6</td>
</tr>
<tr>
<td>deepsjeng</td>
<td>6.62</td>
<td>23.9</td>
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<tr>
<td>leela</td>
<td>5.20</td>
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<tr>
<td>exchange2</td>
<td>6.62</td>
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<td>xz</td>
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</tr>
<tr>
<td>Total</td>
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Supermicro
SuperServer SYS-211E-FRDN2T
(X13SEM-TF, Intel Xeon Platinum 8490H)

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Intel Supermicro

Specspeed®2017_int_base = 13.5
Specspeed®2017_int_peak = 13.7

Results Table

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<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>8.49</td>
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<td>gcc_s</td>
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<td>11.0</td>
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<td>55.1</td>
<td>25.7</td>
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<td>leela_s</td>
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<td>328</td>
<td>5.20</td>
<td>327</td>
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<tr>
<td>exchange2_s</td>
<td>60</td>
<td>143</td>
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<td>20.6</td>
<td>143</td>
<td>20.6</td>
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<tr>
<td>xz_s</td>
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<td>23.9</td>
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<td>23.9</td>
<td>259</td>
<td>23.9</td>
<td>60</td>
<td>259</td>
<td>23.9</td>
<td>259</td>
</tr>
</tbody>
</table>

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalanchmk_r / 623.xalanchmk_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.

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,scatter"
LD_LIBRARY_PATH = "/root/cpu22017-1.1.8/lib/intel64:/root/cpu22017-1.1.8/je5.0.1-64"
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

(Continued on next page)
SPEC CPU®2017 Integer Speed Result
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Test Sponsor: Supermicro
Tested by: Intel Supermicro

SPECspeed®2017_int_base = 13.5
SPECspeed®2017_int_peak = 13.7

Test Date: Dec-2022
Hardware Availability: Jan-2023
Software Availability: Sep-2022

General Notes (Continued)

Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
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.
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.
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.


Platform Notes

BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
SNC = Enable SNC4 (4-Clusters)
KTI Prefetch = Enable
LLC Dead Line Alloc = Disable
DCU Streamer Prefetcher = Disable
Hyper-Threading [ALL] = Disable

Sysinfo program /root/cpu22017-1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on 139-164 Sun Dec 4 03:20:04 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
  1 "physical id"s (chips)
  60 "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

From lscpu from util-linux 2.37.2:
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): 60
On-line CPU(s) list: 0-59
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8490H
CPU family: 6
Model: 143
Thread(s) per core: 1
Core(s) per socket: 60
Socket(s): 1

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

**Supermicro**

SuperServer SYS-211E-FRDN2T
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| SPECspeed®2017_int_base = 13.5 |
| SPECspeed®2017_int_peak = 13.7 |

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Intel Supermicro

---

**Platform Notes (Continued)**

| Stepping: | 6 |
| CPU max MHz: | 3500.000 |
| CPU min MHz: | 800.000 |
| BogoMIPS: | 3800.00 |

- **Flags:**
  - fp
  - vme
  - de
  - pse
  - tsc
  - msr
  - pae
  - mce
  - cx8
  - apic
  - sep
  - mtrr
  - pge
  - mca
  - cmov
  - pat
  - pse36
  - cmov
  - cx16
  - xptr
  - pdcm
  - pclid
  - dca
  - sse4_1
  - sse4_2
  - x2apic
  - movbe
  - popcnt
  - tsc_deadline_timer
  - aes
  - xsave
  - f16c
  - rdrand
  - lahf_lm
  - ahf
  - lms
  - f3sgsbase
  - bmi
  - bmi2
  - ce
  - xcompr
  - ael
  - pdemp
  - pni
  - pclmulqdq
  - dtes64
  - mti
  - pbe
  - syscall
  - nx
  - pdpe1gb
  - rdtscp
  - lm
  - constant_tsc
  - acpica
  - isle
  - bits
  - rep_good
  - npack
  - xtopology
  -ivol
  - virt
  - vms趑
  - pcr
  - cpuid

- **Virtualization:** VT-x

- **L1d cache:** 2.8 MiB (60 instances)
- **L1i cache:** 1.9 MiB (60 instances)
- **L2 cache:** 120 MiB (60 instances)
- **L3 cache:** 112.5 MiB (1 instance)

- **NUMA node(s):** 4
- **NUMA node0 CPU(s):** 0-14
- **NUMA node1 CPU(s):** 15-29
- **NUMA node2 CPU(s):** 30-44
- **NUMA node3 CPU(s):** 45-59

- **Vulnerability L1tf:** Not affected
- **Vulnerability Mds:** Not affected
- **Vulnerability Meltdown:** Not affected
- **Vulnerability Spectre v1:** Mitigation; usercopy/swapgs barriers and __user pointer sanitization
- **Vulnerability Spectre v2:** Mitigation; Enhanced IBRS, IBPB conditional, RSB filling

From lscpu --cache:

From numactl --hardware

---

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

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SPECspeed®2017_int_base = 13.5
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Platform Notes (Continued)

node 1 size: 129020 MB
node 1 free: 125936 MB
node 2 cpus: 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44
node 2 size: 129020 MB
node 2 free: 126022 MB
node 3 cpus: 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
node 3 size: 128991 MB
node 3 free: 125267 MB
node distances:
  node 0  1  2  3
  0: 10 12 12 12
  1: 12 10 12 12
  2: 12 12 10 12
  3: 12 12 12 10

From /proc/meminfo
MemTotal: 528034504 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

From /etc/*release* /etc/*version*
os-release:
  NAME="SLES"
  VERSION="15-SP4"
  VERSION_ID="15.4"
  PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
  ID="sles"
  ID_LIKE="suse"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:
Linux 139-164 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC
2022 (49db222) 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, RBB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Dec 3 21:04

SPEC is set to: /root/cpu2017-1.1.8
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 559G 170G 389G 31% /root

(Continued on next page)
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Hardware Availability: Jan-2023
Software Availability: Sep-2022

**Platform Notes (Continued)**

From /sys/devices/virtual/dmi/id
Vendor: Supermicro
Product: Super Server
Product Family: SMC X13
Serial: 0123456789

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 Micron Technology MTC40F2046S1RC48BA1 64 GB 2 rank 4800

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 1.0c
BIOS Date: 11/30/2022
BIOS Revision: 5.29

(End of data from sysinfo program)

**Compiler Version Notes**

```
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------------------------------------
```

```
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------------------------------------
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 | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------------------------------------
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

(Continued on next page)
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Test Date: Dec-2022
Hardware Availability: Jan-2023
Software Availability: Sep-2022

Base Compiler Invocation (Continued)

Fortran benchmarks:
ifx

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icx

(Continued on next page)
Peak Compiler Invocation (Continued)

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.proftdata(pass 2) -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -fno-strict-overflow -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.proftdata(pass 2) -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes
Supermicro
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SPECspeed®2017_int_base = 13.5
SPECspeed®2017_int_peak = 13.7

Peak Optimization Flags (Continued)

631.deepsjeng_s: basepeak = yes
641.leela_s: basepeak = yes
Fortran benchmarks:
648.exchange2_s: basepeak = yes

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/Supermicro-Platform-Settings-V1.2-SPR-revC.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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