Huawei CH225 V5 (Intel Xeon Silver 4210)

SPECrater2017_int_base = 110
SPECrater2017_int_peak = Not Run

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Mar-2019
CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Mar-2019

Hardware
CPU Name: Intel Xeon Silver 4210
Max MHz.: 3200
Nominal: 2200
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
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)
Storage: 1 x 12000 GB SAS, 10000 RPM
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
4.12.14-94.41-default
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
Compiler Build 20181018 for Linux:
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build 20181018 for Linux
Parallel: No
Firmware: Version 6.52 Released Mar-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None

Tested by: Huawei
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Test Sponsor: Huawei
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Copies
500.perlbench_r 40
502.gcc_r 40
505.mcf_r 40
520.omnetpp_r 40
523.xalanchmk_r 40
525.x264_r 40
531.deepsjeng_r 40
541.leela_r 40
548.exchange2_r 40
557.xz_r 40

SPECrate2017_int_peak = Not Run

Copyright 2017-2019 Standard Performance Evaluation Corporation
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>
<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>40</td>
<td>751</td>
<td>84.8</td>
<td>752</td>
<td>84.6</td>
<td>757</td>
<td>84.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>40</td>
<td>608</td>
<td>93.2</td>
<td>606</td>
<td>93.4</td>
<td>610</td>
<td>92.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>40</td>
<td>423</td>
<td>153</td>
<td>422</td>
<td>153</td>
<td>423</td>
<td>153</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>40</td>
<td>696</td>
<td>75.4</td>
<td>694</td>
<td>75.6</td>
<td>696</td>
<td>75.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>40</td>
<td>321</td>
<td>131</td>
<td>322</td>
<td>131</td>
<td>322</td>
<td>131</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>40</td>
<td>338</td>
<td>207</td>
<td>337</td>
<td>208</td>
<td>337</td>
<td>208</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>40</td>
<td>499</td>
<td>91.8</td>
<td>500</td>
<td>91.7</td>
<td>500</td>
<td>91.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>40</td>
<td>796</td>
<td>83.2</td>
<td>795</td>
<td>83.3</td>
<td>796</td>
<td>83.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>40</td>
<td>544</td>
<td>192</td>
<td>543</td>
<td>193</td>
<td>544</td>
<td>193</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>40</td>
<td>587</td>
<td>73.6</td>
<td>587</td>
<td>73.6</td>
<td>587</td>
<td>73.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 110
SPECrate2017_int_peak = Not Run

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"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/spec/lib/ia32/:/spec/lib/intel64/:/spec/je5.0.1-32/:/spec/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesysteam 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>
Yes: 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)
Huawei

Huawei CH225 V5 (Intel Xeon Silver 4210)

SPECrater2017_int_base = 110
SPECrater2017_int_peak = Not Run

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

General Notes (Continued)
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 /spec/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sles12sp4 Thu Mar 28 12:40:34 2019

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 4210 CPU @ 2.20GHz
 2 "physical id"s (chips)
 40 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
eccrpts 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:
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
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2200.000
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x

(Continued on next page)
## SPEC CPU2017 Integer Rate Result

### Huawei CH225 V5 (Intel Xeon Silver 4210)

**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Tested by:** Huawei

### SPECrate2017_int_base = 110  
**SPECrate2017_int_peak = Not Run**

**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Dec-2018

---

### Platform Notes (Continued)

- **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 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 aperf perf层面 pi pclmulqdq dtes64 ds_many vmx smx est tm2 ssse3 sdbg fma cx16 xtrig pdcm pcid dca ssse4 1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat _13 cp _13 cpuid_single ssbd mba ibrs ibpb stibp tpr_shadow vmni flexpriority ept vpid fsŐsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdms rdt cm qmq mp jc rdt a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavees cmq _llc cmq _occup _llc cmq _mbm _total cmq _mbm _local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data  
```bash  
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 20 21 22 23 24 25 26 27 28 29  
ode 0 size: 191904 MB  
ode 0 free: 182104 MB  
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39  
ode 1 size: 193278 MB  
ode 1 free: 185313 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10
```

From `/proc/meminfo`  
```
MemTotal: 394426740 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

From `/etc/*release*`  
```
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)  
VERSION = 12  
PATCHLEVEL = 4  
```

# This file is deprected and will be removed in a future service pack or release.  
# Please check /etc/os-release for details about this release.

(Continued on next page)
Huawei
Huawei CH225 V5 (Intel Xeon Silver 4210)

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

SPECrate2017_int_base = 110
SPECrate2017_int_peak = Not Run

Platform Notes (Continued)

os-release:
   NAME="SLES"
   VERSION="12-SP4"
   VERSION_ID="12.4"
   PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
   ID="sles"
   ANSI_COLOR="0;32"
   CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Mar 26 21:15

SPEC is set to: /spec
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda3      xfs   849G   30G  819G   4% /

Additional information from dmidecode 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.

BIOS INSYDE Corp. 6.52 03/16/2019
Memory:
   24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

----------------------------------------------------------------------------------------
 CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
     557.xz_r(base)
----------------------------------------------------------------------------------------

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
   Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
Huawei

Huawei CH225 V5 (Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 110</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

---

Compiler Version Notes (Continued)

CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
541.leela_r(base)

Intel (R) C++ Intel (R) 64 Compiler for applications running on Intel (R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

---

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
### Huawei CH225 V5 (Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>SPECrate2017 int_base = 110</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017 int_peak = Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License: 3175</th>
<th>Test Date: Mar-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Huawei</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Huawei</td>
<td>Software Availability: Dec-2018</td>
</tr>
</tbody>
</table>

#### Base Optimization Flags

**C benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-lqkmalloc`

**C++ benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-lqkmalloc`

**Fortran benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-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:

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.5 on 2019-03-28 12:40:33-0400.