**Huawei**

Huawei 2288H V5 (Intel Xeon Platinum 8280)

**SPECrate2017_int_base = 181**

**SPECrate2017_int_peak = Not Run**

**CPU2017 License:** 3175
**Test Date:** Feb-2019
**Test Sponsor:** Huawei
**Hardware Availability:** Apr-2019
**Tested by:** Huawei
**Software Availability:** Dec-2018

### Hardware

- **CPU Name:** Intel Xeon Platinum 8280
- **Max MHz.:** 4000
- **Nominal:** 2700
- **Enabled:** 28 cores, 1 chip, 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:** 38.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 1200 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 6.36 Released Feb-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
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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>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>56</td>
<td>600</td>
<td>148</td>
<td>602</td>
<td>148</td>
<td>600</td>
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<tr>
<td>502.gcc_r</td>
<td>56</td>
<td>553</td>
<td>143</td>
<td>548</td>
<td>145</td>
<td>543</td>
<td>146</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>56</td>
<td>391</td>
<td>231</td>
<td>390</td>
<td>232</td>
<td>389</td>
<td>233</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>56</td>
<td>659</td>
<td>112</td>
<td>658</td>
<td>112</td>
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<tr>
<td>523.xalanckmk_r</td>
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<td>187</td>
<td>316</td>
<td>187</td>
<td>314</td>
<td>189</td>
</tr>
<tr>
<td>525.x264_r</td>
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<td>261</td>
<td>375</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>56</td>
<td>402</td>
<td>160</td>
<td>402</td>
<td>159</td>
<td>402</td>
<td>160</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>56</td>
<td>617</td>
<td>150</td>
<td>636</td>
<td>146</td>
<td>636</td>
<td>146</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>56</td>
<td>436</td>
<td>337</td>
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<td>337</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>56</td>
<td>486</td>
<td>124</td>
<td>487</td>
<td>124</td>
<td>485</td>
<td>125</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"

General Notes

Environment variables set by runcpu before the start of the run:

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
Filesystem 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

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General Notes (Continued)

is mitigated in the system as tested and documented.

Platform Notes

BIOS configuration:
Power Policy Set to Performance
SNC Set to Enabled
IMC Interleaving Set to 1-way Interleave
XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-tr2u Tue Nov 13 18:58:46 2018

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 8280 CPU @ 2.70GHz
  1 "physical id"s (chips)
  56 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000

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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  
**Test Date:** Feb-2019  
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**Platform Notes (Continued)**

- **BogoMIPS:** 5400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K
- **NUMA node0 CPU(s):** 0-3,7-9,14-17,21-23,28-31,35-37,42-45,49-51
- **NUMA node1 CPU(s):** 4-6,10-13,18-20,24-27,32-34,38-41,46-48,52-55
- **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 xtpr pdcm pclcfld dveret stp mtrr pse microcode cpb cpb_mem cpb_cpn cpb_wwp cpb_wwp_size intel_pt xtruncpd xtpackd xtruncpdSize ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  
- **/proc/cpuinfo cache data**  
  - cache size : 39424 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 7 8 9 14 15 16 17 21 22 23 28 29 30 31 35 36 37 42 43 44 45 49 50 51  
node 0 size: 191902 MB  
node 0 free: 191298 MB  
node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 32 33 34 38 39 40 41 46 47 48 52 53 54 55  
node 1 size: 193275 MB  
node 1 free: 192793 MB  
node distances:  
node 0 1  
0: 10 11  
1: 11 10

From /proc/meminfo  
MemTotal: 394422700 KB  
 HugePages_Total: 0  
 Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*  
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)
Huawei 2288H V5 (Intel Xeon Platinum 8280)

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Platform Notes (Continued)

VERSION = 12
PATCHLEVEL = 4
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.

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

run-level 3 Nov 13 18:51

SPEC is set to: /spec2017
  Filesystem  Type  Size  Used  Avail  Use% Mounted on
  /dev/sda3   xfs   882G  100G  783G  12% /

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. 6.36 02/15/2019
  Memory:
    12x NO DIMM NO DIMM
    12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(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
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**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
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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
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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:
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-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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