Huawei 2288H V5 (Intel Xeon Platinum 8280)

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

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<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base (10.7)</th>
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<tr>
<td>600.perlbench_s 56</td>
<td>6.98</td>
</tr>
<tr>
<td>602.gcc_s 56</td>
<td>10.7</td>
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<tr>
<td>605.mcf_s 56</td>
<td>13.5</td>
</tr>
<tr>
<td>620.omnetpp_s 56</td>
<td>9.71</td>
</tr>
<tr>
<td>623.xalancbmk_s 56</td>
<td>12.8</td>
</tr>
<tr>
<td>625.x264_s 56</td>
<td>14.9</td>
</tr>
<tr>
<td>631.deepsjeng_s 56</td>
<td>5.64</td>
</tr>
<tr>
<td>641.leela_s 56</td>
<td>4.90</td>
</tr>
<tr>
<td>648.exchange2_s 56</td>
<td>14.5</td>
</tr>
<tr>
<td>657.xz_s 56</td>
<td>25.4</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Platinum 8280
Max MHz.: 4000
Nominal: 2700
Enabled: 56 cores, 2 chips
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 (24 x 16 GB 2Rx8 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: Yes
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: jemalloc memory allocator V5.0.1
SPEC CPU2017 Integer Speed Result

Huawei
Huawei 2288H V5 (Intel Xeon Platinum 8280)

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

Results Table

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<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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</tr>
</thead>
<tbody>
<tr>
<td>600:perlbench_s</td>
<td>56</td>
<td>255</td>
<td>6.96</td>
<td>254</td>
<td>6.98</td>
<td>253</td>
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<td>56</td>
<td>254</td>
<td>6.98</td>
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<td>7.01</td>
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<tr>
<td>602:gcc_s</td>
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<td>10.6</td>
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<td>10.7</td>
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<td>10.7</td>
<td>372</td>
<td>10.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>605:mcf_s</td>
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<td>13.5</td>
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<td>13.5</td>
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<td>13.5</td>
<td>352</td>
<td>13.4</td>
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<td></td>
</tr>
<tr>
<td>623:xalancbmk_s</td>
<td>56</td>
<td>111</td>
<td>12.8</td>
<td>110</td>
<td>12.9</td>
<td>111</td>
<td>12.8</td>
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<td>625:x264_s</td>
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<td>119</td>
<td>14.8</td>
<td>119</td>
<td>14.9</td>
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<td>14.9</td>
<td></td>
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<td>631:deepsjeng_s</td>
<td>56</td>
<td>254</td>
<td>5.65</td>
<td>254</td>
<td>5.64</td>
<td>254</td>
<td>5.64</td>
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<td>641:leela_s</td>
<td>56</td>
<td>348</td>
<td>4.90</td>
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<td>4.90</td>
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<td>4.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>648:exchange2_s</td>
<td>56</td>
<td>203</td>
<td>14.5</td>
<td>203</td>
<td>14.5</td>
<td>203</td>
<td>14.5</td>
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<td>14.5</td>
<td>203</td>
<td>14.5</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>56</td>
<td>243</td>
<td>25.5</td>
<td>243</td>
<td>25.4</td>
<td>243</td>
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<td>243</td>
<td>25.5</td>
<td>243</td>
<td>25.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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:
KMP_AFFINITY = "granularity=fine,compact,1,0"
OMP_STACKSIZE = "192M"

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
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) is mitigated in the system as tested and documented.
**Huawei**

Huawei 2288H V5 (Intel Xeon Platinum 8280)

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

---

### Platform Notes

BIOS configuration:
- Power Policy Set to Load Balance
- Hyper-Threading Set to Disable
- XPT Prefetch Set to Enabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-xz5s Sat Nov 24 12:09:07 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
- 2 "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: 28
- 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
- physical 1: 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: 1
- Core(s) per socket: 28
- Socket(s): 2
- 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
- BogoMIPS: 5400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K

(Continued on next page)
Platform Notes (Continued)

L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27
NUMA node1 CPU(s): 28-55
Flags: fpu vme de pse tsc msr pae mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdse1gb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pfni pclmulqdq dtes64 monitor ds_cpl xsave
avx1 f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebx cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb tpr_shadow vni flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xsaves xgetbv1 xsaves_cqm_l1c cqm_occup_l1c cqm_mbb_total cqm_mbb_local
dtherm ida arat pin pts pku ospke avx512_vnni flush_l1d arch_capabilities

From /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 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: 191931 MB
    node 0 free: 184844 MB
    node 1 cpus: 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
    node 1 size: 193247 MB
    node 1 free: 190039 MB
    node distances:
        node 0 1
          0: 10 21
          1: 21 10

From /proc/meminfo
    MemTotal: 394423724 KB
    HugePages_Total: 0
    Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*
    SuSE-release:
        SUSE Linux Enterprise Server 12 (x86_64)
        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:

    (Continued on next page)
Huawei

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---

### Platform Notes (Continued)

```plaintext
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 22 06:53
```

```
SPEC is set to: /spec2017
  Filesystem  Type  Size  Used  Avail  Use%  Mounted on
  /dev/sda3   xfs    212G  76G  137G  36%  /
```

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:
24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933

(End of data from sysinfo program)

---

### Compiler Version Notes

```
CC 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(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.
```

```
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(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.
```

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---

**Compiler Version Notes (Continued)**

Intel(R) Fortran 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**

- 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:**
  ```
  -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
  -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
  -L/usr/local/je5.0.1-64/lib -ljemalloc
  ```

**Compiler Version Notes (Continued)**

- FC 648.exchange2_s(base)

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(Continued on next page)
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Base Optimization Flags (Continued)

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:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

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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