SPEC® CFP2006 Result
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Huawei

Huawei 2488 V5 (Intel Xeon Platinum 8153)

$SPECfp®_rate2006 = $ 2290

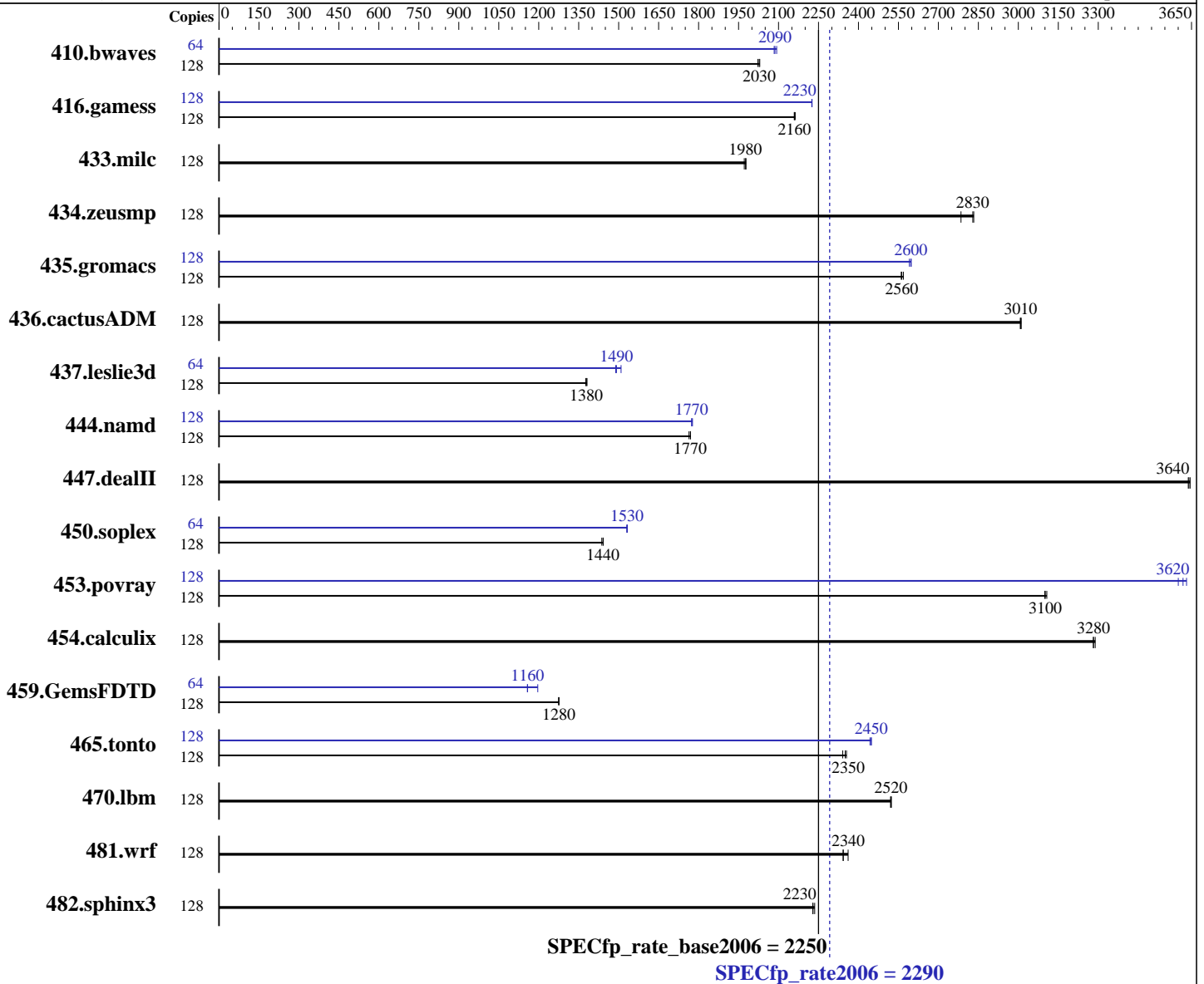$SPECfp_rate_base2006 = $ 2250

CPU2006 license: 3175
Test sponsor: Huawei
Tested by: Huawei

Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

SPECfp_rate_base2006 = 2250

SPECfp_rate2006 = 2290

Hardware

CPU Name: Intel Xeon Platinum 8153
CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz: 2000
FPU: Integrated
CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip, 2 threads/core
CPU(s) orderable: 2,4 chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 1 MB I+D on chip per core

Continued on next page

Software

Operating System: SUSE Linux Enterprise Server 12 SP2 4.4.21-69-default
Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 5 (multi user)

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L3 Cache:	22 MB I+D on chip per chip
Other Cache:	None
Memory:	384 GB (24 x 16 GB 2Rx4 PC4-2666V-R)
Disk Subsystem:	2 x 300 GB SAS, 10K RPM
Other Hardware:	None

Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	128	**858**	**2030**	860	2020	857	2030	64	**417**	**2090**	417	2080	416	2090
416.gamess	128	**1160**	**2160**	1161	2160	1159	2160	128	1126	2220	**1126**	**2230**	1126	2230
433.milc	128	594	1980	**595**	**1980**	596	1970	128	594	1980	**595**	**1980**	596	1970
434.zeusmp	128	411	2830	**412**	**2830**	418	2780	128	411	2830	**412**	**2830**	418	2780
435.gromacs	128	357	2560	356	2570	**357**	**2560**	128	352	2600	353	2590	**352**	**2600**
436.cactusADM	128	**508**	**3010**	509	3010	508	3010	128	**508**	**3010**	509	3010	508	3010
437.leslie3d	128	871	1380	874	1380	**873**	**1380**	64	**403**	**1490**	404	1490	399	1510
444.namd	128	**580**	**1770**	580	1770	582	1760	128	579	1770	578	1780	**579**	**1770**
447.dealII	128	**402**	**3640**	403	3640	402	3640	128	**402**	**3640**	403	3640	402	3640
450.soplex	128	743	1440	740	1440	**741**	**1440**	64	348	1530	**348**	**1530**	349	1530
453.povray	128	220	3100	219	3110	**220**	**3100**	128	189	3600	188	3630	**188**	**3620**
454.calculix	128	321	3290	**322**	**3280**	322	3280	128	321	3290	**322**	**3280**	322	3280
459.GemsFDTD	128	1065	1280	**1065**	**1280**	1065	1280	64	587	1160	568	1200	**586**	**1160**
465.tonto	128	**536**	**2350**	535	2360	538	2340	128	516	2440	**515**	**2450**	514	2450
470.lbm	128	698	2520	697	2520	**697**	**2520**	128	698	2520	697	2520	**697**	**2520**
481.wrf	128	610	2340	606	2360	**610**	**2340**	128	610	2340	606	2360	**610**	**2340**
482.sphinx3	128	1116	2240	1119	2230	**1119**	**2230**	128	1116	2240	1119	2230	**1119**	**2230**

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"
Turbo mode set with:
cpupower -c all frequency-set -g performance

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Test date: Aug-2017
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Software Availability: Apr-2017

Platform Notes

```
BIOS configuration:
Set SNC to enabled
Set IMC interleaving to 1 way interleave
Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-va9t Thu Aug 31 07:29:50 2017

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
  http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Platinum 8153 CPU @ 2.00GHz
      4 "physical id"s (chips)
      128 "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 : 16
      siblings  : 32
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   cache size : 22528 KB

From /proc/meminfo
   MemTotal:       394387292 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
      # 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-SP2"
      VERSION_ID="12.2"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
```

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Platform Notes (Continued)

```
    Linux linux-va9t 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
    (9464f67) x86_64 x86_64 x86_64 GNU/Linux

  run-level 5 Aug 30 18:59

  SPEC is set to: /home/cpu2006
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   516G   17G  499G   4% /home
  Additional information from dmidecode:

    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. 0.38 07/28/2017
  Memory:
  8x NO DIMM NO DIMM
  24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz

 (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled by default
 Filesystem page cache cleared with:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
```

Base Compiler Invocation

C benchmarks:
    icc -m64

C++ benchmarks:
    icpc -m64

Fortran benchmarks:
    ifort -m64

Benchmarks using both Fortran and C:
    icc -m64 ifort -m64

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Base Portability Flags

```
    410.bwaves: -DSPEC_CPU_LP64
    416.gamess: -DSPEC_CPU_LP64
       433.milc: -DSPEC_CPU_LP64
    434.zeusmp: -DSPEC_CPU_LP64
   435.gromacs: -DSPEC_CPU_LP64 -nofor_main
 436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
    437.leslie3d: -DSPEC_CPU_LP64
      444.namd: -DSPEC_CPU_LP64
      447.dealII: -DSPEC_CPU_LP64
     450.soplex: -DSPEC_CPU_LP64
     453.povray: -DSPEC_CPU_LP64
    454.calculix: -DSPEC_CPU_LP64 -nofor_main
  459.GemsFDTD: -DSPEC_CPU_LP64
      465.tonto: -DSPEC_CPU_LP64
       470.lbm: -DSPEC_CPU_LP64
         481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
    482.sphinx3: -DSPEC_CPU_LP64
```

Base Optimization Flags

C benchmarks:

```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

C++ benchmarks:

```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

Fortran benchmarks:

```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

Benchmarks using both Fortran and C:

```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
    -qopt-mem-layout-trans=3
```

Peak Compiler Invocation

C benchmarks:

```
    icc -m64
```

C++ benchmarks (except as noted below):

```
    icpc -m64
```

```
  450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
```

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Peak Compiler Invocation (Continued)

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc -m64 ifort -m64
```

Peak Portability Flags

```
   410.bwaves: -DSPEC_CPU_LP64
   416.gamess: -DSPEC_CPU_LP64
     433.milc: -DSPEC_CPU_LP64
   434.zeusmp: -DSPEC_CPU_LP64
  435.gromacs: -DSPEC_CPU_LP64 -nofor_main
 436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
  437.leslie3d: -DSPEC_CPU_LP64
     444.namd: -DSPEC_CPU_LP64
    447.dealII: -DSPEC_CPU_LP64
    450.soplex: -D_FILE_OFFSET_BITS=64
    453.povray: -DSPEC_CPU_LP64
   454.calculix: -DSPEC_CPU_LP64 -nofor_main
  459.GemsFDTD: -DSPEC_CPU_LP64
     465.tonto: -DSPEC_CPU_LP64
      470.lbm: -DSPEC_CPU_LP64
      481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
   482.sphinx3: -DSPEC_CPU_LP64
```

Peak Optimization Flags

C benchmarks:

```
     433.milc: basepeak = yes

      470.lbm: basepeak = yes

   482.sphinx3: basepeak = yes
```

C++ benchmarks:

```
     444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
              -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
              -no-prec-div(pass 2) -fno-alias -auto-ilp32
              -qopt-mem-layout-trans=3

    447.dealII: basepeak = yes
```

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Peak Optimization Flags (Continued)

```
450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
            -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -qopt-malloc-options=3
            -qopt-mem-layout-trans=3
```

```
453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
            -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -unroll4 -qopt-mem-layout-trans=3
```

Fortran benchmarks:

```
410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

```
416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
            -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
            -no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-
```

```
434.zeusmp: basepeak = yes
```

```
437.leslie3d: Same as 410.bwaves
```

```
459.GemsFDTD: Same as 410.bwaves
```

```
465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
           -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
           -no-prec-div(pass 2) -unroll4 -auto -inline-calloc
           -qopt-malloc-options=3
```

Benchmarks using both Fortran and C:

```
435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
             -par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32
             -qopt-mem-layout-trans=3
```

```
436.cactusADM: basepeak = yes
```

```
454.calculix: basepeak = yes
```

```
481.wrf: basepeak = yes
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-SKL-V1.6.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-SKL-V1.6.xml

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