SPEC® CFP2006 Result
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Huawei

Huawei CH242 V5 (Intel Xeon Gold 5115)

$SPECfp^®\_rate2006 =$ 1710

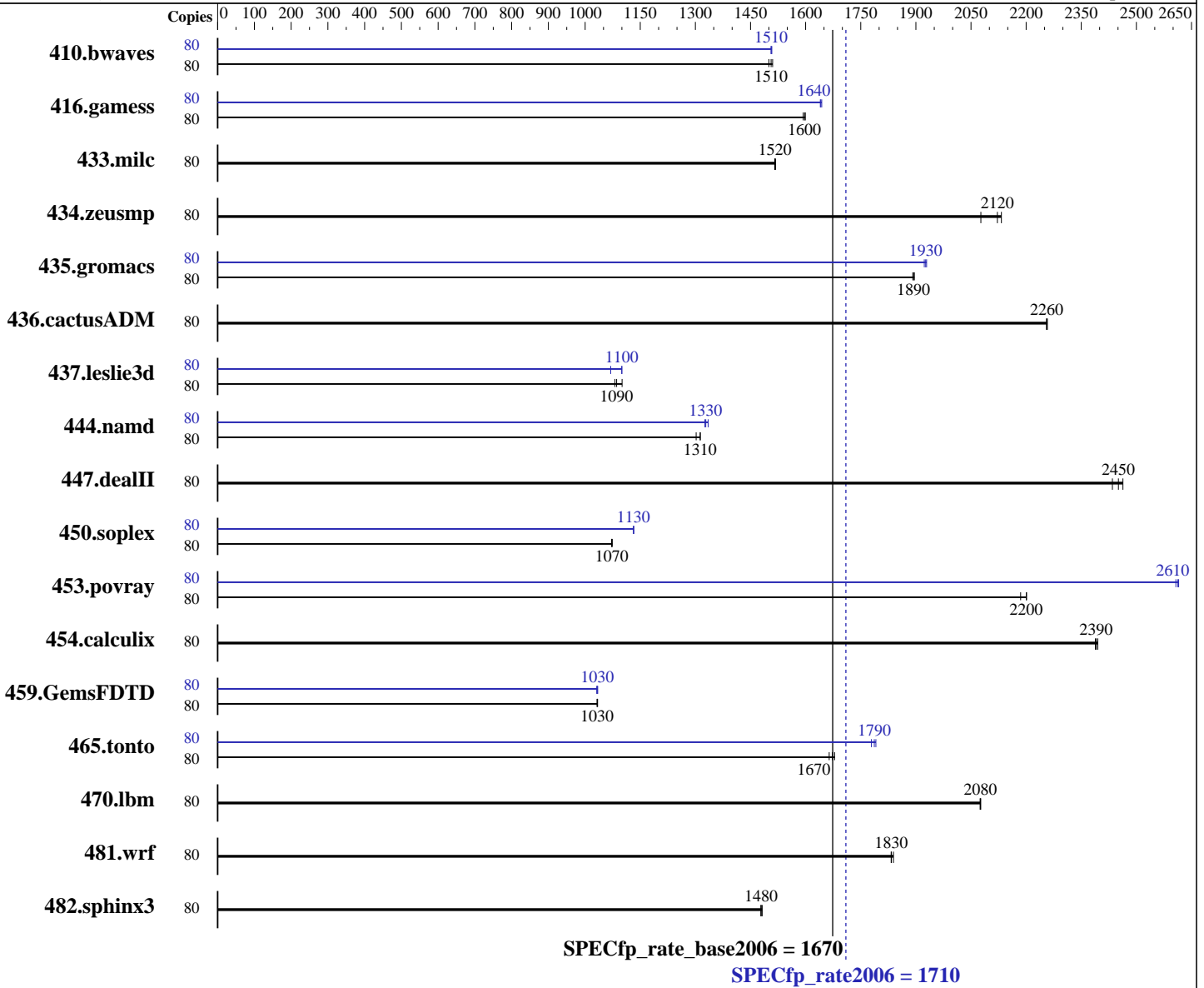$SPECfp\_rate\_base2006 =$ 1670

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

Test date: Dec-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2016

Benchmark	Copies	Result (base)	Result (peak)
410.bwaves	80 / 80	1510	1510
416.gamess	80 / 80	1600	1640
433.milc	80	1520	
434.zeusmp	80	2120	
435.gromacs	80 / 80	1890	1930
436.cactusADM	80	2260	
437.leslie3d	80 / 80	1090	1100
444.namd	80 / 80	1310	1330
447.dealII	80	2450	
450.soplex	80 / 80	1070	1130
453.povray	80 / 80	2200	2610
454.calculix	80	2390	
459.GemsFDTD	80 / 80	1030	1030
465.tonto	80 / 80	1670	1790
470.lbm	80	2080	
481.wrf	80	1830	
482.sphinx3	80	1480	

SPECfp_rate_base2006 = 1670

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Hardware

CPU Name:	Intel Xeon Gold 5115
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	40 cores, 4 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable:	1,2,3,4 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:	Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.el7.x86_64
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel:	No
File System:	xfs

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L3 Cache:	13.75 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)	Peak Pointers:	32/64-bit
		Other Software:	None
Disk Subsystem:	1 x 900 GB SAS, 10000 RPM		
Other Hardware:	None		

Results Table

	Base							Peak						
Benchmark	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	80	725	1500	720	1510	**722**	**1510**	80	**722**	**1510**	722	1510	721	1510
416.gamess	80	983	1590	980	1600	**981**	**1600**	80	**954**	**1640**	953	1640	955	1640
433.milc	80	484	1520	484	1520	**484**	**1520**	80	484	1520	484	1520	**484**	**1520**
434.zeusmp	80	341	2130	351	2080	**343**	**2120**	80	341	2130	351	2080	**343**	**2120**
435.gromacs	80	301	1900	**302**	**1890**	302	1890	80	297	1920	**296**	**1930**	296	1930
436.cactusADM	80	423	2260	424	2260	**424**	**2260**	80	423	2260	424	2260	**424**	**2260**
437.leslie3d	80	683	1100	696	1080	**693**	**1090**	80	**684**	**1100**	703	1070	684	1100
444.namd	80	**489**	**1310**	493	1300	489	1310	80	484	1330	481	1330	**483**	**1330**
447.dealII	80	**373**	**2450**	372	2460	376	2430	80	**373**	**2450**	372	2460	376	2430
450.soplex	80	**622**	**1070**	622	1070	621	1070	80	**590**	**1130**	589	1130	590	1130
453.povray	80	**193**	**2200**	195	2190	193	2200	80	163	2610	163	2620	**163**	**2610**
454.calculix	80	276	2400	**276**	**2390**	276	2390	80	276	2400	**276**	**2390**	276	2390
459.GemsFDTD	80	822	1030	821	1030	**822**	**1030**	80	823	1030	**822**	**1030**	821	1030
465.tonto	80	469	1680	**471**	**1670**	473	1660	80	**441**	**1790**	443	1780	439	1790
470.lbm	80	**530**	**2080**	530	2070	529	2080	80	**530**	**2080**	530	2070	529	2080
481.wrf	80	486	1840	**487**	**1830**	488	1830	80	486	1840	**487**	**1830**	488	1830
482.sphinx3	80	1052	1480	1055	1480	**1054**	**1480**	80	1052	1480	1055	1480	**1054**	**1480**

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"

Platform Notes

BIOS configuration:
Set Power Policy to Performance
Sysinfo program /spec2006/config/sysinfo.rev6993

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Platform Notes (Continued)

```
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on localhost.localdomain Wed Dec  6 10:24:18 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) Gold 5115 CPU @ 2.40GHz
      4 "physical id"s (chips)
      80 "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 : 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
      physical 2: cores 0 1 2 3 4 8 9 10 11 12
      physical 3: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 14080 KB

From /proc/meminfo
   MemTotal:       1583435272 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.3 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.3"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13
   EDT 2016 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 5 13:04

SPEC is set to: /spec2006
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   723G  219G  504G  31% /
Additional information from dmidecode:
```

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Platform Notes (Continued)

```
    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. 0.65 10/27/2017
  Memory:
    36x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666 MHz, configured at 2400 MHz
    12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz, configured at 2400 MHz

 (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/spec2006/libs/32:/spec2006/libs/64:/spec2006/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 with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
 Filesystem page cache cleared with:
 echo 1>        /proc/sys/vm/drop_caches
 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
```

Base Portability Flags

```
    410.bwaves: -DSPEC_CPU_LP64
    416.gamess: -DSPEC_CPU_LP64
      433.milc: -DSPEC_CPU_LP64
    434.zeusmp: -DSPEC_CPU_LP64
```

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Base Portability Flags (Continued)

```
    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
```

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

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

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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

       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:

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Peak Optimization Flags (Continued)

```
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.html
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-SKL-V1.7.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.xml
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-SKL-V1.7.xml

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