SPEC® CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

$SPECfp^{®}\_rate2006 =$ 1600

$SPECfp\_rate\_base2006 =$ 1570

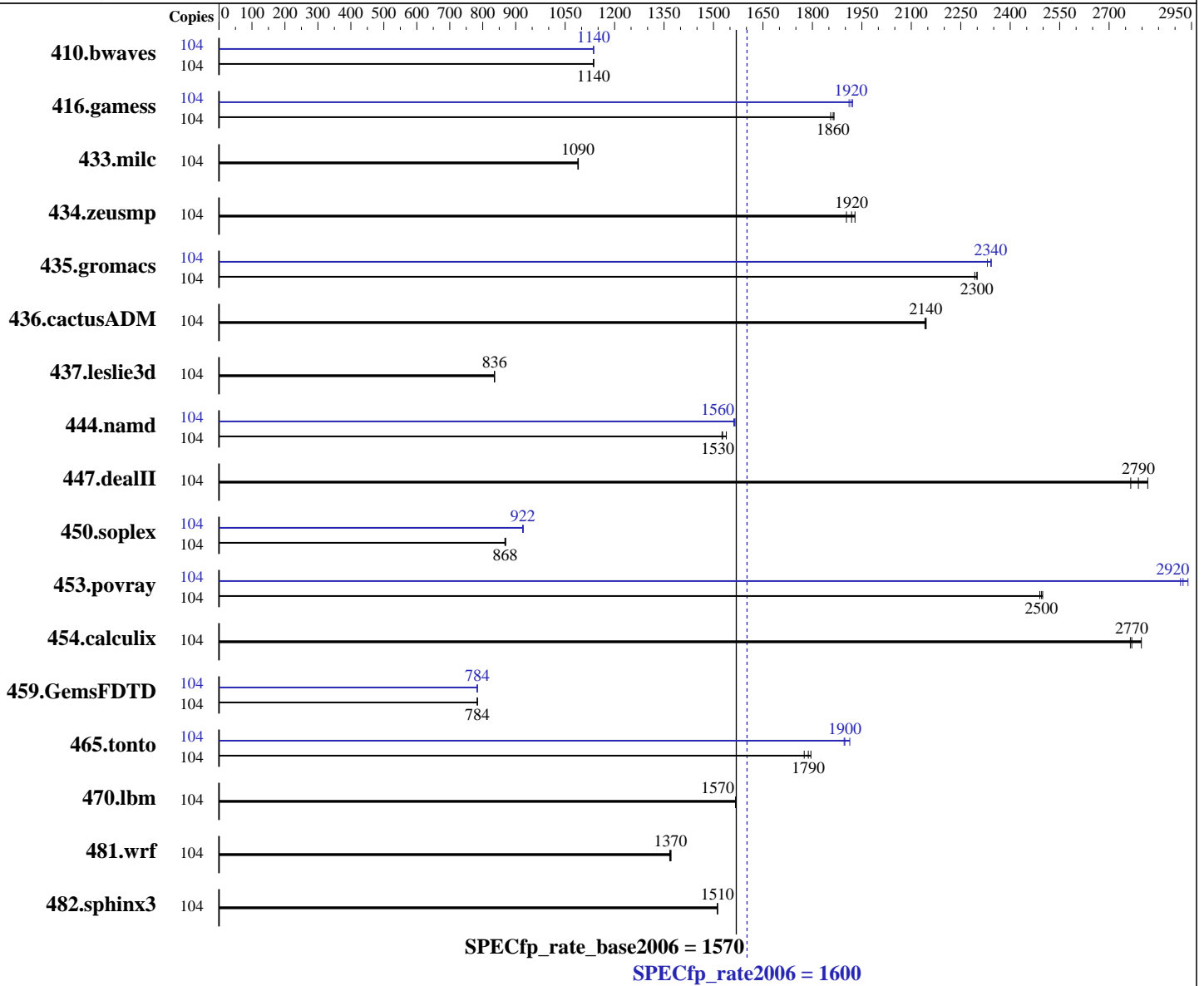**CPU2006 license:** 3175
Test sponsor: Huawei
Tested by: Huawei

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

Copies	Results
410.bwaves 104 / 104	1140 / 1140
416.gamess 104 / 104	1920 / 1860
433.milc 104	1090
434.zeusmp 104	1920
435.gromacs 104 / 104	2340 / 2300
436.cactusADM 104	2140
437.leslie3d 104	836
444.namd 104 / 104	1560 / 1530
447.dealII 104	2790
450.soplex 104 / 104	922 / 868
453.povray 104 / 104	2920 / 2500
454.calculix 104	2770
459.GemsFDTD 104 / 104	784 / 784
465.tonto 104 / 104	1900 / 1790
470.lbm 104	1570
481.wrf 104	1370
482.sphinx3 104	1510

SPECfp_rate_base2006 = 1570

SPECfp_rate2006 = 1600

Hardware

CPU Name:	Intel Xeon Platinum 8164
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2000
FPU:	Integrated
CPU(s) enabled:	52 cores, 2 chips, 26 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 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

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

SPECfp_rate2006 = 1600

SPECfp_rate_base2006 = 1570

CPU2006 license: 3175	**Test date:** Jul-2017
Test sponsor: Huawei	**Hardware Availability:** Sep-2017
Tested by: Huawei	**Software Availability:** Nov-2016

L3 Cache:	35.75 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)	Peak Pointers:	32/64-bit
Disk Subsystem:	1 x 1200 GB SAS, 10000 RPM	Other Software:	None
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	104	1244	1140	1243	1140	**1244**	**1140**	104	1244	1140	1244	1140	**1244**	**1140**
416.gamess	104	1091	1870	**1093**	**1860**	1097	1860	104	1059	1920	**1062**	**1920**	1065	1910
433.milc	104	877	1090	**877**	**1090**	876	1090	104	877	1090	**877**	**1090**	876	1090
434.zeusmp	104	491	1930	**493**	**1920**	497	1900	104	491	1930	**493**	**1920**	497	1900
435.gromacs	104	**323**	**2300**	324	2290	323	2300	104	**317**	**2340**	319	2330	317	2340
436.cactusADM	104	580	2140	**580**	**2140**	579	2150	104	580	2140	**580**	**2140**	579	2150
437.leslie3d	104	1170	836	**1170**	**836**	1170	836	104	1170	836	**1170**	**836**	1170	836
444.namd	104	**546**	**1530**	547	1530	542	1540	104	534	1560	533	1570	**533**	**1560**
447.dealII	104	430	2770	**427**	**2790**	422	2820	104	430	2770	**427**	**2790**	422	2820
450.soplex	104	**999**	**868**	1000	867	997	870	104	942	921	940	923	**941**	**922**
453.povray	104	**222**	**2500**	222	2490	221	2500	104	188	2940	**189**	**2920**	190	2920
454.calculix	104	310	2760	307	2800	**310**	**2770**	104	310	2760	307	2800	**310**	**2770**
459.GemsFDTD	104	**1408**	**784**	1408	784	1408	784	104	**1408**	**784**	1410	783	1407	784
465.tonto	104	576	1780	570	1800	**572**	**1790**	104	540	1900	**539**	**1900**	535	1910
470.lbm	104	**912**	**1570**	912	1570	911	1570	104	**912**	**1570**	912	1570	911	1570
481.wrf	104	**848**	**1370**	850	1370	847	1370	104	**848**	**1370**	850	1370	847	1370
482.sphinx3	104	1341	1510	**1340**	**1510**	1340	1510	104	1341	1510	**1340**	**1510**	1340	1510

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 Efficiency Mode to Performance
Set SNC to Enable

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

$SPECfp_rate2006 = $ 1600

$SPECfp_rate_base2006 = $ 1570

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

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

Platform Notes (Continued)

```
  Set IMC Interleaving to 1 way
  Set Patrol Scrub to Disable
  Sysinfo program /spec17/config/sysinfo.rev6993
  Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
  running on localhost.localdomain Mon Jul 17 04:57:38 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 8164 CPU @ 2.00GHz
        2 "physical id"s (chips)
        104 "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 : 26
        siblings  : 52
        physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
        26 27 28 29
        physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
        26 27 28 29
     cache size : 36608 KB

  From /proc/meminfo
     MemTotal:       394144692 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 Jul 14 17:36

  SPEC is set to: /spec17
     Filesystem      Type  Size  Used Avail Use% Mounted on
```

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

SPECfp_rate2006 =   1600

SPECfp_rate_base2006 = 1570

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

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

Platform Notes (Continued)

```
    /dev/sda2      xfs   262G   86G  177G  33% /
 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. 0.20 07/14/2017
  Memory:
    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 = "/spec17/libs/32:/spec17/libs/64:/spec17/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
```

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

SPECfp_rate2006 =   1600

SPECfp_rate_base2006 = 1570

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

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

Base Portability Flags (Continued)

```
       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
```

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

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

SPECfp_rate2006 =   1600

SPECfp_rate_base2006 = 1570

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

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

Peak Compiler Invocation (Continued)

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

     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
```

Continued on next page

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

$SPECfp_rate2006 = $ 1600

$SPECfp_rate_base2006 = $ 1570

CPU2006 license: 3175		**Test date:**	Jul-2017
Test sponsor: Huawei		**Hardware Availability:**	Sep-2017
Tested by: Huawei		**Software Availability:**	Nov-2016

Peak Optimization Flags (Continued)

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: basepeak = yes

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-V1.6.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.xml
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-SKL-V1.6.xml

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8164)

$\text{SPECfp\_rate2006} = \quad 1600$

$\text{SPECfp\_rate\_base2006} = \quad 1570$

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

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

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Aug 8 15:41:52 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 8 August 2017.