



# SPEC<sup>®</sup> CFP2006 Result

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## Huawei

SPECfp<sup>®</sup>\_rate2006 = 1540

### Huawei 2288H V5 (Intel Xeon Gold 6154)

SPECfp\_rate\_base2006 = 1510

CPU2006 license: 3175

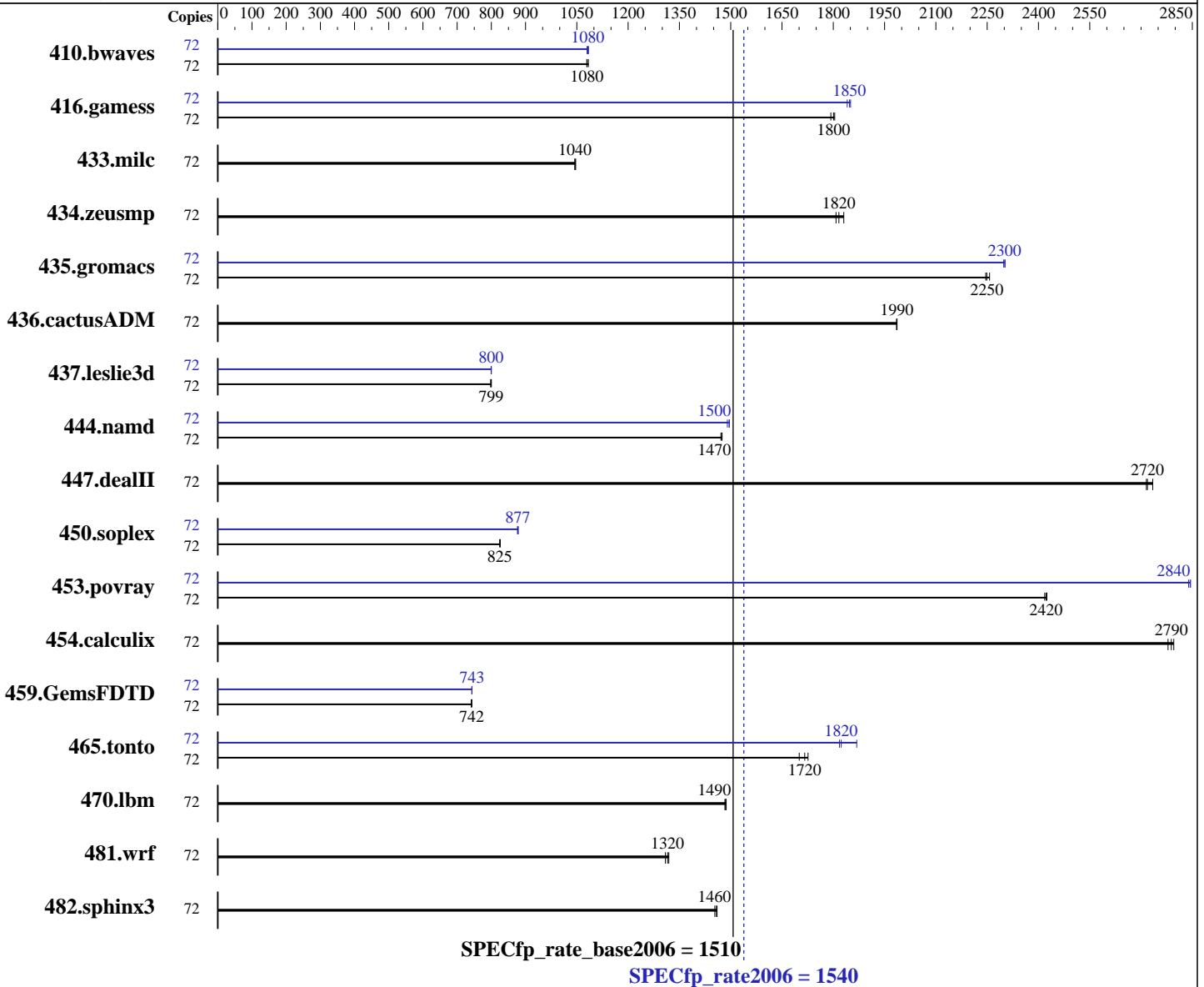
Test sponsor: Huawei

Tested by: Huawei

Test date: May-2017

Hardware Availability: Aug-2017

Software Availability: Nov-2016



#### Hardware

CPU Name: Intel Xeon Gold 6154  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz  
 CPU MHz: 3000  
 FPU: Integrated  
 CPU(s) enabled: 36 cores, 2 chips, 18 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

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#### 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: 24.75 MB I+D on chip per chip  
Other Cache: None  
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)  
Disk Subsystem: 1 x 1200 GB SAS, 10000 RPM  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	72	903	1080	907	1080	<b>906</b>	<b>1080</b>	72	<b>904</b>	<b>1080</b>	906	1080	903	1080
416.gamess	72	786	1790	781	1800	<b>783</b>	<b>1800</b>	72	<b>763</b>	<b>1850</b>	766	1840	762	1850
433.milc	72	631	1050	633	1040	<b>633</b>	<b>1040</b>	72	631	1050	633	1040	<b>633</b>	<b>1040</b>
434.zeusmp	72	<b>361</b>	<b>1820</b>	358	1830	362	1810	72	<b>361</b>	<b>1820</b>	358	1830	362	1810
435.gromacs	72	229	2250	228	2260	<b>229</b>	<b>2250</b>	72	223	2300	<b>223</b>	<b>2300</b>	224	2300
436.cactusADM	72	433	1990	433	1980	<b>433</b>	<b>1990</b>	72	433	1990	433	1980	<b>433</b>	<b>1990</b>
437.leslie3d	72	846	800	848	798	<b>847</b>	<b>799</b>	72	846	800	<b>846</b>	<b>800</b>	847	799
444.namd	72	<b>392</b>	<b>1470</b>	392	1470	392	1470	72	386	1500	387	1490	<b>386</b>	<b>1500</b>
447.dealII	72	301	2730	<b>303</b>	<b>2720</b>	303	2720	72	301	2730	<b>303</b>	<b>2720</b>	303	2720
450.soplex	72	<b>728</b>	<b>825</b>	727	826	728	825	72	685	876	<b>684</b>	<b>877</b>	683	879
453.povray	72	158	2420	158	2420	<b>158</b>	<b>2420</b>	72	135	2840	<b>135</b>	<b>2840</b>	135	2840
454.calculix	72	212	2800	<b>213</b>	<b>2790</b>	214	2780	72	212	2800	<b>213</b>	<b>2790</b>	214	2780
459.GemsFDTD	72	1028	743	<b>1029</b>	<b>742</b>	1031	741	72	<b>1028</b>	<b>743</b>	1028	743	1028	743
465.tonto	72	417	1700	410	1730	<b>413</b>	<b>1720</b>	72	379	1870	390	1820	<b>389</b>	<b>1820</b>
470.lbm	72	665	1490	<b>666</b>	<b>1490</b>	667	1480	72	665	1490	<b>666</b>	<b>1490</b>	667	1480
481.wrf	72	610	1320	614	1310	<b>611</b>	<b>1320</b>	72	610	1320	614	1310	<b>611</b>	<b>1320</b>
482.sphinx3	72	<b>962</b>	<b>1460</b>	965	1450	961	1460	72	<b>962</b>	<b>1460</b>	965	1450	961	1460

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

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### 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 Jun 5 07:05:31 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 6154 CPU @ 3.00GHz
 2 "physical id"s (chips)
 72 "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    : 18
  siblings    : 36
  physical 0   : cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1   : cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size     : 25344 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 May 28 03:31
```

```
SPEC is set to: /spec17
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   262G  85G  177G  33% /
```

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. 0.10 02/14/2017

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

433.milc: -DSPEC\_CPU\_LP64

434.zeusmp: -DSPEC\_CPU\_LP64

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Software Availability: Nov-2016

## 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.lelie3d: -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-V1.6.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>

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