# SPEC® CFP2006 Result
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## Huawei

Huawei RH5885 V3 (Intel Xeon E7-8891 v4)

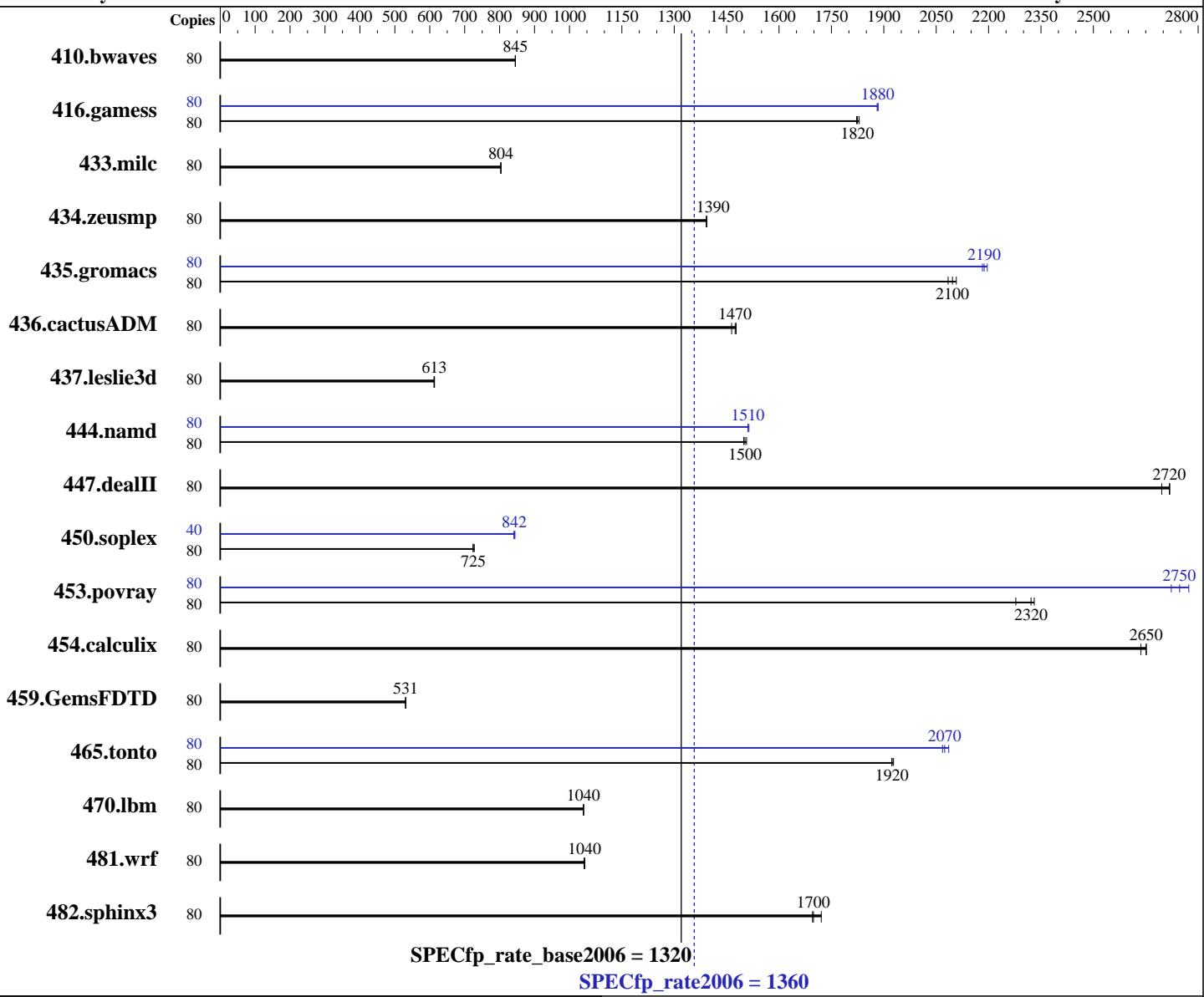$SPECfp^®\_rate2006 =$ 1360

$SPECfp\_rate\_base2006 =$ 1320

| Benchmark | Copies | Result |
|---|---|---|
| 410.bwaves | 80 | 845 |
| 416.gamess | 80 | 1880 |
| 416.gamess | 80 | 1820 |
| 433.milc | 80 | 804 |
| 434.zeusmp | 80 | 1390 |
| 435.gromacs | 80 | 2190 |
| 435.gromacs | 80 | 2100 |
| 436.cactusADM | 80 | 1470 |
| 437.leslie3d | 80 | 613 |
| 444.namd | 80 | 1510 |
| 444.namd | 80 | 1500 |
| 447.dealII | 80 | 2720 |
| 450.soplex | 40 | 842 |
| 450.soplex | 80 | 725 |
| 453.povray | 80 | 2750 |
| 453.povray | 80 | 2320 |
| 454.calculix | 80 | 2650 |
| 459.GemsFDTD | 80 | 531 |
| 465.tonto | 80 | 2070 |
| 465.tonto | 80 | 1920 |
| 470.lbm | 80 | 1040 |
| 481.wrf | 80 | 1040 |
| 482.sphinx3 | 80 | 1700 |

SPECfp_rate_base2006 = 1320
SPECfp_rate2006 = 1360

## Hardware

CPU Name: Intel Xeon E7-8891 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz: 2800
FPU: Integrated
CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable: 2,4 chips
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
**Continued on next page**

## Software

Operating System: Red Hat Enterprise Linux Server release 7.2 (Maipo)
3.10.0-327.el7.x86_64
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;
Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: xfs
**Continued on next page**

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| | |
|---|---|
| SPECfp_rate2006 = | 1360 |
| SPECfp_rate_base2006 = | 1320 |

| | | | |
|---|---|---|---|
| **CPU2006 license:** 3175 | | **Test date:** | Oct-2016 |
| **Test sponsor:** Huawei | | **Hardware Availability:** | Jun-2016 |
| **Tested by:** Huawei | | **Software Availability:** | Nov-2015 |

| | | | |
|---|---|---|---|
| L3 Cache: | 60 MB I+D on chip per chip | System State: | Run level 3 (multi-user) |
| Other Cache: | None | Base Pointers: | 32/64-bit |
| Memory: | 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R, running at 1600 MHz) | Peak Pointers: | 32/64-bit |
| | | Other Software: | None |
| Disk Subsystem: | 2 x 600 GB SAS, 10K RPM | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 80 | **1286** | **845** | 1286 | 845 | 1287 | 845 | 80 | **1286** | **845** | 1286 | 845 | 1287 | 845 |
| 416.gamess | 80 | 856 | 1830 | **858** | **1820** | 860 | 1820 | 80 | 832 | 1880 | **832** | **1880** | 833 | 1880 |
| 433.milc | 80 | **914** | **804** | 914 | 804 | 914 | 804 | 80 | **914** | **804** | 914 | 804 | 914 | 804 |
| 434.zeusmp | 80 | **523** | **1390** | 523 | 1390 | 523 | 1390 | 80 | **523** | **1390** | 523 | 1390 | 523 | 1390 |
| 435.gromacs | 80 | 271 | 2110 | **272** | **2100** | 274 | 2080 | 80 | 260 | 2200 | 262 | 2180 | **261** | **2190** |
| 436.cactusADM | 80 | 647 | 1480 | **648** | **1470** | 653 | 1460 | 80 | 647 | 1480 | **648** | **1470** | 653 | 1460 |
| 437.leslie3d | 80 | 1226 | 613 | **1226** | **613** | 1229 | 612 | 80 | 1226 | 613 | **1226** | **613** | 1229 | 612 |
| 444.namd | 80 | 426 | 1510 | **427** | **1500** | 428 | 1500 | 80 | 425 | 1510 | 424 | 1510 | **425** | **1510** |
| 447.dealII | 80 | **337** | **2720** | 339 | 2700 | 337 | 2720 | 80 | **337** | **2720** | 339 | 2700 | 337 | 2720 |
| 450.soplex | 80 | **921** | **725** | 922 | 724 | 917 | 728 | 40 | **396** | **842** | 397 | 841 | 395 | 844 |
| 453.povray | 80 | 183 | 2330 | **183** | **2320** | 187 | 2280 | 80 | 156 | 2720 | **155** | **2750** | 153 | 2770 |
| 454.calculix | 80 | **249** | **2650** | 250 | 2640 | 249 | 2650 | 80 | **249** | **2650** | 250 | 2640 | 249 | 2650 |
| 459.GemsFDTD | 80 | **1599** | **531** | 1601 | 530 | 1596 | 532 | 80 | **1599** | **531** | 1601 | 530 | 1596 | 532 |
| 465.tonto | 80 | **409** | **1920** | 408 | 1930 | 409 | 1920 | 80 | **379** | **2070** | 381 | 2070 | 377 | 2090 |
| 470.lbm | 80 | 1057 | 1040 | 1057 | 1040 | **1057** | **1040** | 80 | 1057 | 1040 | 1057 | 1040 | **1057** | **1040** |
| 481.wrf | 80 | 858 | 1040 | **857** | **1040** | 856 | 1040 | 80 | 858 | 1040 | **857** | **1040** | 856 | 1040 |
| 482.sphinx3 | 80 | 919 | 1700 | 906 | 1720 | **918** | **1700** | 80 | 919 | 1700 | 906 | 1720 | **918** | **1700** |

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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SPECfp_rate2006 =    1360

SPECfp_rate_base2006 =  1320

### Platform Notes

```
BIOS configuration:
Set Power Efficiency Mode to Performance
Set Lock_step to disabled
Baseboard Management Controller used to adjust the fan speed to 100%
Set C-State to C0/C1
Sysinfo program /home/speccpu/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on RH5885V3 Thu Oct 13 09:03:23 2016

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) CPU E7-8891 v4 @ 2.80GHz
      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 5 9 10 11 13 18 24 26 28 29
      physical 1: cores 5 9 10 11 13 18 24 26 28 29
      physical 2: cores 5 9 10 11 13 18 24 26 28 29
      physical 3: cores 5 9 10 11 13 18 24 26 28 29
   cache size : 61440 KB

From /proc/meminfo
   MemTotal:       263856772 kB
   HugePages_Total:        0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.2 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.2"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

uname -a:
   Linux RH5885V3 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 12 23:37
```

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

**Test date:**           Oct-2016
**Hardware Availability:** Jun-2016
**Software Availability:** Nov-2015

## Platform Notes (Continued)

```
  SPEC is set to: /home/speccpu
    Filesystem          Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   419G   76G  343G  19% /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 American Megatrends Inc. BLISV767 07/27/2016
  Memory:
   16x Micron 18ASF2G72PDZ-2G3B1 16 GB 2 rank 2400 MHz, configured at 1600 MHz
   32x NO DIMM NO DIMM

 (End of data from sysinfo program)
```

## General Notes

```
 Environment variables set by runspec before the start of the run:
 LD_LIBRARY_PATH = "/home/speccpu/libs/32:/home/speccpu/libs/64:/home/speccpu/sh"

  Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 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

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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 -opt-prefetch -auto-p32
    -ansi-alias -opt-mem-layout-trans=3
```

C++ benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
    -ansi-alias -opt-mem-layout-trans=3
```

Fortran benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
    -ansi-alias -opt-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_2016/linux/compiler/lib/ia32_lin
```

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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: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
> -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
> -par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)
> -prof-use(pass 2) -fno-alias -auto-ilp32

> 447.dealII: basepeak = yes

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**Test date:** Oct-2016  
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**Software Availability:** Nov-2015

# Peak Optimization Flags (Continued)

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

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

Fortran benchmarks:

 410.bwaves: basepeak = yes

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

 434.zeusmp: basepeak = yes

 437.leslie3d: basepeak = yes

 459.GemsFDTD: basepeak = yes

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

Benchmarks using both Fortran and C:

 435.gromacs: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
 -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
 -par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)
 -prof-use(pass 2) -opt-prefetch -auto-ilp32

 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-ic16.0-official-linux64.html  
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-V1.2-BDW-RevG.html

You can also download the XML flags sources by saving the following links:  
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml  
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-V1.2-BDW-RevG.xml

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