# SPEC® CFP2006 Result
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## Huawei

Huawei CH121 V3 (Intel Xeon E5-2698 v3)

$SPECfp^{®}2006 =$ 109
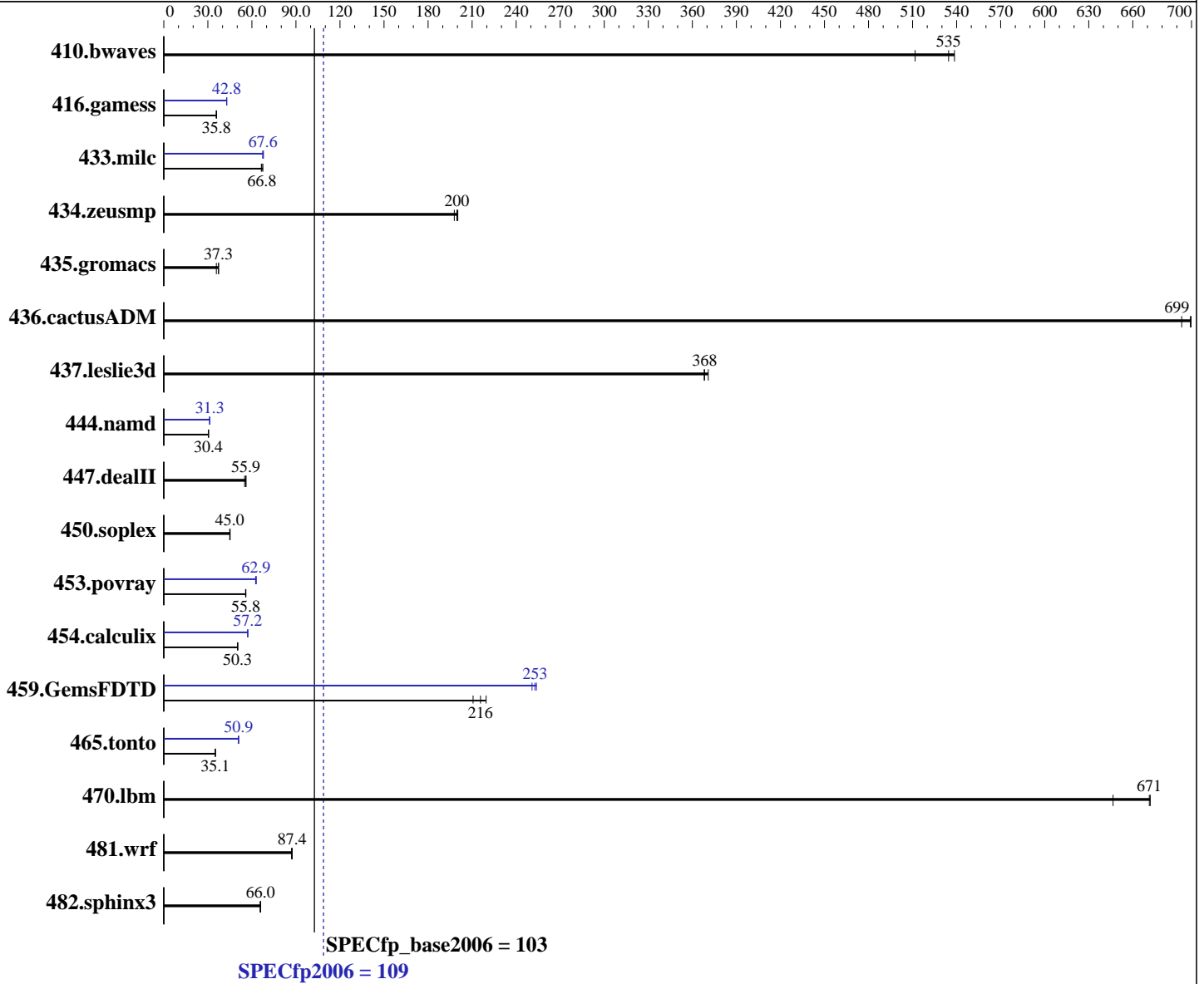
$SPECfp\_base2006 =$ 103

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

**Test date:** Jan-2015
**Hardware Availability:** Sep-2014
**Software Availability:** Sep-2014



| Benchmark | base | peak |
|---|---|---|
| 410.bwaves | 535 | |
| 416.gamess | 35.8 | 42.8 |
| 433.milc | 66.8 | 67.6 |
| 434.zeusmp | 200 | |
| 435.gromacs | 37.3 | |
| 436.cactusADM | 699 | |
| 437.leslie3d | 368 | |
| 444.namd | 30.4 | 31.3 |
| 447.dealII | 55.9 | |
| 450.soplex | 45.0 | |
| 453.povray | 55.8 | 62.9 |
| 454.calculix | 50.3 | 57.2 |
| 459.GemsFDTD | 216 | 253 |
| 465.tonto | 35.1 | 50.9 |
| 470.lbm | 671 | |
| 481.wrf | 87.4 | |
| 482.sphinx3 | 66.0 | |

SPECfp_base2006 = 103
SPECfp2006 = 109

## Hardware

CPU Name: Intel Xeon E5-2698 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2300
FPU: Integrated
CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip
CPU(s) orderable: 1,2 chip
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 7.0 (Maipo)
3.10.0-123.el7.x86_64
Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;
Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: ext4
**Continued on next page**

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| | | | |
|---|---|---|---|
| L3 Cache: | 40 MB I+D on chip per chip | System State: | Run level 3 (multi-user) |
| Other Cache: | None | Base Pointers: | 64-bit |
| Memory: | 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R) | Peak Pointers: | 32/64-bit |
| Disk Subsystem: | 1 x 300 GB SAS, 10000 RPM | Other Software: | None |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 25.2 | 539 | **25.4** | **535** | 26.6 | 512 | 25.2 | 539 | **25.4** | **535** | 26.6 | 512 |
| 416.gamess | **547** | **35.8** | 546 | 35.9 | 548 | 35.7 | 457 | 42.9 | **457** | **42.8** | 458 | 42.8 |
| 433.milc | **137** | **66.8** | 138 | 66.4 | 136 | 67.5 | 136 | 67.3 | 135 | 67.9 | **136** | **67.6** |
| 434.zeusmp | 46.0 | 198 | 45.4 | 200 | **45.6** | **200** | 46.0 | 198 | 45.4 | 200 | **45.6** | **200** |
| 435.gromacs | 199 | 35.8 | **192** | **37.3** | 191 | 37.3 | 199 | 35.8 | **192** | **37.3** | 191 | 37.3 |
| 436.cactusADM | 17.2 | 693 | 17.1 | 700 | **17.1** | **699** | 17.2 | 693 | 17.1 | 700 | **17.1** | **699** |
| 437.leslie3d | 25.5 | 368 | **25.5** | **368** | 25.3 | 371 | 25.5 | 368 | **25.5** | **368** | 25.3 | 371 |
| 444.namd | **264** | **30.4** | 264 | 30.4 | 264 | 30.4 | **257** | **31.3** | 256 | 31.3 | 257 | 31.3 |
| 447.dealII | **205** | **55.9** | 204 | 56.0 | 208 | 55.0 | **205** | **55.9** | 204 | 56.0 | 208 | 55.0 |
| 450.soplex | 186 | 44.9 | **185** | **45.0** | 185 | 45.2 | 186 | 44.9 | **185** | **45.0** | 185 | 45.2 |
| 453.povray | 95.1 | 55.9 | 95.5 | 55.7 | **95.3** | **55.8** | **84.6** | **62.9** | 85.1 | 62.5 | 84.6 | 62.9 |
| 454.calculix | **164** | **50.3** | 164 | 50.2 | 164 | 50.4 | 144 | 57.2 | 144 | 57.2 | **144** | **57.2** |
| 459.GemsFDTD | 50.4 | 211 | **49.2** | **216** | 48.3 | 220 | 41.8 | 254 | 42.3 | 251 | **42.0** | **253** |
| 465.tonto | 280 | 35.2 | 281 | 35.0 | **280** | **35.1** | 193 | 50.9 | 193 | 51.0 | **193** | **50.9** |
| 470.lbm | 21.3 | 647 | **20.5** | **671** | 20.4 | 672 | 21.3 | 647 | **20.5** | **671** | 20.4 | 672 |
| 481.wrf | **128** | **87.4** | 128 | 87.0 | 128 | 87.5 | **128** | **87.4** | 128 | 87.0 | 128 | 87.5 |
| 482.sphinx3 | 295 | 66.0 | **295** | **66.0** | 297 | 65.6 | 295 | 66.0 | **295** | **66.0** | 297 | 65.6 |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

    Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

    BIOS configuration:
    Set Power Efficiency Mode to Custom
    Set Snoop Mode to HS
    Set Hyper-Threading to Disabled
    Baseboard Management Controller used to adjust the fan speed to 100%
    Sysinfo program /spec15/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on localhost.localdomain Mon Jan 12 14:40:02 2015

    This section contains SUT (System Under Test) info as seen by

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|---|---|
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| $SPECfp\_base2006 =$ | 103 |

| | | | |
|---|---|---|---|
| **CPU2006 license:** 3175 | | **Test date:** | Jan-2015 |
| **Test sponsor:** Huawei | | **Hardware Availability:** Sep-2014 |
| **Tested by:** Huawei | | **Software Availability:** Sep-2014 |

## Platform Notes (Continued)

```
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 E5-2698 v3 @ 2.30GHz
      2 "physical id"s (chips)
      32 "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  : 16
      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
   cache size : 40960 KB

From /proc/meminfo
   MemTotal:       263719624 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.0 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.0"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57
   EDT 2014 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 12 14:39

SPEC is set to: /spec15
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sdb1      ext4  237G   11G  215G   5% /
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. 1.19 10/10/2014
```

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## Platform Notes (Continued)

```
    Memory:
     8x NO DIMM NO DIMM   3 rank
     8x Samsung M393A2G40DB0-CPB 16 GB 1 rank 2133 MHz
     8x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz

   (End of data from sysinfo program)
```

## General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/spec15/libs/32:/spec15/libs/64:/spec15/sh"
OMP_NUM_THREADS = "32"

 Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
 runspec command invoked through numactl i.e.:
 numactl --interleave=all runspec <etc>
 The Huawei CH121 V3 and Huawei CH222 V3 models are electronically equivalent.
 The results have been measured on a Huawei CH121 V3 model.
```

## 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
   435.gromacs: -DSPEC_CPU_LP64 -nofor_main
 436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
   437.leslie3d: -DSPEC_CPU_LP64
```

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## Base Portability Flags (Continued)

```
   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 -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

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

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias
```

## Peak 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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# Peak Portability Flags

Same as Base Portability Flags

# Peak Optimization Flags

C benchmarks:

      433.milc: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
                  `-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
                  `-auto-ilp32 -ansi-alias`

      470.lbm: `basepeak = yes`

   482.sphinx3: `basepeak = yes`

C++ benchmarks:

     444.namd: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
                `-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
                `-fno-alias -auto-ilp32`

    447.dealII: `basepeak = yes`

    450.soplex: `basepeak = yes`

   453.povray: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
                `-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4`
                `-ansi-alias`

Fortran benchmarks:

   410.bwaves: `basepeak = yes`

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

   434.zeusmp: `basepeak = yes`

   437.leslie3d: `basepeak = yes`

459.GemsFDTD: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
                `-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2`
                `-inline-level=0 -opt-prefetch -parallel`

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

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# Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-HASWELL-V1.4.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-HASWELL-V1.4.xml

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