



# SPEC<sup>®</sup> CFP2006 Result

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## Huawei

SPECfp<sup>®</sup>\_rate2006 = 16300

## KunLun 9032 (Intel Xeon E7-8890 v3)

SPECfp\_rate\_base2006 = 16000

CPU2006 license: 3175

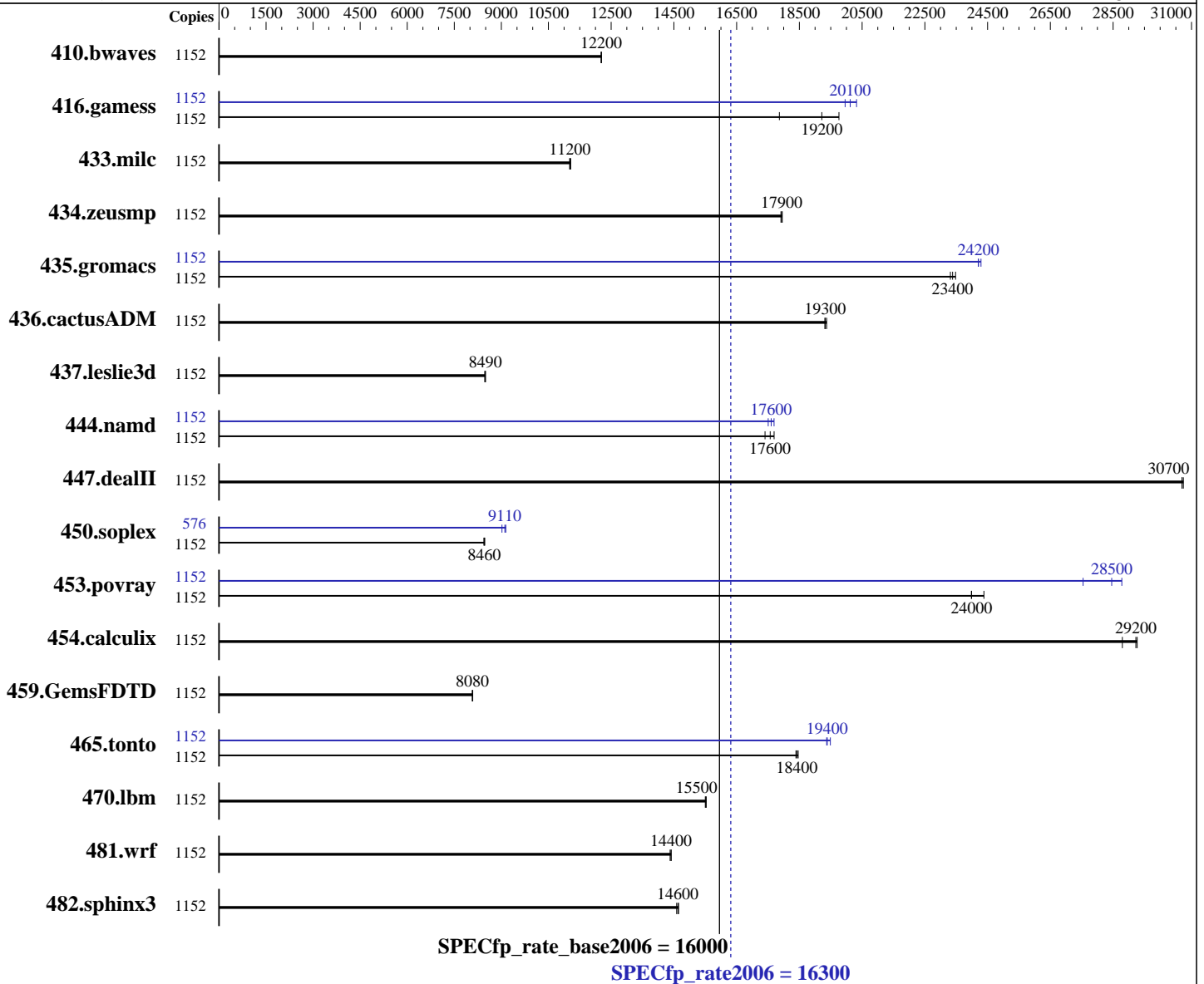
Test date: Feb-2016

Test sponsor: Huawei

Hardware Availability: Jan-2016

Tested by: Huawei

Software Availability: Aug-2015



### Hardware

CPU Name: Intel Xeon E7-8890 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2500  
 FPU: Integrated  
 CPU(s) enabled: 576 cores, 32 chips, 18 cores/chip, 2 threads/core  
 CPU(s) orderable: 4,8,16,24,32 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core

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### Software

Operating System: Red Hat Enterprise Linux Server release 7.1 (Maipo)  
 3.10.0-229.20.1.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: tmpfs

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L3 Cache: 45 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 8 TB (512 x 16 GB 2Rx4 PC4-2133P-R, running at 1600Mhz)  
 Disk Subsystem: 3 x 300 GB SAS, 10K 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	1152	1285	12200	1284	12200	<b>1285</b>	<b>12200</b>	1152	1285	12200	1284	12200	<b>1285</b>	<b>12200</b>
416.gamess	1152	1263	17900	1141	19800	<b>1174</b>	<b>19200</b>	1152	<b>1121</b>	<b>20100</b>	1110	20300	1130	20000
433.milc	1152	943	11200	946	11200	<b>945</b>	<b>11200</b>	1152	943	11200	946	11200	<b>945</b>	<b>11200</b>
434.zeusmp	1152	585	17900	584	18000	<b>584</b>	<b>17900</b>	1152	585	17900	584	18000	<b>584</b>	<b>17900</b>
435.gromacs	1152	350	23500	<b>352</b>	<b>23400</b>	353	23300	1152	339	24300	340	24200	<b>340</b>	<b>24200</b>
436.cactusADM	1152	711	19400	<b>712</b>	<b>19300</b>	713	19300	1152	711	19400	<b>712</b>	<b>19300</b>	713	19300
437.leslie3d	1152	1278	8470	1275	8490	<b>1275</b>	<b>8490</b>	1152	1278	8470	1275	8490	<b>1275</b>	<b>8490</b>
444.namd	1152	522	17700	<b>526</b>	<b>17600</b>	531	17400	1152	<b>525</b>	<b>17600</b>	522	17700	528	17500
447.dealII	1152	<b>429</b>	<b>30700</b>	429	30700	429	30700	1152	<b>429</b>	<b>30700</b>	429	30700	429	30700
450.soplex	1152	1134	8470	<b>1136</b>	<b>8460</b>	1138	8440	576	<b>527</b>	<b>9110</b>	525	9140	533	9020
453.povray	1152	251	24400	256	24000	<b>255</b>	<b>24000</b>	1152	213	28800	<b>215</b>	<b>28500</b>	223	27500
454.calculix	1152	330	28800	<b>325</b>	<b>29200</b>	325	29300	1152	330	28800	<b>325</b>	<b>29200</b>	325	29300
459.GemsFDTD	1152	<b>1513</b>	<b>8080</b>	1511	8090	1514	8070	1152	<b>1513</b>	<b>8080</b>	1511	8090	1514	8070
465.tonto	1152	614	18500	<b>615</b>	<b>18400</b>	616	18400	1152	585	19400	<b>585</b>	<b>19400</b>	582	19500
470.lbm	1152	1021	15500	<b>1020</b>	<b>15500</b>	1019	15500	1152	1021	15500	<b>1020</b>	<b>15500</b>	1019	15500
481.wrf	1152	895	14400	893	14400	<b>893</b>	<b>14400</b>	1152	895	14400	893	14400	<b>893</b>	<b>14400</b>
482.sphinx3	1152	1533	14600	<b>1535</b>	<b>14600</b>	1539	14600	1152	1533	14600	<b>1535</b>	<b>14600</b>	1539	14600

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"  
 Tmpfs filesystem can be set with:  
 mkdir -p /home/shm  
 mount -t tmpfs -o size=2048g,rw tmpfs /home/shm  
 Turbo mode set with:  
 cpupower -c all frequency-set -g performance



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## 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/shm/speccpu-1.2-ic16/config/sysinfo.rev6914

\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1

running on 9016 Fri Feb 19 06:21:30 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 E7-8890 v3 @ 2.50GHz

32 "physical id"s (chips)

1152 "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

physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 4: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 5: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 6: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 7: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 8: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 9: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 10: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 11: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 12: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 13: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 14: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 15: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 16: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 17: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 18: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 19: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 20: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 21: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 22: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 23: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 24: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 25: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 26: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 27: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 28: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

physical 29: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

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## Platform Notes (Continued)

```
physical 30: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 31: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 46080 KB
```

```
From /proc/meminfo
MemTotal:      8454947816 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.1 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.1"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server
```

```
uname -a:
Linux 9016 3.10.0-229.20.1.el7.x86_64 #1 SMP Thu Sep 24 12:23:56 EDT 2015
x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Feb 19 06:05

```
SPEC is set to: /home/shm/speccpu-1.2-ic16
Filesystem      Type      Size  Used Avail Use% Mounted on
tmpfs           tmpfs    2.0T  7.2G  2.0T   1% /home/shm
```

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. BLXSV919 12/24/2015

(End of data from sysinfo program)

Because Huawei KunLun 9032 uses System Management BIOS (SMBIOS) v3.0, but the dmidecode of RHEL7.1 is based on V2.0, so can not read the memory information.

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/home/shm/speccpu-1.2-ic16/libs/32:/home/shm/speccpu-1.2-ic16/libs/64:/home/shm/speccpu-1.2-ic16/sh"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB

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## General Notes (Continued)

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

## 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

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## Base Optimization Flags (Continued)

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

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

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## Peak Portability Flags (Continued)

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

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

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## Peak Optimization Flags (Continued)

```
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-HSW-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-HSW-RevG.xml>

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