



# SPEC<sup>®</sup> CFP2006 Result

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## Cisco Systems

**SPECfp<sup>®</sup>2006 = 69.3**

Cisco UCS C22 M3 (Intel Xeon E5-2450, 2.10 GHz)

**SPECfp\_base2006 = 66.4**

CPU2006 license: 9019

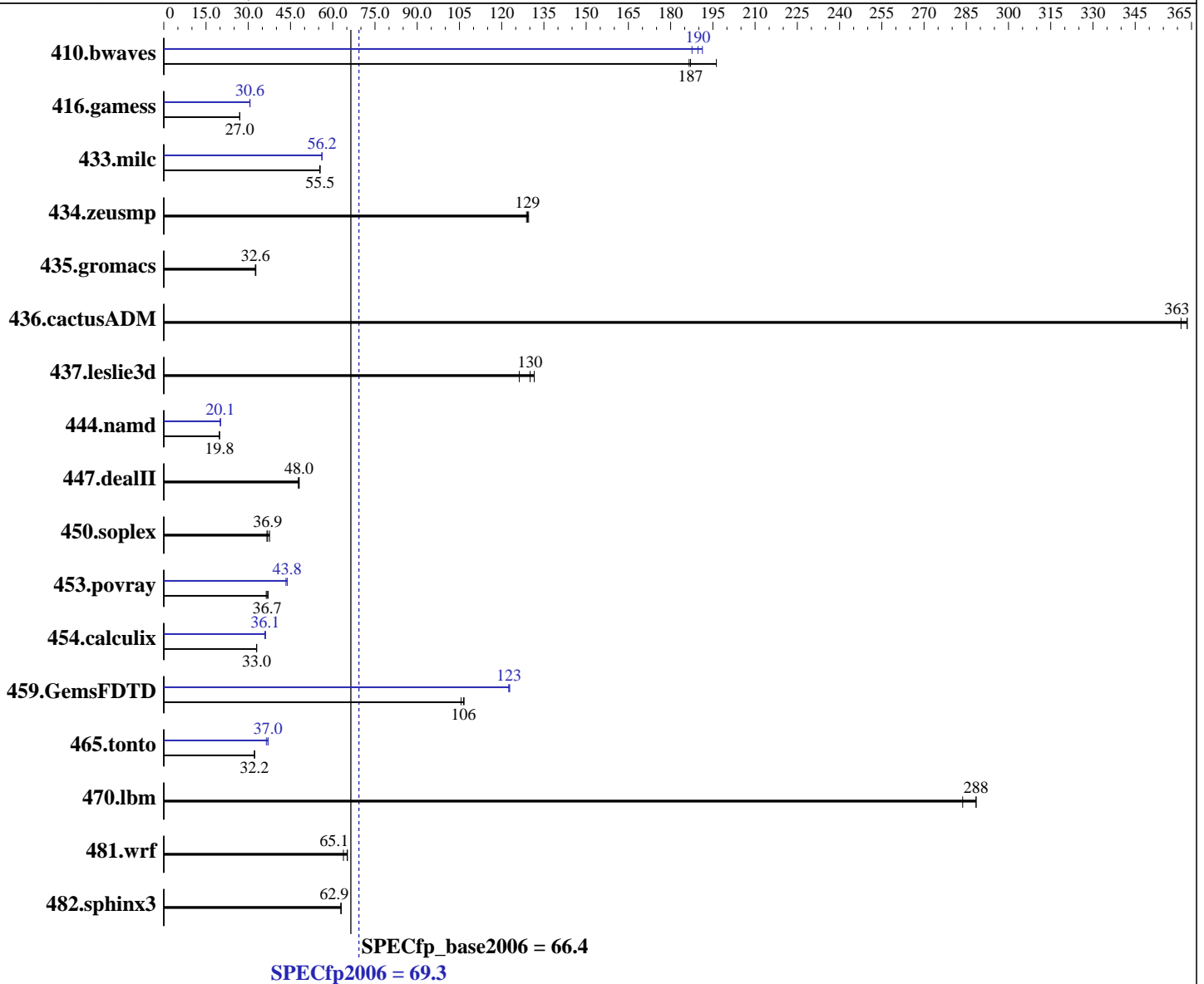
Test date: Jul-2012

Test sponsor: Cisco Systems

Hardware Availability: Aug-2012

Tested by: Cisco Systems

Software Availability: Dec-2011



### Hardware

CPU Name: Intel Xeon E5-2450  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.90 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 2 chips, 8 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

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### Software

Operating System: Red Hat Enterprise Linux Server release 6.2 (Santiago)  
 2.6.32-220.el6.x86\_64  
 Compiler: C/C++: Version 12.1.3.293 of Intel C++ Studio XE for Linux;  
 Fortran: Version 12.1.3.293 of Intel Fortran Studio XE for Linux  
 Auto Parallel: Yes  
 File System: ext4

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L3 Cache: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 96 GB (12 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: 146 GB 15000 RPM SAS  
 Other Hardware: None

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

## Results Table

| Benchmark     | Base        |             |             |             |             |             | Peak        |             |             |             |             |             |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|               | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       |
| 410.bwaves    | 72.8        | 187         | <b>72.6</b> | <b>187</b>  | 69.2        | 196         | <b>71.6</b> | <b>190</b>  | 72.4        | 188         | 71.0        | 191         |
| 416.gamess    | 727         | 27.0        | <b>726</b>  | <b>27.0</b> | 725         | 27.0        | 640         | 30.6        | <b>640</b>  | <b>30.6</b> | 640         | 30.6        |
| 433.milc      | 165         | 55.5        | <b>165</b>  | <b>55.5</b> | 166         | 55.4        | 163         | 56.2        | 163         | 56.2        | <b>163</b>  | <b>56.2</b> |
| 434.zeusmp    | <b>70.4</b> | <b>129</b>  | 70.2        | 130         | 70.6        | 129         | <b>70.4</b> | <b>129</b>  | 70.2        | 130         | 70.6        | 129         |
| 435.gromacs   | 218         | 32.7        | 220         | 32.5        | <b>219</b>  | <b>32.6</b> | 218         | 32.7        | 220         | 32.5        | <b>219</b>  | <b>32.6</b> |
| 436.cactusADM | 33.1        | 361         | <b>32.9</b> | <b>363</b>  | 32.9        | 363         | 33.1        | 361         | <b>32.9</b> | <b>363</b>  | 32.9        | 363         |
| 437.leslie3d  | 71.4        | 132         | 74.4        | 126         | <b>72.2</b> | <b>130</b>  | 71.4        | 132         | 74.4        | 126         | <b>72.2</b> | <b>130</b>  |
| 444.namd      | 406         | 19.8        | 406         | 19.8        | <b>406</b>  | <b>19.8</b> | 399         | 20.1        | 399         | 20.1        | <b>399</b>  | <b>20.1</b> |
| 447.dealII    | 239         | 47.8        | <b>238</b>  | <b>48.0</b> | 238         | 48.1        | 239         | 47.8        | <b>238</b>  | <b>48.0</b> | 238         | 48.1        |
| 450.soplex    | 222         | 37.6        | <b>226</b>  | <b>36.9</b> | 228         | 36.6        | 222         | 37.6        | <b>226</b>  | <b>36.9</b> | 228         | 36.6        |
| 453.povray    | 146         | 36.4        | 144         | 37.1        | <b>145</b>  | <b>36.7</b> | <b>121</b>  | <b>43.8</b> | 121         | 43.8        | 123         | 43.4        |
| 454.calculix  | 250         | 33.0        | 250         | 33.0        | <b>250</b>  | <b>33.0</b> | 228         | 36.1        | 230         | 35.9        | <b>229</b>  | <b>36.1</b> |
| 459.GemsFDTD  | <b>99.7</b> | <b>106</b>  | 100         | 106         | 99.5        | 107         | 86.6        | 123         | <b>86.6</b> | <b>123</b>  | 86.4        | 123         |
| 465.tonto     | 305         | 32.3        | <b>305</b>  | <b>32.2</b> | 306         | 32.2        | <b>266</b>  | <b>37.0</b> | 266         | 37.0        | 270         | 36.4        |
| 470.lbm       | 47.6        | 288         | 48.4        | 284         | <b>47.6</b> | <b>288</b>  | 47.6        | 288         | 48.4        | 284         | <b>47.6</b> | <b>288</b>  |
| 481.wrf       | <b>171</b>  | <b>65.1</b> | 175         | 63.8        | 171         | 65.2        | <b>171</b>  | <b>65.1</b> | 175         | 63.8        | 171         | 65.2        |
| 482.sphinx3   | 310         | 63.0        | <b>310</b>  | <b>62.9</b> | 310         | 62.9        | <b>310</b>  | <b>63.0</b> | <b>310</b>  | <b>62.9</b> | 310         | 62.9        |

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

Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6800  
 \$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3  
 running on localhost.localdomain Wed Jul 11 23:07:14 2012

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 E5-2450 0 @ 2.10GHz  
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Hardware Availability: Aug-2012

Software Availability: Dec-2011

## Platform Notes (Continued)

2 "physical id"s (chips)  
16 "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 : 8
siblings  : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
cache size : 20480 KB
```

From /proc/meminfo

```
MemTotal:      99041972 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

/usr/bin/lsc\_release -d

Red Hat Enterprise Linux Server release 6.2 (Santiago)

From /etc/\*release\* /etc/\*version\*

```
redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

uname -a:

```
Linux localhost.localdomain 2.6.32-220.el6.x86_64 #1 SMP Wed Nov 9 08:03:13
EST 2011 x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Jul 11 23:05

SPEC is set to: /opt/cpu2006-1.2

```
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sdal        ext4      134G  10G  118G   8% /
```

Additional information from dmidecode:

Memory:

12x 0xCE00 M393B1K70DH0-YK0 8 GB 1600 MHz 2 rank

(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 = "/opt/cpu2006-1.2/libs/32:/opt/cpu2006-1.2/libs/64"

OMP\_NUM\_THREADS = "16"

Intel HT Technology=disable

Binaries compiled on a system with 2 X Intel Xeon E5-2690 CPU + 128 GB memory using RHEL 6.2

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled

Filesystem page cache cleared with:

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## General Notes (Continued)

```
echo 1> /proc/sys/vm/drop_caches
```

## 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:

```
-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:

```
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias
```

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## Base Optimization Flags (Continued)

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -static -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

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

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

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -xAVX(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

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## Peak Optimization Flags (Continued)

447.dealll: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xAVX(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: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -parallel  
-static

416.gamess: -xAVX(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- -static

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xAVX(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: -xAVX(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

### Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xAVX -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-ic12.1-official-linux64.20120425.html>

<http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20120425.xml>

<http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2.xml>



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