



# SPEC<sup>®</sup> CFP2006 Result

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## Cisco Systems

Cisco UCS C220 M3 (Intel Xeon E5-2660 v2, 2.20 GHz)

SPECfp<sup>®</sup>\_rate2006 = 587

SPECfp\_rate\_base2006 = 575

CPU2006 license: 9019

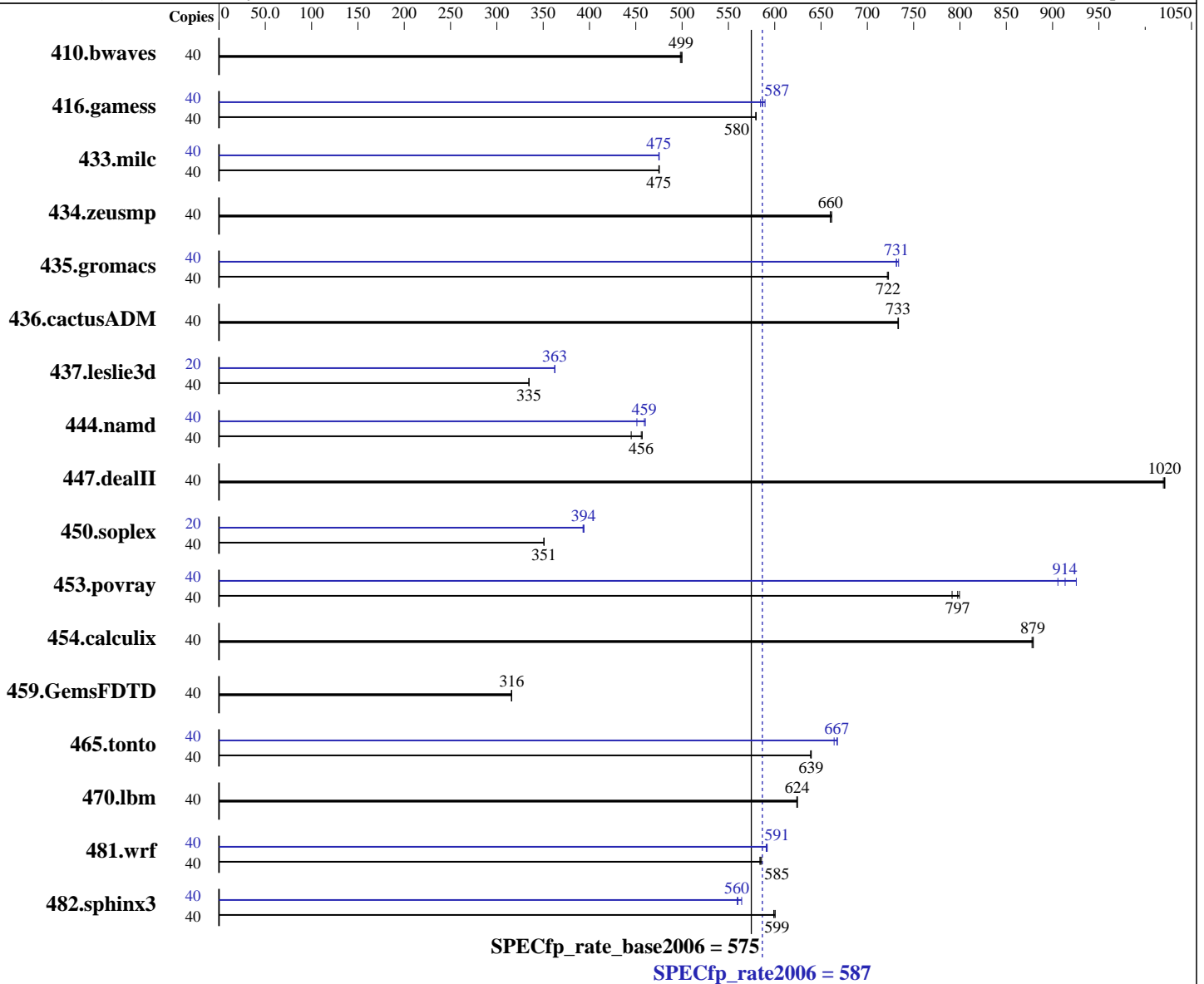
Test sponsor: Cisco Systems

Tested by: Cisco Systems

Test date: Dec-2013

Hardware Availability: Dec-2013

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2660 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 20 cores, 2 chips, 10 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: 256 KB I+D on chip per core

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### Software

Operating System: Red Hat Enterprise Linux Server release 6.4 (Santiago)  
 2.6.32-358.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4

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L3 Cache: 25 MB I+D on chip per chip  
Other Cache: None  
Memory: 128 GB (16 x 8 GB 2Rx4 PC3-14900R-13, ECC)  
Disk Subsystem: 1 X 146 GB 15000 RPM SAS  
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    | 40     | 1087              | 500               | <b><u>1089</u></b> | <b><u>499</u></b>  | 1091               | 498               | 40     | 1087               | 500               | <b><u>1089</u></b> | <b><u>499</u></b>  | 1091               | 498               |
| 416.gamess    | 40     | 1352              | 579               | 1350               | 580                | <b><u>1351</u></b> | <b><u>580</u></b> | 40     | 1328               | 590               | 1340               | 585                | <b><u>1334</u></b> | <b><u>587</u></b> |
| 433.milc      | 40     | <b><u>773</u></b> | <b><u>475</u></b> | 773                | 475                | 772                | 475               | 40     | 772                | 475               | 773                | 475                | <b><u>773</u></b>  | <b><u>475</u></b> |
| 434.zeusmp    | 40     | 550               | 662               | <b><u>551</u></b>  | <b><u>660</u></b>  | 552                | 660               | 40     | 550                | 662               | <b><u>551</u></b>  | <b><u>660</u></b>  | 552                | 660               |
| 435.gromacs   | 40     | 395               | 723               | <b><u>395</u></b>  | <b><u>722</u></b>  | 396                | 722               | 40     | 390                | 731               | 389                | 734                | <b><u>390</u></b>  | <b><u>731</u></b> |
| 436.cactusADM | 40     | 652               | 733               | 652                | 734                | <b><u>652</u></b>  | <b><u>733</u></b> | 40     | 652                | 733               | 652                | 734                | <b><u>652</u></b>  | <b><u>733</u></b> |
| 437.leslie3d  | 40     | 1123              | 335               | <b><u>1123</u></b> | <b><u>335</u></b>  | 1124               | 335               | 20     | 518                | 363               | 519                | 362                | <b><u>518</u></b>  | <b><u>363</u></b> |
| 444.namd      | 40     | 721               | 445               | 702                | 457                | <b><u>704</u></b>  | <b><u>456</u></b> | 40     | <b><u>699</u></b>  | <b><u>459</u></b> | 697                | 460                | 711                | 451               |
| 447.dealII    | 40     | 448               | 1020              | <b><u>448</u></b>  | <b><u>1020</u></b> | 449                | 1020              | 40     | 448                | 1020              | <b><u>448</u></b>  | <b><u>1020</u></b> | 449                | 1020              |
| 450.soplex    | 40     | 950               | 351               | <b><u>951</u></b>  | <b><u>351</u></b>  | 951                | 351               | 20     | 424                | 393               | 423                | 394                | <b><u>424</u></b>  | <b><u>394</u></b> |
| 453.povray    | 40     | 269               | 791               | 266                | 800                | <b><u>267</u></b>  | <b><u>797</u></b> | 40     | <b><u>233</u></b>  | <b><u>914</u></b> | 235                | 906                | 230                | 926               |
| 454.calculix  | 40     | 375               | 879               | <b><u>376</u></b>  | <b><u>879</u></b>  | 376                | 878               | 40     | 375                | 879               | <b><u>376</u></b>  | <b><u>879</u></b>  | 376                | 878               |
| 459.GemsFDTD  | 40     | 1344              | 316               | <b><u>1343</u></b> | <b><u>316</u></b>  | 1343               | 316               | 40     | 1344               | 316               | <b><u>1343</u></b> | <b><u>316</u></b>  | 1343               | 316               |
| 465.tonto     | 40     | 616               | 639               | 616                | 639                | <b><u>616</u></b>  | <b><u>639</u></b> | 40     | 590                | 668               | 593                | 664                | <b><u>590</u></b>  | <b><u>667</u></b> |
| 470.lbm       | 40     | <b><u>880</u></b> | <b><u>624</u></b> | 881                | 624                | 880                | 625               | 40     | <b><u>880</u></b>  | <b><u>624</u></b> | 881                | 624                | 880                | 625               |
| 481.wrf       | 40     | <b><u>764</u></b> | <b><u>585</u></b> | 763                | 586                | 765                | 584               | 40     | 755                | 592               | 756                | 591                | <b><u>755</u></b>  | <b><u>591</u></b> |
| 482.sphinx3   | 40     | 1302              | 599               | 1298               | 601                | <b><u>1301</u></b> | <b><u>599</u></b> | 40     | <b><u>1391</u></b> | <b><u>560</u></b> | 1381               | 564                | 1393               | 560               |

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 Settings:  
Intel HT Technology = Enabled  
CPU performance set to HPC

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Software Availability: Sep-2013

### Platform Notes (Continued)

Power Technology set to Custom  
 CPU Power State C6 set to Enabled  
 CPU Power State C1 Enhanced set to Disabled  
 Energy Performance policy set to Performance  
 Memory RAS configuration set to Maximum Performance  
 DRAM Clock Throttling Set to Performance  
 LV DDR Mode set to Performance-mode  
 DRAM Refresh Rate Set to 1x  
 Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6818  
 \$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
 running on localhost.localdomain Thu Dec 19 03:24:51 2013

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 E5-2660 v2 @ 2.20GHz
 2 "physical id"s (chips)
 40 "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 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size     : 25600 KB
```

```
From /proc/meminfo
MemTotal:      132123340 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.4 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux localhost.localdomain 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013 x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Dec 19 03:23

```
SPEC is set to: /opt/cpu2006-1.2
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sdal       ext4      134G  12G  116G  10% /
```

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### Platform Notes (Continued)

Additional information from dmidecode:  
BIOS Cisco Systems, Inc. C220M3.1.5.2.27.071120132232 07/11/2013  
Memory:  
16x 0xAD00 HMT31GR7EFR4C-RD 8 GB 1866 MHz 2 rank  
  
(End of data from sysinfo program)

### General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/opt/cpu2006-1.2/libs/32:/opt/cpu2006-1.2/libs/64:/opt/cpu2006-1.2/sh"  
  
Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4  
Transparent Huge Pages enabled with:  
echo always > /sys/kernel/mm/redhat\_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

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## Base Portability Flags (Continued)

```

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

```

C++ benchmarks:

```

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3

```

Fortran benchmarks:

```

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

```

Benchmarks using both Fortran and C:

```

-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3

```

## Peak Compiler Invocation

C benchmarks (except as noted below):

```
icc -m64
```

```
482.sphinx3: icc -m32
```

C++ benchmarks (except as noted below):

```
icpc -m64
```

```
450.soplex: icpc -m32
```

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.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -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

```

## 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) -opt-mem-layout-trans=3(pass 2)
         -prof-use(pass 2) -auto-ilp32

```

```

470.lbm: basepeak = yes

```

```

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
            -unroll2

```

C++ benchmarks:

```

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
         -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
         -prof-use(pass 2) -fno-alias -auto-ilp32

```

```

447.dealII: basepeak = yes

```

```

450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
         -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
         -prof-use(pass 2) -opt-malloc-options=3

```

```

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
         -no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
         -prof-use(pass 2) -unroll4 -ansi-alias

```

Fortran benchmarks:

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## Peak Optimization Flags (Continued)

410.bwaves: basepeak = yes

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-

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

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

Benchmarks using both Fortran and C:

435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -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: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html>

<http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2.20130717.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>

<http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2.20130717.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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