SPEC® CFP2006 Result
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Cisco Systems

Cisco UCS C460 M4 (Intel Xeon E7-4860 v2 @ 2.60GHz)

$SPECfp®\_rate2006 =$ 1450

$SPECfp\_rate\_base2006 =$ 1420
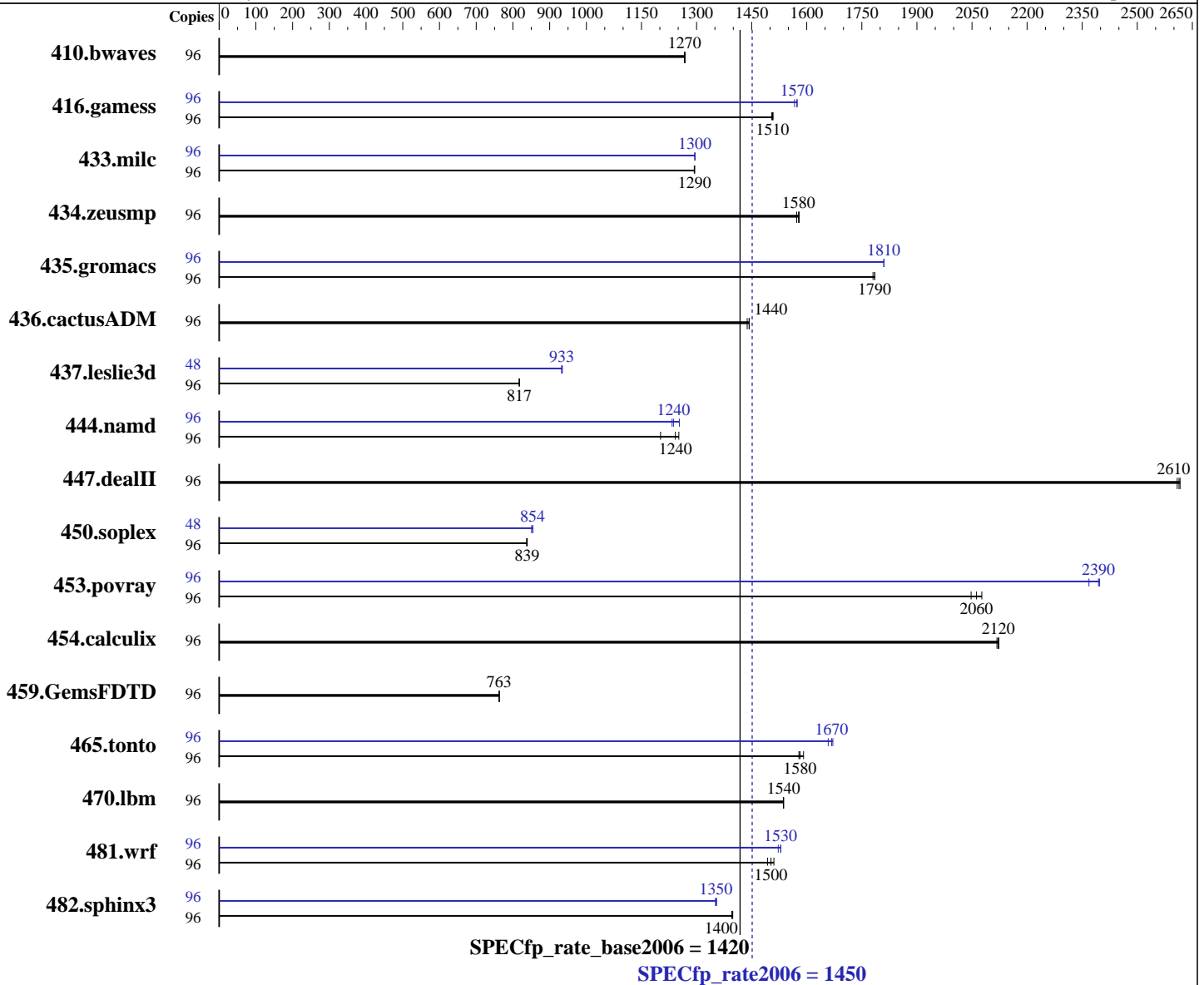
CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

Test date: Feb-2014
Hardware Availability: Apr-2014
Software Availability: Sep-2013

Benchmark	Copies	Result
410.bwaves	96	1270
416.gamess	96	1570
416.gamess	96	1510
433.milc	96	1300
433.milc	96	1290
434.zeusmp	96	1580
435.gromacs	96	1810
435.gromacs	96	1790
436.cactusADM	96	1440
437.leslie3d	48	933
437.leslie3d	96	817
444.namd	96	1240
444.namd	96	1240
447.dealII	96	2610
450.soplex	48	854
450.soplex	96	839
453.povray	96	2390
453.povray	96	2060
454.calculix	96	2120
459.GemsFDTD	96	763
465.tonto	96	1670
465.tonto	96	1580
470.lbm	96	1540
481.wrf	96	1530
481.wrf	96	1500
482.sphinx3	96	1350
482.sphinx3	96	1400

SPECfp_rate_base2006 = 1420

SPECfp_rate2006 = 1450

Hardware

CPU Name: Intel Xeon E7-4860 v2
CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz: 2600
FPU: Integrated
CPU(s) enabled: 48 cores, 4 chips, 12 cores/chip, 2 threads/core
CPU(s) orderable: 1,2,3,4 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 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:	30 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	32/64-bit
Memory:	512 GB (64 x 8 GB 2Rx4 PC3-12800R-11, ECC, and CL11)	Peak Pointers:	32/64-bit
		Other Software:	None
Disk Subsystem:	1 x 300 GB SAS SATA 15K RPM		
Other Hardware:	None		

Results Table

	Base						Peak					
Benchmark	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Copies**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	96	1028	1270	**1029**	**1270**	1030	1270	96	1028	1270	**1029**	**1270**	1030	1270
416.gamess	96	1246	1510	**1247**	**1510**	1249	1500	96	**1195**	**1570**	1194	1570	1200	1570
433.milc	96	681	1290	681	1290	**681**	**1290**	96	680	1300	**680**	**1300**	680	1300
434.zeusmp	96	556	1570	553	1580	**554**	**1580**	96	556	1570	553	1580	**554**	**1580**
435.gromacs	96	384	1790	**384**	**1790**	385	1780	96	379	1810	**379**	**1810**	379	1810
436.cactusADM	96	**795**	**1440**	798	1440	795	1440	96	**795**	**1440**	798	1440	795	1440
437.leslie3d	96	1104	817	**1104**	**817**	1104	818	48	484	933	**483**	**933**	483	934
444.namd	96	615	1250	**620**	**1240**	641	1200	96	624	1230	614	1250	**622**	**1240**
447.dealII	96	**420**	**2610**	420	2620	421	2610	96	**420**	**2610**	420	2620	421	2610
450.soplex	96	**955**	**839**	954	839	957	837	48	471	851	**469**	**854**	469	854
453.povray	96	**248**	**2060**	249	2050	246	2080	96	**213**	**2390**	213	2400	216	2370
454.calculix	96	374	2120	**373**	**2120**	373	2120	96	374	2120	**373**	**2120**	373	2120
459.GemsFDTD	96	**1336**	**763**	1336	762	1335	763	96	**1336**	**763**	1336	762	1335	763
465.tonto	96	594	1590	**597**	**1580**	598	1580	96	**566**	**1670**	570	1660	565	1670
470.lbm	96	**858**	**1540**	859	1540	858	1540	96	**858**	**1540**	859	1540	858	1540
481.wrf	96	718	1490	710	1510	**714**	**1500**	96	704	1520	701	1530	**701**	**1530**
482.sphinx3	96	1338	1400	1340	1400	**1339**	**1400**	96	1384	1350	1381	1350	**1383**	**1350**

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"

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Platform Notes

```
CPU performance set to Enterprise
Power Technology set to Custom
CPU Power State C6 set to Enabled
CPU Power State C1 Enhanced set to Disabled
Package C State Limit set to C0/C1 State
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 SPECCPU-RHEL64 Fri Mar 21 11:31:12 2014

 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 E7-4860 v2 @ 2.60GHz
       4 "physical id"s (chips)
       96 "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 : 12
       siblings  : 24
       physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
       physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
       physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13
       physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13
    cache size : 30720 KB

 From /proc/meminfo
    MemTotal:       529137696 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 SPECCPU-RHEL64 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 Mar 20 16:07
```

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Platform Notes (Continued)

```
  SPEC is set to: /opt/cpu2006-1.2
    Filesystem     Type     Size   Used Avail Use% Mounted on
    /dev/sda2      ext4     275G   11G  251G   4% /

  Additional information from dmidecode:
    BIOS Cisco Systems, Inc. C460M4.1.5.5.13.012720142211 01/27/2014
    Memory:
    64x    8 GB
    64x 0xCE00 M393B1K70QB0-YK0 8 GB 1333 MHz 2 rank
    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 = "/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

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Base Portability Flags (Continued)

```
     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 -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
```

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Peak Compiler Invocation (Continued)

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
     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
```

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Peak Optimization Flags (Continued)

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:

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-V1.2.20140311.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-V1.2.20140311.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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