SPEC® CFP2006 Result
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Cisco Systems

Cisco UCS B460 M4 (Intel Xeon E7-8890 v4 2.20 GHz)

$SPECfp^{®}2006 =$ 129

$SPECfp\_base2006 =$ 122

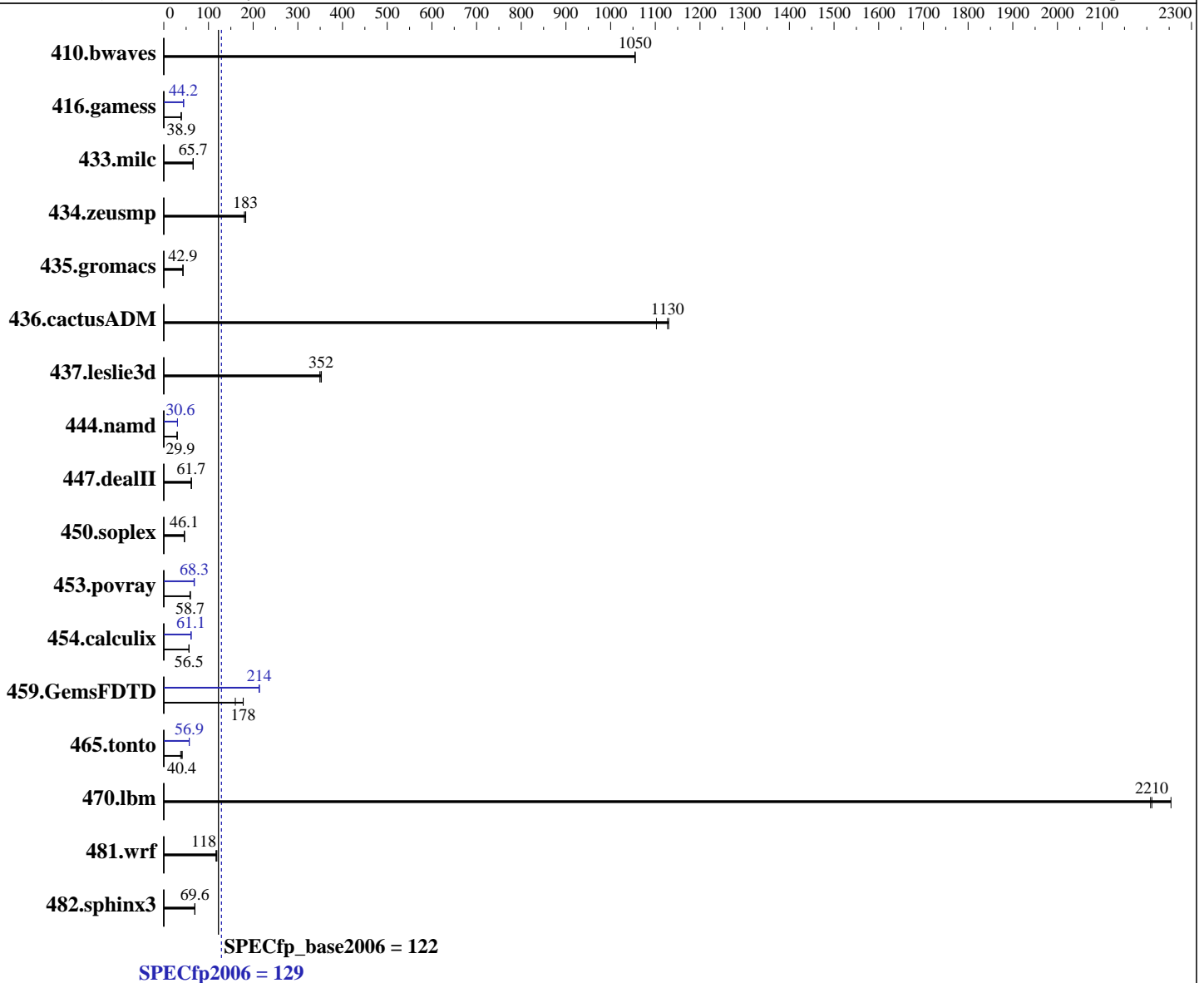|	
CPU2006 license: 9019	**Test date:** Apr-2017
Test sponsor: Cisco Systems	**Hardware Availability:** Apr-2016
Tested by: Cisco Systems	**Software Availability:** Sep-2016

Benchmark results (reference time ratios):

- 410.bwaves: 1050
- 416.gamess: 44.2 / 38.9
- 433.milc: 65.7
- 434.zeusmp: 183
- 435.gromacs: 42.9
- 436.cactusADM: 1130
- 437.leslie3d: 352
- 444.namd: 30.6 / 29.9
- 447.dealII: 61.7
- 450.soplex: 46.1
- 453.povray: 68.3 / 58.7
- 454.calculix: 61.1 / 56.5
- 459.GemsFDTD: 214 / 178
- 465.tonto: 56.9 / 40.4
- 470.lbm: 2210
- 481.wrf: 118
- 482.sphinx3: 69.6

SPECfp_base2006 = 122

SPECfp2006 = 129

Hardware

CPU Name:	Intel Xeon E7-8890 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.40 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	96 cores, 4 chips, 24 cores/chip
CPU(s) orderable:	2,4 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:	SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)

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L3 Cache:	60 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	1 TB (32 x 32 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)	Other Software:	None
Disk Subsystem:	1 x 400 GB SAS SSD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	12.9	1050	**12.9**	**1050**	12.9	1050	12.9	1050	**12.9**	**1050**	12.9	1050
416.gamess	**504**	**38.9**	499	39.2	504	38.9	443	44.2	**443**	**44.2**	442	44.2
433.milc	139	65.8	**140**	**65.7**	140	65.6	139	65.8	**140**	**65.7**	140	65.6
434.zeusmp	49.6	183	**49.8**	**183**	50.5	180	49.6	183	**49.8**	**183**	50.5	180
435.gromacs	167	42.8	**167**	**42.9**	166	42.9	167	42.8	**167**	**42.9**	166	42.9
436.cactusADM	10.6	1130	10.8	1100	**10.6**	**1130**	10.6	1130	10.8	1100	**10.6**	**1130**
437.leslie3d	26.7	353	**26.7**	**352**	26.9	349	26.7	353	**26.7**	**352**	26.9	349
444.namd	268	29.9	268	29.9	**268**	**29.9**	262	30.6	262	30.6	**262**	**30.6**
447.dealII	185	61.8	**185**	**61.7**	186	61.6	185	61.8	**185**	**61.7**	186	61.6
450.soplex	**181**	**46.1**	181	46.1	180	46.2	**181**	**46.1**	181	46.1	180	46.2
453.povray	91.0	58.5	88.9	59.8	**90.6**	**58.7**	78.6	67.7	**77.9**	**68.3**	77.7	68.4
454.calculix	146	56.5	**146**	**56.5**	146	56.4	**135**	**61.1**	135	61.1	136	60.9
459.GemsFDTD	59.7	178	**59.7**	**178**	66.3	160	**49.6**	**214**	49.8	213	49.6	214
465.tonto	239	41.2	261	37.8	**243**	**40.4**	173	57.0	**173**	**56.9**	173	56.9
470.lbm	6.22	2210	**6.21**	**2210**	6.10	2250	6.22	2210	**6.21**	**2210**	6.10	2250
481.wrf	95.6	117	93.9	119	**94.8**	**118**	95.6	117	93.9	119	**94.8**	**118**
482.sphinx3	281	69.3	**280**	**69.6**	279	69.8	281	69.3	**280**	**69.6**	279	69.8

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 Settings:
Intel Hyper-Threading Technology option set to Disabled
CPU performance set to Enterprise
Power Technology set to Energy Efficient
Energy Performance BIAS setting set to Balanced Performance
Memory RAS configuration set to Maximum Performance
Memory Power Saving Mode set to Disabled
QPI Snoop Mode set to Home Directory Snoop with OSB
 Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6993
```

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Hardware Availability: Apr-2016
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Platform Notes (Continued)

```
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-3y2r Tue Apr 25 02:08:38 2017

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 v4 @ 2.20GHz
      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 : 24
      siblings  : 24
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
   cache size : 61440 KB

From /proc/meminfo
   MemTotal:       1058506000 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 1
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12-SP1"
      VERSION_ID="12.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
   Linux linux-3y2r 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
  run-level 3 Jan 4 23:04

  SPEC is set to: /opt/cpu2006-1.2
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda1       xfs   373G   23G  351G   7% /
  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 Cisco Systems, Inc. EXM4.3.1.2c.0.080220161434 08/02/2016
  Memory:
   32x 0xCE00 M393A4K40BB0-CPB 32 GB 2 rank 2133 MHz, configured at 1600 MHz
   64x NO DIMM NO DIMM   2400 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"
LD_LIBRARY_PATH = "/opt/cpu2006-1.2/libs/32:/opt/cpu2006-1.2/libs/64:/opt/cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "96"

 Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

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

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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 -parallel -qopt-prefetch
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

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

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

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: basepeak = yes

    470.lbm: basepeak = yes

    482.sphinx3: basepeak = yes

C++ benchmarks:

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

    447.dealII: basepeak = yes

    450.soplex: basepeak = yes

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

Fortran benchmarks:

    410.bwaves: basepeak = yes

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

    434.zeusmp: basepeak = yes

    437.leslie3d: basepeak = yes

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

    465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
        -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
        -no-prec-div(pass 2) -inline-calloc -qopt-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

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-ic17.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revD.20170404.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revD.20170404.xml

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