SPEC® CFP2006 Result
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Cisco Systems

Cisco UCS C220 M4 (Intel Xeon E5-2697 v4 2.30 GHz)

$SPECfp^{®}2006 =$ 126
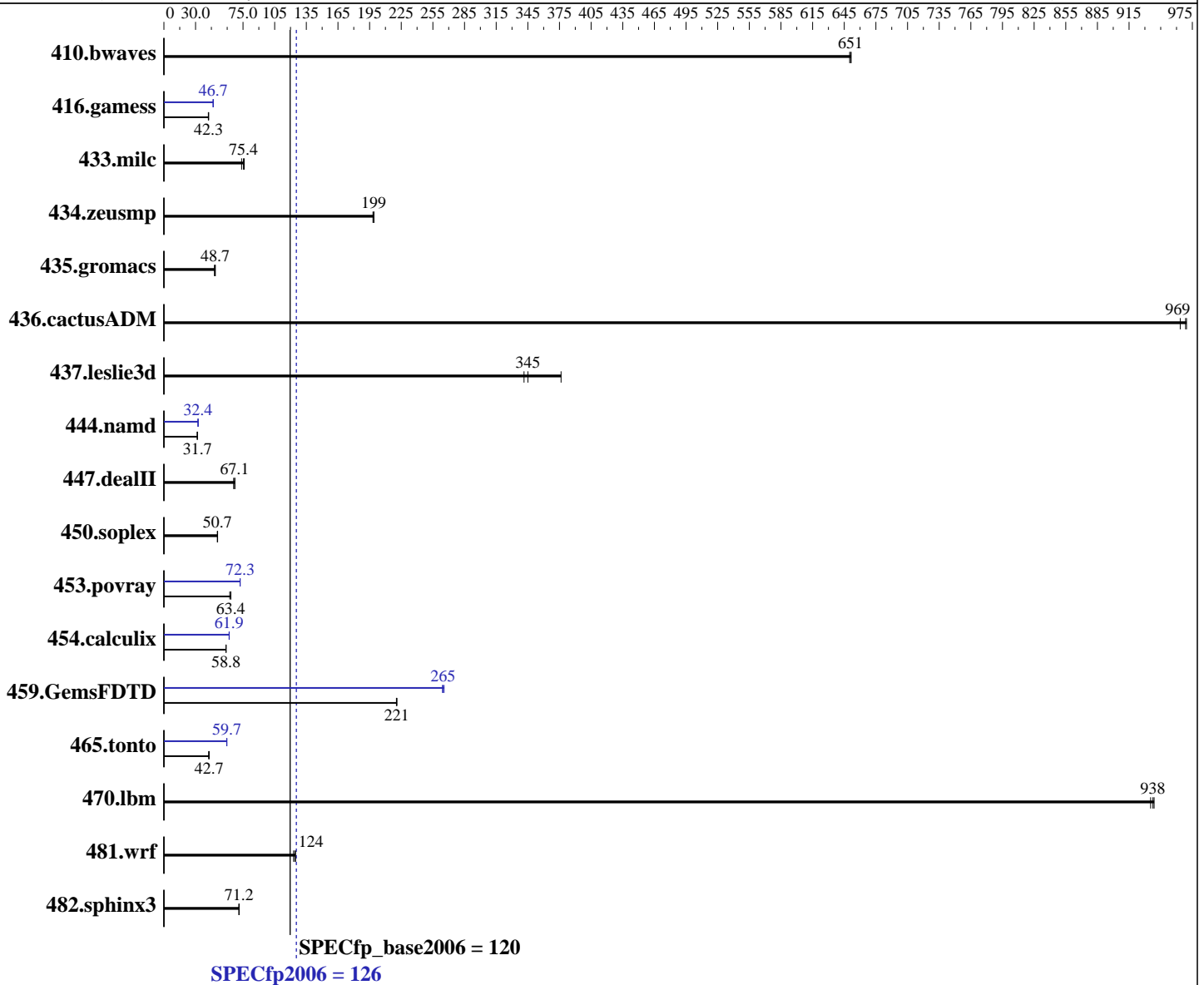
$SPECfp\_base2006 =$ 120

CPU2006 license: 9019	**Test date:** Feb-2017
Test sponsor: Cisco Systems	**Hardware Availability:** Apr-2016
Tested by: Cisco Systems	**Software Availability:** Dec-2015

0 30.0 75.0 105 135 165 195 225 255 285 315 345 375 405 435 465 495 525 555 585 615 645 675 705 735 765 795 825 855 885 915 975

- 410.bwaves 651
- 416.gamess 46.7 / 42.3
- 433.milc 75.4
- 434.zeusmp 199
- 435.gromacs 48.7
- 436.cactusADM 969
- 437.leslie3d 345
- 444.namd 32.4 / 31.7
- 447.dealII 67.1
- 450.soplex 50.7
- 453.povray 72.3 / 63.4
- 454.calculix 61.9 / 58.8
- 459.GemsFDTD 265 / 221
- 465.tonto 59.7 / 42.7
- 470.lbm 938
- 481.wrf 124
- 482.sphinx3 71.2

SPECfp_base2006 = 120

SPECfp2006 = 126

Hardware

CPU Name:	Intel Xeon E5-2697 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	36 cores, 2 chips, 18 cores/chip
CPU(s) orderable:	1,2 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:	45 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)	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	20.9	652	**20.9**	**651**	20.9	650	20.9	652	**20.9**	**651**	20.9	650
416.gamess	465	42.1	**462**	**42.3**	462	42.4	419	46.7	**419**	**46.7**	419	46.7
433.milc	125	73.7	**122**	**75.4**	121	76.1	125	73.7	**122**	**75.4**	121	76.1
434.zeusmp	45.7	199	45.9	198	**45.7**	**199**	45.7	199	45.9	198	**45.7**	**199**
435.gromacs	149	47.9	**147**	**48.7**	147	48.7	149	47.9	**147**	**48.7**	147	48.7
436.cactusADM	12.3	969	**12.3**	**969**	12.4	964	12.3	969	**12.3**	**969**	12.4	964
437.leslie3d	25.0	377	**27.2**	**345**	27.5	341	25.0	377	**27.2**	**345**	27.5	341
444.namd	253	31.7	253	31.7	**253**	**31.7**	247	32.4	248	32.3	**248**	**32.4**
447.dealII	**170**	**67.1**	170	67.2	173	66.1	**170**	**67.1**	170	67.2	173	66.1
450.soplex	164	50.7	164	50.9	**164**	**50.7**	164	50.7	164	50.9	**164**	**50.7**
453.povray	83.8	63.5	**83.9**	**63.4**	85.2	62.4	**73.6**	**72.3**	73.6	72.3	73.7	72.2
454.calculix	140	59.0	**140**	**58.8**	140	58.8	133	62.0	133	61.8	**133**	**61.9**
459.GemsFDTD	48.1	220	**48.1**	**221**	48.0	221	**40.1**	**265**	39.9	266	40.2	264
465.tonto	232	42.4	**230**	**42.7**	230	42.8	**165**	**59.7**	165	59.5	165	59.7
470.lbm	**14.7**	**938**	14.7	935	14.6	939	**14.7**	**938**	14.7	935	14.6	939
481.wrf	**90.0**	**124**	90.9	123	89.5	125	**90.0**	**124**	90.9	123	89.5	125
482.sphinx3	274	71.2	**274**	**71.2**	274	71.2	274	71.2	**274**	**71.2**	274	71.2

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
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
```

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CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

Test date: Feb-2017
Hardware Availability: Apr-2016
Software Availability: Dec-2015

Platform Notes (Continued)

```
running on linux-u192 Tue Feb  7 03:05:04 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 E5-2697 v4 @ 2.30GHz
      2 "physical id"s (chips)
      36 "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  : 18
      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
   cache size : 46080 KB

From /proc/meminfo
   MemTotal:       264566924 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-u192 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 6 22:10

SPEC is set to: /opt/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda1       xfs   372G   12G  360G   4% /
Additional information from dmidecode:
```

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Platform Notes (Continued)

```
    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. C220M4.2.0.13d.0.0812161113 08/12/2016
  Memory:
    16x 0xCE00 M393A2G40EB1-CRC 16 GB 2 rank 2400 MHz
    8x NO DIMM NO DIMM

  (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 = "36"

 Binaries compiled on a system with 1x Intel Core i7-4790 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
```

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
```

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Cisco Systems

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SPECfp2006 = 126

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CPU2006 license: 9019

Test sponsor: Cisco Systems

Tested by: Cisco Systems

Test date: Feb-2017

Hardware Availability: Apr-2016

Software Availability: Dec-2015

Base Portability Flags (Continued)

```
    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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

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CPU2006 license: 9019		**Test date:**	Feb-2017
Test sponsor: Cisco Systems		**Hardware Availability:**	Apr-2016
Tested by: Cisco Systems		**Software Availability:**	Dec-2015

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`

Benchmarks using both Fortran and C:

    435.gromacs: `basepeak = yes`

  436.cactusADM: `basepeak = yes`

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Peak Optimization Flags (Continued)

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-revE.html

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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-revE.xml

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Tested with SPEC CPU2006 v1.2.
Report generated on Tue Feb 21 16:14:17 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 21 February 2017.