SPEC® CFP2006 Result
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Cisco Systems

Cisco UCS C220 M4 (Intel Xeon E5-2660 v4, 2.00 GHz)

$SPECfp^{®}2006 =$ 117
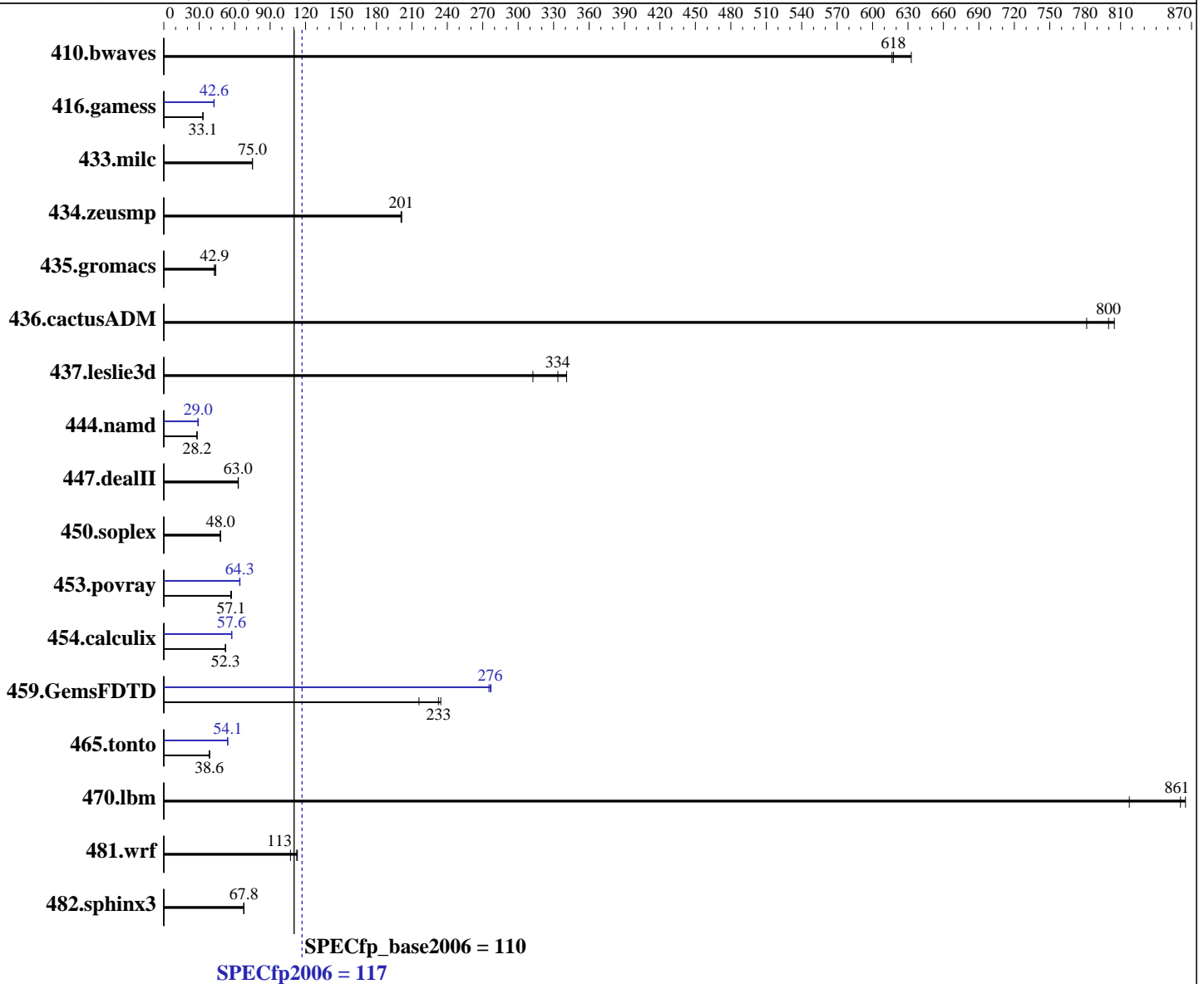
$SPECfp\_base2006 =$ 110

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

Test date: Jul-2016
Hardware Availability: Apr-2016
Software Availability: Dec-2015

Benchmark	Result
410.bwaves	618
416.gamess	42.6 / 33.1
433.milc	75.0
434.zeusmp	201
435.gromacs	42.9
436.cactusADM	800
437.leslie3d	334
444.namd	29.0 / 28.2
447.dealII	63.0
450.soplex	48.0
453.povray	64.3 / 57.1
454.calculix	57.6 / 52.3
459.GemsFDTD	276 / 233
465.tonto	54.1 / 38.6
470.lbm	861
481.wrf	113
482.sphinx3	67.8

SPECfp_base2006 = 110

SPECfp2006 = 117

Hardware

CPU Name:	Intel Xeon E5-2660 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2000
FPU:	Integrated
CPU(s) enabled:	28 cores, 2 chips, 14 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 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)

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L3 Cache:	35 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 960 GB SAS HDD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	22.0	616	21.5	633	**22.0**	**618**	22.0	616	21.5	633	**22.0**	**618**
416.gamess	591	33.1	**591**	**33.1**	591	33.1	463	42.3	**459**	**42.6**	459	42.7
433.milc	122	75.1	122	75.0	**122**	**75.0**	122	75.1	122	75.0	**122**	**75.0**
434.zeusmp	45.2	201	**45.3**	**201**	45.3	201	45.2	201	**45.3**	**201**	45.3	201
435.gromacs	162	44.0	167	42.9	**166**	**42.9**	162	44.0	167	42.9	**166**	**42.9**
436.cactusADM	**14.9**	**800**	15.3	781	14.9	805	**14.9**	**800**	15.3	781	14.9	805
437.leslie3d	**28.2**	**334**	30.1	312	27.6	341	**28.2**	**334**	30.1	312	27.6	341
444.namd	285	28.2	285	28.1	**285**	**28.2**	277	29.0	**276**	**29.0**	276	29.0
447.dealII	**182**	**63.0**	182	62.9	181	63.2	**182**	**63.0**	182	62.9	181	63.2
450.soplex	174	47.9	174	48.0	**174**	**48.0**	174	47.9	174	48.0	**174**	**48.0**
453.povray	93.8	56.7	**93.2**	**57.1**	92.9	57.2	**82.7**	**64.3**	82.8	64.2	82.4	64.5
454.calculix	157	52.4	158	52.1	**158**	**52.3**	143	57.6	144	57.3	**143**	**57.6**
459.GemsFDTD	45.2	234	49.1	216	**45.6**	**233**	38.6	275	**38.4**	**276**	38.3	277
465.tonto	253	38.8	256	38.5	**255**	**38.6**	182	53.9	182	54.2	**182**	**54.1**
470.lbm	15.9	865	**16.0**	**861**	16.8	817	15.9	865	**16.0**	**861**	16.8	817
481.wrf	104	107	**99.3**	**113**	98.8	113	104	107	**99.3**	**113**	98.8	113
482.sphinx3	**287**	**67.8**	287	67.8	288	67.6	**287**	**67.8**	287	67.8	288	67.6

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.rev6914
     $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1

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Platform Notes (Continued)

```
running on linux-40jf Tue Jul 12 14:14:51 2016

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 v4@ 2.00GHz
      2 "physical id"s (chips)
      28 "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 : 14
      siblings  : 14
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
   cache size : 35840 KB

From /proc/meminfo
   MemTotal:       264568500 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-40jf 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 Jul 12 08:17

SPEC is set to: /opt/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda1       xfs   893G   14G  880G   2% /
Additional information from dmidecode:
```

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

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. C220M4.2.0.10c.0.032320160810 03/23/2016
  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/sh"
OMP_NUM_THREADS = "28"

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 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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Hardware Availability: Apr-2016

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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 -opt-prefetch
-ansi-alias
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -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
```

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

    447.dealII: basepeak = yes

    450.soplex: basepeak = yes

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

Fortran benchmarks:

    410.bwaves: basepeak = yes

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

    434.zeusmp: basepeak = yes

    437.leslie3d: basepeak = yes

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

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

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Peak Optimization Flags (Continued)

465.tonto (continued):
```
-opt-malloc-options=3 -auto -unroll4
```

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 -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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revE.xml

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

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