SPEC® CFP2006 Result

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Cisco Systems

Cisco UCS B200 M4 (Intel Xeon E5-2637 v4, 3.50 GHz)

$SPECfp®\_rate2006 = 448$

$SPECfp\_rate\_base2006 = 441$
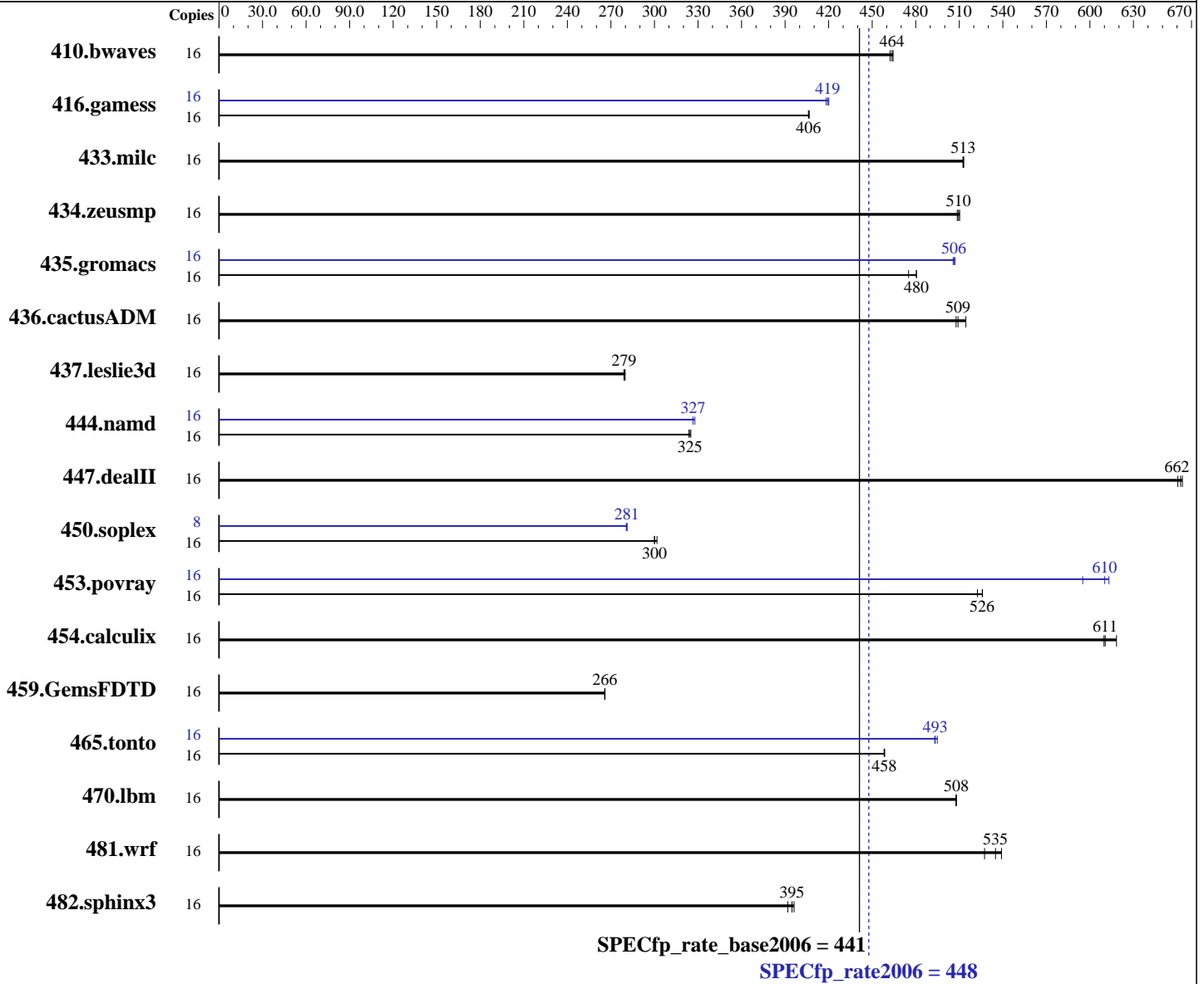
CPU2006 license: 9019   **Test date:** Jun-2016
Test sponsor: Cisco Systems   **Hardware Availability:** Apr-2016
Tested by: Cisco Systems   **Software Availability:** Dec-2015

Benchmark	Copies	Result
410.bwaves	16	464
416.gamess	16 / 16	419 / 406
433.milc	16	513
434.zeusmp	16	510
435.gromacs	16 / 16	506 / 480
436.cactusADM	16	509
437.leslie3d	16	279
444.namd	16 / 16	327 / 325
447.dealII	16	662
450.soplex	8 / 16	281 / 300
453.povray	16 / 16	610 / 526
454.calculix	16	611
459.GemsFDTD	16	266
465.tonto	16 / 16	493 / 458
470.lbm	16	508
481.wrf	16	535
482.sphinx3	16	395

SPECfp_rate_base2006 = 441

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Hardware

CPU Name: Intel Xeon E5-2637 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 3500
FPU: Integrated
CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip, 2 threads/core
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: No
File System: xfs
System State: Run level 3 (multi-user)

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L3 Cache:	15 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem:	1 x 400 GB SSD SAS
Other Hardware:	None

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	16	**469**	**464**	468	464	470	462	16	**469**	**464**	468	464	470	462
416.gamess	16	772	406	**771**	**406**	770	407	16	749	418	746	420	**747**	**419**
433.milc	16	286	513	**286**	**513**	287	513	16	286	513	**286**	**513**	287	513
434.zeusmp	16	285	510	**286**	**510**	286	509	16	285	510	**286**	**510**	286	509
435.gromacs	16	238	481	240	475	**238**	**480**	16	226	506	**226**	**506**	225	507
436.cactusADM	16	377	508	**376**	**509**	372	515	16	377	508	**376**	**509**	372	515
437.leslie3d	16	537	280	539	279	**539**	**279**	16	537	280	539	279	**539**	**279**
444.namd	16	395	325	396	324	**395**	**325**	16	393	327	391	328	**393**	**327**
447.dealII	16	276	664	277	661	**276**	**662**	16	276	664	277	661	**276**	**662**
450.soplex	16	445	300	442	302	**445**	**300**	8	237	281	238	281	**237**	**281**
453.povray	16	**162**	**526**	163	522	162	526	16	143	595	**139**	**610**	139	613
454.calculix	16	213	618	**216**	**611**	216	610	16	213	618	**216**	**611**	216	610
459.GemsFDTD	16	638	266	**638**	**266**	639	266	16	638	266	**638**	**266**	639	266
465.tonto	16	344	458	343	459	**344**	**458**	16	**319**	**493**	318	495	319	493
470.lbm	16	433	508	433	508	**433**	**508**	16	433	508	433	508	**433**	**508**
481.wrf	16	**334**	**535**	332	539	339	527	16	**334**	**535**	332	539	339	527
482.sphinx3	16	787	396	**790**	**395**	796	392	16	787	396	**790**	**395**	796	392

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:
CPU performance set to Enterprise
Power Technology set to Energy Efficient

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Platform Notes (Continued)

```
  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/CISCO_Benchmarks/cpu2006/config/sysinfo.rev6914
   $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
   running on linux-nsg9 Tue Jun 21 09:00:29 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 E5-2637 v4 @ 3.50GHz
        2 "physical id"s (chips)
        16 "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 : 4
        siblings  : 8
        physical 0: cores 0 1 2 3
        physical 1: cores 0 1 2 3
     cache size : 15360 KB

  From /proc/meminfo
     MemTotal:      264369660 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  /usr/bin/lsb_release -d
     SUSE Linux Enterprise Server 12 SP1

  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-nsg9 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
```

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Platform Notes (Continued)

```
    (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Jun 21 00:52

  SPEC is set to: /opt/CISCO_Benchmarks/cpu2006
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda1       xfs   325G   14G  312G   5% /
  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. B200M4.3.1.2.4.041120161047 04/11/2016
   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:
LD_LIBRARY_PATH = "/opt/CISCO_Benchmarks/cpu2006/libs/32:/opt/CISCO_Benchmarks/cpu2006/libs/64:/opt/CISCO_Benchmarks/cpu2006/sh"

 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
 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

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

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

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

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

Peak Compiler Invocation

C benchmarks:
```
icc   -m64
```

C++ benchmarks (except as noted below):
```
icpc  -m64
```

```
  450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
```

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Peak Compiler Invocation (Continued)

Fortran benchmarks:
```
ifort -m64
```

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
    450.soplex: -D_FILE_OFFSET_BITS=64
    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
```

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) -opt-mem-layout-trans=3(pass 2)
              -prof-use(pass 2) -fno-alias -auto-ilp32
```

    447.dealII: basepeak = yes

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Peak Optimization Flags (Continued)

450.soplex: -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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-malloc-options=3

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) -opt-mem-layout-trans=3(pass 2)
-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: basepeak = yes

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) -unroll4 -auto
-inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -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) -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: 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

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