SPEC® CFP2006 Result

Cisco Systems

Cisco UCS B420 M4 (Intel Xeon E5-4640 v3, 1.90 GHz)

$SPECfp®\_rate2006 =$ 1280

$SPECfp\_rate\_base2006 =$ 1250
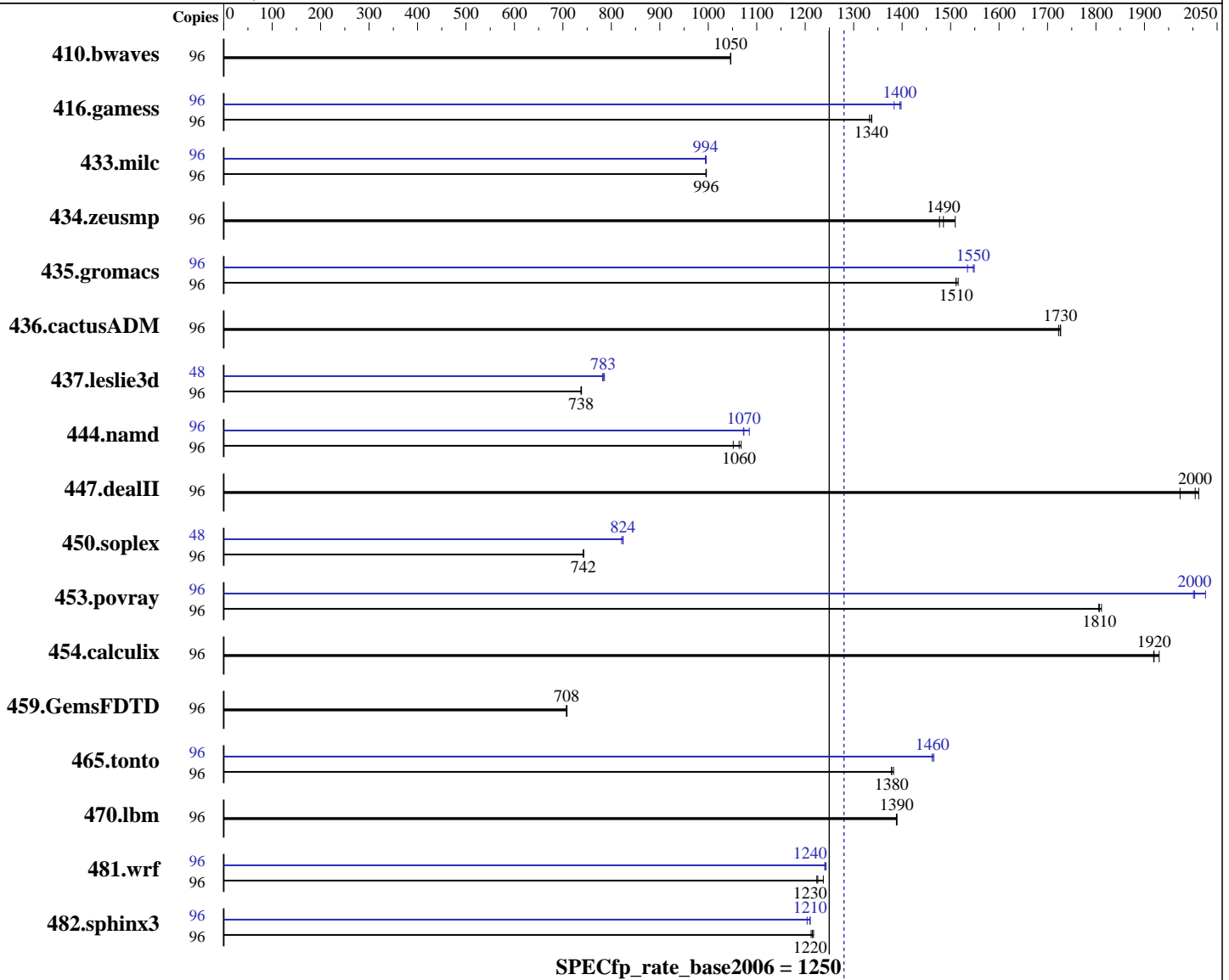
CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

Test date: Aug-2015
Hardware Availability: Jun-2015
Software Availability: Nov-2014

SPECfp_rate_base2006 = 1250

SPECfp_rate2006 = 1280

Hardware

CPU Name:	Intel Xeon E5-4640 v3
CPU Characteristics:	Intel Turbo Boost Technology up to 2.60 GHz
CPU MHz:	1900
FPU:	Integrated
CPU(s) enabled:	48 cores, 4 chips, 12 cores/chip, 2 threads/core
CPU(s) orderable:	2,4 chip
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 (x86_64) 3.12.28-4-default
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	ext4
System State:	Run level 3 (multi-user)

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L3 Cache:	30 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	512 GB (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)	Other Software:	None
Disk Subsystem:	1 x 300 GB SAS, 15K RPM		
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	96	1247	1050	1247	1050	**1247**	**1050**	96	1247	1050	1247	1050	**1247**	**1050**
416.gamess	96	1411	1330	**1406**	**1340**	1406	1340	96	1345	1400	**1347**	**1400**	1359	1380
433.milc	96	**885**	**996**	885	996	886	995	96	885	996	886	994	**886**	**994**
434.zeusmp	96	591	1480	579	1510	**588**	**1490**	96	591	1480	579	1510	**588**	**1490**
435.gromacs	96	452	1520	454	1510	**453**	**1510**	96	447	1530	443	1550	**443**	**1550**
436.cactusADM	96	**664**	**1730**	664	1730	666	1720	96	**664**	**1730**	664	1730	666	1720
437.leslie3d	96	1224	737	1222	738	**1223**	**738**	48	574	786	577	782	**576**	**783**
444.namd	96	721	1070	732	1050	**724**	**1060**	96	**717**	**1070**	710	1080	718	1070
447.dealII	96	546	2010	**548**	**2000**	556	1970	96	546	2010	**548**	**2000**	556	1970
450.soplex	96	1079	742	1078	743	**1079**	**742**	48	486	824	487	821	**486**	**824**
453.povray	96	282	1810	283	1810	**283**	**1810**	96	252	2030	**255**	**2000**	255	2000
454.calculix	96	413	1920	410	1930	**412**	**1920**	96	413	1920	410	1930	**412**	**1920**
459.GemsFDTD	96	1440	707	1438	708	**1440**	**708**	96	1440	707	1438	708	**1440**	**708**
465.tonto	96	**685**	**1380**	683	1380	686	1380	96	645	1470	646	1460	**646**	**1460**
470.lbm	96	949	1390	**950**	**1390**	950	1390	96	949	1390	**950**	**1390**	950	1390
481.wrf	96	867	1240	876	1220	**875**	**1230**	96	863	1240	864	1240	**864**	**1240**
482.sphinx3	96	1537	1220	**1540**	**1220**	1543	1210	96	**1546**	**1210**	1546	1210	1554	1200

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

```
 BIOS Configuraton:
 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
 LV DDR Mode set to Performance-mode
  Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6914
  $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
  running on sles12 Tue Aug 25 14:41:19 2015

  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 E5-4640 v3 @ 1.90GHz
        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:       529165368 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
     SuSE-release:
        SUSE Linux Enterprise Server 12 (x86_64)
        VERSION = 12
        PATCHLEVEL = 0
        # 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"
        VERSION_ID="12"
        PRETTY_NAME="SUSE Linux Enterprise Server 12"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12"

  uname -a:
```

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Platform Notes (Continued)

```
    Linux sles12 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014 (9879bd4)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Aug 24 23:49

 SPEC is set to: /opt/cpu2006-1.2
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda2       ext4  254G   11G  243G   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. B420M4.2.2.5.0.043020152304 04/30/2015
  Memory:
    32x 0xCE00 M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz, configured at 1866 MHz
    16x 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 i5-4670K CPU + 16GB
 memory using RedHat EL 7.0
 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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Test sponsor: Cisco Systems
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Test date: Aug-2015
Hardware Availability: Jun-2015
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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/composer_xe_2015/lib/ia32
```

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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
        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: -xCORE-AVX2(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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
                  -unroll2

C++ benchmarks:

        444.namd: -xCORE-AVX2(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

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SPECfp_rate_base2006 = 1250

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Test date: Aug-2015
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Peak Optimization Flags (Continued)

447.dealII: basepeak = yes

450.soplex: -xCORE-AVX2(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

453.povray: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2 -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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revC.20150812.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revC.20150812.xml

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$SPECfp\_rate2006 =$ **1280**

$SPECfp\_rate\_base2006 =$ **1250**

CPU2006 license: 9019

Test sponsor: Cisco Systems

Tested by: Cisco Systems

Test date: Aug-2015

Hardware Availability: Jun-2015

Software Availability: Nov-2014

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

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