SPEC® CFP2006 Result
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Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 5122, 3.60GHz)

$SPECfp®\_rate2006 = 549$
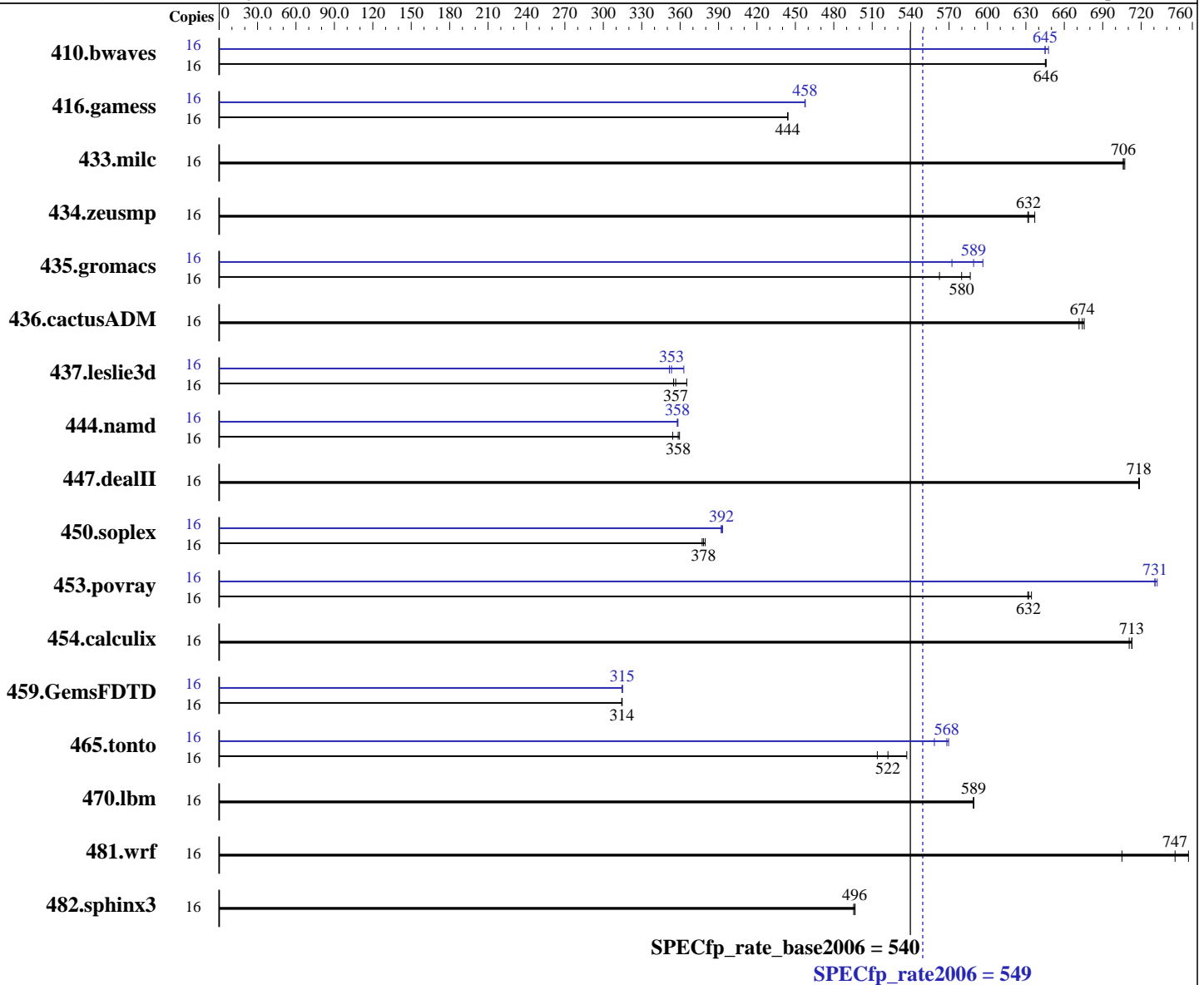
$SPECfp\_rate\_base2006 = 540$

CPU2006 license: 9019

Test sponsor: Cisco Systems

Tested by: Cisco Systems

Test date: Sep-2017

Hardware Availability: Aug-2017

Software Availability: Apr-2017

SPECfp_rate_base2006 = 540

SPECfp_rate2006 = 549

410.bwaves	16 / 645 ; 16 / 646
416.gamess	16 / 458 ; 16 / 444
433.milc	16 / 706
434.zeusmp	16 / 632
435.gromacs	16 / 589 ; 16 / 580
436.cactusADM	16 / 674
437.leslie3d	16 / 353 ; 16 / 357
444.namd	16 / 358 ; 16 / 358
447.dealII	16 / 718
450.soplex	16 / 392 ; 16 / 378
453.povray	16 / 731 ; 16 / 632
454.calculix	16 / 713
459.GemsFDTD	16 / 315 ; 16 / 314
465.tonto	16 / 568 ; 16 / 522
470.lbm	16 / 589
481.wrf	16 / 747
482.sphinx3	16 / 496

Hardware

CPU Name: Intel Xeon Gold 5122

CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz

CPU MHz: 3600

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: 1 MB I+D on chip per core

Continued on next page

Software

Operating System: SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default

Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.3.191 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:	16.5 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	384 GB (24 x 16 GB 2Rx4 PC4-2666V-R)	Other Software:	None
Disk Subsystem:	1 x 480 GB SSD SAS		
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	16	**337**	**646**	337	646	337	645	16	336	648	**337**	**645**	337	645
416.gamess	16	**706**	**444**	705	444	706	444	16	685	457	**685**	**458**	684	458
433.milc	16	208	707	208	706	**208**	**706**	16	208	707	208	706	**208**	**706**
434.zeusmp	16	**230**	**632**	229	637	231	632	16	**230**	**632**	229	637	231	632
435.gromacs	16	203	563	**197**	**580**	195	587	16	192	596	200	572	**194**	**589**
436.cactusADM	16	**284**	**674**	285	672	283	676	16	**284**	**674**	285	672	283	676
437.leslie3d	16	**422**	**357**	412	365	424	355	16	428	352	**426**	**353**	414	363
444.namd	16	357	360	362	354	**358**	**358**	16	358	358	**359**	**358**	359	358
447.dealII	16	255	719	255	718	**255**	**718**	16	255	719	255	718	**255**	**718**
450.soplex	16	354	377	352	380	**353**	**378**	16	339	393	**340**	**392**	340	392
453.povray	16	**135**	**632**	135	631	134	634	16	**116**	**731**	116	733	116	731
454.calculix	16	186	711	185	713	**185**	**713**	16	186	711	185	713	**185**	**713**
459.GemsFDTD	16	540	314	539	315	**540**	**314**	16	**539**	**315**	539	315	540	315
465.tonto	16	293	537	**301**	**522**	306	514	16	**277**	**568**	282	559	276	570
470.lbm	16	**373**	**589**	373	589	373	589	16	**373**	**589**	373	589	373	589
481.wrf	16	**239**	**747**	236	757	254	705	16	**239**	**747**	236	757	254	705
482.sphinx3	16	**628**	**496**	628	497	629	495	16	**628**	**496**	628	497	629	495

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:
Intel HyperThreading Technology set to Enabled
CPU performance set to Enterprise

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Platform Notes (Continued)

```
Power Performance Tuning set to OS
SNC set to Enabled
IMC Interleaving set to 1-way Interleave
Patrol Scrub set to Disabled
 Sysinfo program /home/cpu2006-1.2/config/sysinfo.rev6993
 Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
 running on linux-ox2h Fri Sep  1 22:11:45 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) Gold 5122 CPU @ 3.60GHz
       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 1 2 5 11
       physical 1: cores 1 2 5 11
    cache size : 16896 KB

 From /proc/meminfo
    MemTotal:       394653392 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12 SP2

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 2
       # 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-SP2"
       VERSION_ID="12.2"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp2"

 uname -a:
    Linux linux-ox2h 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
```

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Platform Notes (Continued)

```
    (9464f67) x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Sep 1 21:57

 SPEC is set to: /home/cpu2006-1.2
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sdb5      xfs   317G  8.3G  309G   3% /home
 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. C220M5.3.1.1d.0.0615170645 06/15/2017
  Memory:
   24x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666 MHz

 (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006-1.2/lib/ia32:/home/cpu2006-1.2/lib/intel64:/home/cpu2006-1.2/sh10.2"

 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
 Filesystem page cache cleared with:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
 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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Hardware Availability: Aug-2017

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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 -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-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_2017/linux/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
     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: -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
                 -qopt-mem-layout-trans=3

       447.dealII: basepeak = yes
```

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Peak Optimization Flags (Continued)

    450.soplex: -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) -qopt-malloc-options=3
                -qopt-mem-layout-trans=3

    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 -qopt-mem-layout-trans=3

Fortran benchmarks:

    410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

    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: Same as 410.bwaves

    459.GemsFDTD: Same as 410.bwaves

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

Benchmarks using both Fortran and C:

    435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                -par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32
                -qopt-mem-layout-trans=3

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

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