



SPEC® CFP2006 Result

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Cisco Systems

Cisco UCS B420 M4 (Intel Xeon E5-4660 v4, 2.20 GHz)

SPECfp®_rate2006 = 1860

SPECfp_rate_base2006 = 1830

CPU2006 license: 9019

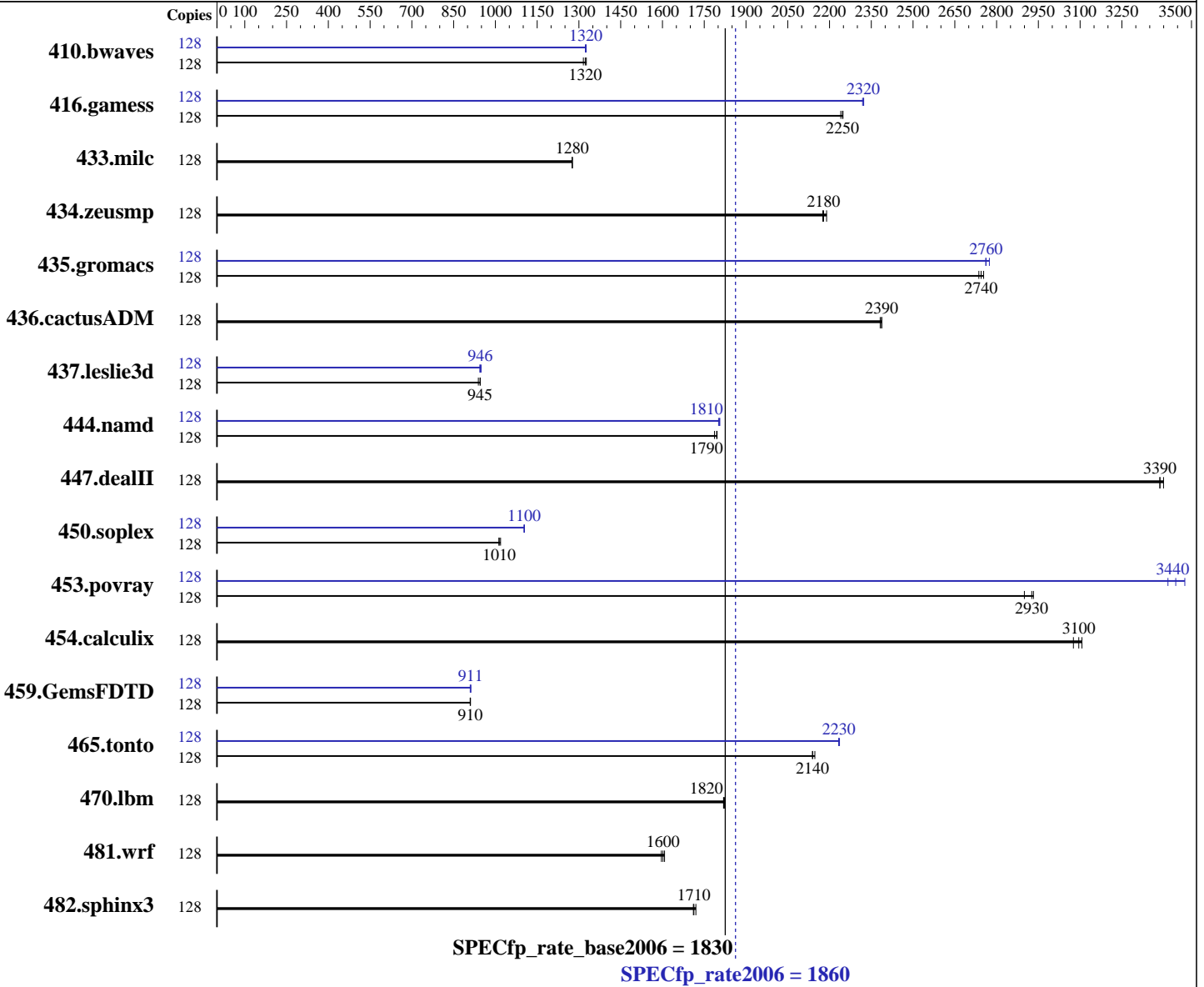
Test sponsor: Cisco Systems

Tested by: Cisco Systems

Test date: Feb-2017

Hardware Availability: Jun-2016

Software Availability: Sep-2016



Hardware

CPU Name: Intel Xeon E5-4660 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
 CPU MHz: 2200
 FPU: Integrated
 CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip, 2 threads/core
 CPU(s) orderable: 2,4 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: No
 File System: xfs
 System State: Run level 3 (multi-user)

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L3 Cache: 40 MB I+D on chip per chip
Other Cache: None
Memory: 1 TB (32 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 300 GB SAS, 15K RPM
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 | 128 | 1322 | 1320 | <u>1315</u> | <u>1320</u> | 1311 | 1330 | 128 | <u>1313</u> | <u>1320</u> | 1312 | 1330 | 1315 | 1320 |
| 416.gamess | 128 | 1119 | 2240 | 1115 | 2250 | <u>1116</u> | <u>2250</u> | 128 | 1079 | 2320 | <u>1079</u> | <u>2320</u> | 1081 | 2320 |
| 433.milc | 128 | 920 | 1280 | 921 | 1280 | <u>921</u> | <u>1280</u> | 128 | 920 | 1280 | 921 | 1280 | <u>921</u> | <u>1280</u> |
| 434.zeusmp | 128 | <u>535</u> | <u>2180</u> | 535 | 2180 | 532 | 2190 | 128 | <u>535</u> | <u>2180</u> | 535 | 2180 | 532 | 2190 |
| 435.gromacs | 128 | 332 | 2750 | <u>333</u> | <u>2740</u> | 334 | 2740 | 128 | <u>331</u> | <u>2760</u> | 331 | 2760 | 329 | 2770 |
| 436.cactusADM | 128 | 642 | 2380 | <u>641</u> | <u>2390</u> | 641 | 2390 | 128 | 642 | 2380 | <u>641</u> | <u>2390</u> | 641 | 2390 |
| 437.leslie3d | 128 | <u>1273</u> | <u>945</u> | 1273 | 945 | 1282 | 939 | 128 | 1274 | 944 | 1268 | 949 | <u>1272</u> | <u>946</u> |
| 444.namd | 128 | 571 | 1800 | <u>572</u> | <u>1790</u> | 575 | 1790 | 128 | 570 | 1800 | <u>569</u> | <u>1810</u> | 568 | 1810 |
| 447.dealII | 128 | 432 | 3390 | <u>432</u> | <u>3390</u> | 431 | 3400 | 128 | 432 | 3390 | <u>432</u> | <u>3390</u> | 431 | 3400 |
| 450.soplex | 128 | 1054 | 1010 | <u>1053</u> | <u>1010</u> | 1048 | 1020 | 128 | <u>967</u> | <u>1100</u> | 967 | 1100 | 968 | 1100 |
| 453.povray | 128 | 235 | 2900 | <u>233</u> | <u>2930</u> | 232 | 2930 | 128 | 199 | 3420 | 196 | 3480 | <u>198</u> | <u>3440</u> |
| 454.calculix | 128 | <u>341</u> | <u>3100</u> | 343 | 3080 | 340 | 3110 | 128 | <u>341</u> | <u>3100</u> | 343 | 3080 | 340 | 3110 |
| 459.GemsFDTD | 128 | <u>1492</u> | <u>910</u> | 1492 | 910 | 1493 | 909 | 128 | 1489 | 912 | 1493 | 910 | <u>1491</u> | <u>911</u> |
| 465.tonto | 128 | 587 | 2150 | 589 | 2140 | <u>589</u> | <u>2140</u> | 128 | <u>564</u> | <u>2230</u> | 563 | 2240 | 564 | 2230 |
| 470.lbm | 128 | 967 | 1820 | 965 | 1820 | <u>966</u> | <u>1820</u> | 128 | 967 | 1820 | 965 | 1820 | <u>966</u> | <u>1820</u> |
| 481.wrf | 128 | 896 | 1600 | 889 | 1610 | <u>892</u> | <u>1600</u> | 128 | 896 | 1600 | 889 | 1610 | <u>892</u> | <u>1600</u> |
| 482.sphinx3 | 128 | 1458 | 1710 | <u>1456</u> | <u>1710</u> | 1450 | 1720 | 128 | 1458 | 1710 | <u>1456</u> | <u>1710</u> | 1450 | 1720 |

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 set to Balanced Performance
Memory RAS configuration set to Maximum Performance
Memory Power Saving Mode set to Disabled
QPI Snoop Mode set to Cluster-on-Die
Sysinfo program /home/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-84bk Thu Feb 23 10:35:01 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 E5-4660 v4 @ 2.20GHz
 4 "physical id"s (chips)
 128 "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 : 16
  siblings  : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cache size : 20480 KB
```

```
From /proc/meminfo
MemTotal:      1058466180 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"
```

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Platform Notes (Continued)

```
uname -a:
Linux linux-84bk 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 22 22:12
```

```
SPEC is set to: /home/cpu2006-1.2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda7       xfs   236G  9.9G  226G   5% /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. B420M4.3.1.2d.0.081120161622 08/11/2016
Memory:
32x 0xCE00 M393A4K40BB1-CRC 32 GB 2 rank 2400 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 = "/home/cpu2006-1.2/libs/32:/home/cpu2006-1.2/libs/64:/home/cpu2006-1.2/sh10.2"

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

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Base Compiler Invocation (Continued)

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
 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

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Peak Compiler Invocation (Continued)

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

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.deallI: -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

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Peak Optimization Flags (Continued)

447.dealII: basepeak = yes

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.html>

<http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revD.20170404.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-revD.20170404.xml>

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