Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp_rate2006 = 1150
SPECfp_rate_base2006 = 1130

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems
Test date: Aug-2016
Hardware Availability: Sep-2016
Software Availability: Dec-2015

<table>
<thead>
<tr>
<th>CPU</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>80</td>
<td>714</td>
</tr>
<tr>
<td>416.gamess</td>
<td>80</td>
<td>808</td>
</tr>
<tr>
<td>433.milc</td>
<td>80</td>
<td>816</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>80</td>
<td>746</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>80</td>
<td>697</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>80</td>
<td>697</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>80</td>
<td>808</td>
</tr>
<tr>
<td>444.namd</td>
<td>40</td>
<td>780</td>
</tr>
<tr>
<td>447.dealII</td>
<td>80</td>
<td>1380</td>
</tr>
<tr>
<td>450.soplex</td>
<td>40</td>
<td>1270</td>
</tr>
<tr>
<td>453.povray</td>
<td>80</td>
<td>1570</td>
</tr>
<tr>
<td>454.calculix</td>
<td>80</td>
<td>1330</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>80</td>
<td>1240</td>
</tr>
<tr>
<td>465.tonto</td>
<td>80</td>
<td>1150</td>
</tr>
<tr>
<td>470.lbm</td>
<td>80</td>
<td>1390</td>
</tr>
<tr>
<td>481.wrf</td>
<td>80</td>
<td>1210</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>80</td>
<td>1140</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon E5-4610 v4
CPU Characteristics:
CPU MHz: 1800
FPU: Integrated
CPU(s) enabled: 40 cores, 4 chips, 10 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

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)
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

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

| L3 Cache: | 25 MB I+D on chip per chip  
| Other Cache: | None  
| Memory: | 512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)  
| Disk Subsystem: | 1 x 300 GB SAS HDD, 15K RPM  
| Other Hardware: | None  
| Base Pointers: | 32/64-bit  
| Peak Pointers: | 32/64-bit  
| Other Software: | None  

---

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>80</td>
<td>1039</td>
<td>1050</td>
<td>1037</td>
<td>1050</td>
<td>1038</td>
<td>1050</td>
<td>80</td>
<td>1039</td>
<td>1050</td>
<td>1037</td>
<td>1050</td>
<td>1038</td>
</tr>
<tr>
<td>416.gamess</td>
<td>80</td>
<td>1534</td>
<td>1020</td>
<td>1535</td>
<td>1020</td>
<td>1537</td>
<td>1020</td>
<td>80</td>
<td>1490</td>
<td>1050</td>
<td>1491</td>
<td>1050</td>
<td>1486</td>
</tr>
<tr>
<td>433.milc</td>
<td>80</td>
<td>725</td>
<td>1010</td>
<td>724</td>
<td>1010</td>
<td>725</td>
<td>1010</td>
<td>80</td>
<td>725</td>
<td>1010</td>
<td>724</td>
<td>1010</td>
<td>725</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>80</td>
<td>528</td>
<td>1400</td>
<td>526</td>
<td>1380</td>
<td>526</td>
<td>1380</td>
<td>80</td>
<td>528</td>
<td>1380</td>
<td>521</td>
<td>1400</td>
<td>526</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>80</td>
<td>450</td>
<td>1270</td>
<td>451</td>
<td>1270</td>
<td>452</td>
<td>1260</td>
<td>80</td>
<td>431</td>
<td>1330</td>
<td>431</td>
<td>1320</td>
<td>441</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>80</td>
<td>593</td>
<td>1610</td>
<td>593</td>
<td>1610</td>
<td>593</td>
<td>1610</td>
<td>80</td>
<td>593</td>
<td>1610</td>
<td>595</td>
<td>1610</td>
<td>593</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>80</td>
<td>1054</td>
<td>713</td>
<td>1054</td>
<td>714</td>
<td>1050</td>
<td>716</td>
<td>80</td>
<td>1054</td>
<td>713</td>
<td><strong>1054</strong></td>
<td><strong>714</strong></td>
<td>1050</td>
</tr>
<tr>
<td>444.namd</td>
<td>80</td>
<td>794</td>
<td>808</td>
<td>795</td>
<td>807</td>
<td>791</td>
<td>811</td>
<td>80</td>
<td>784</td>
<td>818</td>
<td>786</td>
<td>816</td>
<td>786</td>
</tr>
<tr>
<td>447.dealII</td>
<td>80</td>
<td>527</td>
<td>1740</td>
<td>526</td>
<td>1740</td>
<td>527</td>
<td>1740</td>
<td>80</td>
<td>527</td>
<td>1740</td>
<td>526</td>
<td>1740</td>
<td>527</td>
</tr>
<tr>
<td>450.soplex</td>
<td>80</td>
<td>895</td>
<td>746</td>
<td>894</td>
<td>746</td>
<td>895</td>
<td>745</td>
<td>40</td>
<td>427</td>
<td>781</td>
<td>428</td>
<td>780</td>
<td>428</td>
</tr>
<tr>
<td>453.povray</td>
<td>80</td>
<td>320</td>
<td>1330</td>
<td>321</td>
<td>1330</td>
<td>320</td>
<td>1330</td>
<td>80</td>
<td>270</td>
<td>1570</td>
<td>275</td>
<td>1550</td>
<td>271</td>
</tr>
<tr>
<td>454.calcullx</td>
<td>80</td>
<td>405</td>
<td>1630</td>
<td><strong>405</strong></td>
<td><strong>1630</strong></td>
<td>407</td>
<td>1620</td>
<td>80</td>
<td>405</td>
<td>1630</td>
<td><strong>405</strong></td>
<td><strong>1630</strong></td>
<td>407</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>80</td>
<td>1218</td>
<td>697</td>
<td>1217</td>
<td>697</td>
<td>1218</td>
<td>697</td>
<td>80</td>
<td>1218</td>
<td>697</td>
<td>1217</td>
<td>697</td>
<td>1218</td>
</tr>
<tr>
<td>465.tonto</td>
<td>80</td>
<td>682</td>
<td>1160</td>
<td><strong>682</strong></td>
<td><strong>1150</strong></td>
<td>682</td>
<td>1150</td>
<td>80</td>
<td>636</td>
<td>1240</td>
<td>636</td>
<td>1240</td>
<td>636</td>
</tr>
<tr>
<td>470.hm</td>
<td>80</td>
<td>791</td>
<td>1390</td>
<td>791</td>
<td>1390</td>
<td>792</td>
<td>1390</td>
<td>80</td>
<td>791</td>
<td>1390</td>
<td>791</td>
<td>1390</td>
<td>792</td>
</tr>
<tr>
<td>481.wrft</td>
<td>80</td>
<td>735</td>
<td>1210</td>
<td>739</td>
<td>1210</td>
<td><strong>737</strong></td>
<td><strong>1210</strong></td>
<td>80</td>
<td>735</td>
<td>1210</td>
<td>739</td>
<td>1210</td>
<td><strong>737</strong></td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>80</td>
<td>1368</td>
<td>1140</td>
<td>1371</td>
<td>1140</td>
<td>1367</td>
<td>1140</td>
<td>80</td>
<td><strong>1368</strong></td>
<td><strong>1140</strong></td>
<td>1371</td>
<td>1140</td>
<td>1367</td>
</tr>
</tbody>
</table>

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"
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPEC CFP2006 Result

SPECfp_rate2006 = 1150
SPECfp_rate_base2006 = 1130

Platform Notes

BIOS Settings:
CPU performance set to Enterprise
Power Technology set to Performance
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

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 E5-4610 v4 @ 1.80GHz
 4 "physical id"s (chips)
 80 "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 : 10
siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
  physical 2: cores 0 1 2 3 4 8 9 10 11 12
  physical 3: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal:  529162332 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"

Continued on next page
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPEC CFP2006 Result

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_rate2006</td>
<td>1150</td>
</tr>
<tr>
<td>SPECfp_rate_base2006</td>
<td>1130</td>
</tr>
</tbody>
</table>

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

Platform Notes (Continued)

uname -a:
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Aug 18 22:36
SPEC is set to: /opt/cpu2006-1.2
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda1      xfs   280G   11G  270G   4% /

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. B420M4.3.1.1.11.022220161943 02/22/2016
Memory:
32x 0xAD00 HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz, configured at 1866 MHz
16x NO DIMM NO DIMM

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 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
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp_rate2006 = 1150
SPECfp_rate_base2006 = 1130

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

Test date: Aug-2016
Hardware Availability: Sep-2016
Software Availability: Dec-2015

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 -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

Continued on next page
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp_rate2006 = 1150
SPECfp_rate_base2006 = 1130

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

Test date: Aug-2016
Hardware Availability: Sep-2016
Software Availability: Dec-2015

Peak Compiler Invocation (Continued)

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

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

Fortran benchmarks:
    ifort -m64

Benchmarks using both Fortran and C:
    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 -nofor_main
    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
    482.sphinx3: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

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

Continued on next page
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

SPECfp_rate2006 = 1150
SPECfp_rate_base2006 = 1130

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

Test date: Aug-2016
Hardware Availability: Sep-2016
Software Availability: Dec-2015

Peak Optimization Flags (Continued)

447.dealII: basepeak = yes
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-ii32

436.cactusADM: basepeak = yes
454.calculix: basepeak = yes
481.wrf: basepeak = yes
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4610 v4, 1.80 GHz)

<table>
<thead>
<tr>
<th>SPECfp_rate2006 = 1150</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_rate_base2006 = 1130</td>
</tr>
</tbody>
</table>

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

Test date: Aug-2016
Hardware Availability: Sep-2016
Software Availability: Dec-2015

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

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Sep 6 16:57:26 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 6 September 2016.