# SPEC® CFP2006 Result

## Cisco Systems

Cisco UCS B200 M4 (Intel Xeon E5-2650 v4, 2.20 GHz)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
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</thead>
<tbody>
<tr>
<td>111</td>
<td>107</td>
</tr>
</tbody>
</table>

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

### Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2650 v4</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 2.90 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2200</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>24 cores, 2 chips, 12 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

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CPU2006 license: 9019  
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L3 Cache: 30 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: 64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>24.5</td>
<td>554</td>
<td>23.6</td>
<td>577</td>
<td>23.2</td>
<td>586</td>
<td>24.5</td>
<td>554</td>
</tr>
<tr>
<td>416.gamess</td>
<td>606</td>
<td>32.3</td>
<td>607</td>
<td>32.3</td>
<td>606</td>
<td>32.3</td>
<td>524</td>
<td>37.4</td>
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<tr>
<td>433.milc</td>
<td>138</td>
<td>66.7</td>
<td>139</td>
<td>66.0</td>
<td>137</td>
<td>66.8</td>
<td>138</td>
<td>66.7</td>
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<tr>
<td>434.zesmp</td>
<td>45.9</td>
<td>198</td>
<td>46.2</td>
<td>197</td>
<td>45.9</td>
<td>198</td>
<td>45.9</td>
<td>198</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>157</td>
<td>45.4</td>
<td>157</td>
<td>45.5</td>
<td>157</td>
<td>45.6</td>
<td>157</td>
<td>45.4</td>
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<tr>
<td>436.cactusADM</td>
<td>14.2</td>
<td>843</td>
<td>14.3</td>
<td>833</td>
<td>14.1</td>
<td>845</td>
<td>14.2</td>
<td>843</td>
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<td>437.leslie3d</td>
<td>26.3</td>
<td>357</td>
<td>27.9</td>
<td>337</td>
<td>26.3</td>
<td>358</td>
<td>26.3</td>
<td>357</td>
</tr>
<tr>
<td>444.namd</td>
<td>314</td>
<td>25.5</td>
<td>315</td>
<td>25.5</td>
<td>314</td>
<td>25.5</td>
<td>305</td>
<td>26.3</td>
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<tr>
<td>447.dealII</td>
<td>201</td>
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<td>54.8</td>
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<td>56.8</td>
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<tr>
<td>450.soplex</td>
<td>191</td>
<td>43.7</td>
<td>193</td>
<td>43.3</td>
<td>195</td>
<td>42.7</td>
<td>191</td>
<td>43.7</td>
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<tr>
<td>453.povray</td>
<td>106</td>
<td>50.1</td>
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<td>50.9</td>
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<td>50.9</td>
<td>91.4</td>
<td>58.2</td>
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<tr>
<td>454.calculix</td>
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<td>48.9</td>
<td>169</td>
<td>48.9</td>
<td>169</td>
<td>48.9</td>
<td>160</td>
<td>51.6</td>
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<td>459.GemsFDTD</td>
<td>45.8</td>
<td>232</td>
<td>45.1</td>
<td>235</td>
<td>45.1</td>
<td>236</td>
<td>39.0</td>
<td>272</td>
</tr>
<tr>
<td>465.tonto</td>
<td>253</td>
<td>38.9</td>
<td>253</td>
<td>38.8</td>
<td>256</td>
<td>38.4</td>
<td>205</td>
<td>47.9</td>
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<tr>
<td>470.lbm</td>
<td>17.2</td>
<td>799</td>
<td>16.8</td>
<td>819</td>
<td>16.9</td>
<td>812</td>
<td>17.2</td>
<td>799</td>
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<tr>
<td>481.wrf</td>
<td>101</td>
<td>110</td>
<td>101</td>
<td>110</td>
<td>102</td>
<td>110</td>
<td>101</td>
<td>110</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>278</td>
<td>70.0</td>
<td>279</td>
<td>69.8</td>
<td>280</td>
<td>69.6</td>
<td>278</td>
<td>70.0</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes
BIOS Settings:
Intel Hyper-Threading Technology option set to Disabled
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
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
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Cisco Systems
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SPECfp2006 = 111
SPECfp_base2006 = 107

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

Platform Notes (Continued)

running on linux-a9vg Mon Apr 11 11:31:02 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 E5-2650 v4@ 2.20GHz
   2 "physical id"s (chips)
   24 "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 : 12
      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
   cache size : 30720 KB

From /proc/meminfo
   MemTotal: 264566988 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"

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

run-level 3 Apr 11 05:50

SPEC is set to: /opt/cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
   /dev/sdal xfs 325G 11G 315G 4% /
Additional information from dmidecode:

Continued on next page
Platform Notes (Continued)

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. B200M4.3.1.1.11.110420151758 11/04/2015
Memory:
4x 0xAD00 HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
12x 0xCE00 M393A2G40DB1-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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/opt/cpu2006-1.2/libs/32:/opt/cpu2006-1.2/libs/64:/opt/cpu2006-1.2/sh"
OMP_NUM_THREADS = "24"

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

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

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

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| Tested by: | Cisco Systems |

### Base Portability Flags (Continued)

- 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 -parallel -opt-prefetch`
- `-ansi-alias`

**C++ benchmarks:**
- `-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias`

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

**Benchmarks using both Fortran and C:**
- `-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch`
- `-ansi-alias`

### Peak Compiler Invocation

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

**C++ benchmarks:**
- `icpc -m64`

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

**Benchmarks using both Fortran and C:**
- `icc -m64 ifort -m64`
Cisco Systems

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Hardware Availability: Apr-2016
Tested by: Cisco Systems
Software Availability: Dec-2015

Peak Portability Flags

Same as Base Portability Flags

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) -03(pass 2) -no-prec-div(pass 2)
  -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias
  -auto-ilp32
- 447.dealII: basepeak = yes
- 450.soplex: basepeak = yes
- 453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
  -ipo(pass 2) -03(pass 2) -no-prec-div(pass 2)
  -par-num-threads=1(pass 1) -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) -03(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: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
  -ipo(pass 2) -03(pass 2) -no-prec-div(pass 2)
  -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
  -inline-level=0 -opt-prefetch -parallel
- 465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
  -ipo(pass 2) -03(pass 2) -no-prec-div(pass 2)
  -par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc

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Peak Optimization Flags (Continued)

465.tonto (continued):
- opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
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-revD.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-revD.xml

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