Cisco UCS B460 M4 (Intel Xeon E7-8890 v4, 2.20 GHz)

<table>
<thead>
<tr>
<th>SPECfp_rate2006 = Not Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_rate_base2006 = 2380</td>
</tr>
</tbody>
</table>

- **CPU2006 license:** 9019
- **Test sponsor:** Cisco Systems
- **Tested by:** Cisco Systems
- **Hardware Availability:** Jul-2016
- **Software Availability:** Aug-2015
- **CPU Name:** Intel Xeon E7-8890 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.40 GHz
- **CPU MHz:** 2200
- **FPU:** Integrated
- **CPU(s) enabled:** 96 cores, 4 chips, 24 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
- **Operating System:** SUSE Linux Enterprise Server 12 (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)

| Copied | 200 | 400 | 600 | 800 | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 | 3200 | 3400 | 3600 | 3800 | 4000 | 4200 | 4400 | 4600 | 4800 | 5000 |
|--------|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 310 | 330 | 350 | 370 | 390 | 410 | 420 | 430 | 440 | 450 | 460 | 470 | 480 | 490 | 500 | 510 | 520 | 530 | 540 | 550 | 560 | 570 | 580 | 590 | 600 | 610 | 620 | 630 | 640 | 650 | 660 |
| 2100 | 2200 | 2300 | 2400 | 2500 | 2600 | 2700 | 2800 | 2900 | 3000 | 3100 | 3200 | 3300 | 3400 | 3500 | 3600 | 3700 | 3800 | 3900 | 4000 | 4100 | 4200 | 4300 | 4400 | 4500 | 4600 | 4700 | 4800 |
| 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 | 192 |

**Hardware**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
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<tr>
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<td>Operating System: SUSE Linux Enterprise Server 12 (x86_64) 3.12.49-11-default</td>
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Continued on next page
## Cisco Systems

Cisco UCS B460 M4 (Intel Xeon E7-8890 v4, 2.20 GHz)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2006 license</td>
<td>9019</td>
</tr>
<tr>
<td>Test sponsor</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>60 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1600 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 X 400 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Aug-2015</td>
</tr>
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<td>Aug-2015</td>
</tr>
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</table>

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Pointers</th>
<th>Peak Pointers</th>
<th>Other Software</th>
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<tbody>
<tr>
<td>bwave</td>
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<tr>
<td>namd</td>
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<tr>
<td>sphinx3</td>
<td>192</td>
<td>1778</td>
<td>2110</td>
<td>1779</td>
<td>2100</td>
<td>1776</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 B460 M4 (Intel Xeon E7-8890 v4, 2.20 GHz)

SPEC CFP2006 Result
SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 2380

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

Test date: May-2016
Hardware Availability: Jul-2016
Software Availability: Aug-2015

Platform Notes

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
Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-snnk Tue Jan 5 19:17:21 2010

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 E7-8890 v4 @ 2.20GHz
  4 "physical id"s (chips)
  192 "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 : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 22 23 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 22 23 24 25 26 27 28 29
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 22 23 24 25 26 27 28 29
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 22 23 24 25 26 27 28 29
cache size : 30720 KB

From /proc/meminfo
MemTotal:       528963636 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"

Continued on next page
Platform Notes (Continued)

CPE_NAME="cpe:/o:suse:sles:12:sp1"

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

run-level 3 Jan 5 19:16

SPEC is set to: /opt/cpu2006-1.2
    Filesystem   Type   Size   Used  Avail Use% Mounted on
    /dev/sda1     xfs    372G   109G  263G  30%  /

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. EXM4.3.1.1.3.042620161123 04/26/2016
Memory:
    32x 0xCE00 M393A2G40EB1-CRC 16 GB 2 rank 2400 MHz, configured at 1600 MHz
    64x 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 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>

Submitted_by: "Vijay Durairaj (vijd)" <vijd@cisco.com>
Submitted: Thu May 19 03:12:54 EDT 2016
Submission: cpu2006-20160516-41332.sub

Base Compiler Invocation

    C benchmarks:
        icc   -m64

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Cisco Systems
Cisco UCS B460 M4 (Intel Xeon E7-8890 v4, 2.20 GHz)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 2380

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

Test date: May-2016
Hardware Availability: Jul-2016
Tested by: Cisco Systems
Software Availability: Aug-2015

Base Compiler Invocation (Continued)

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
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 -nofor_main
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFD: -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
Cisco Systems
Cisco UCS B460 M4 (Intel Xeon E7-8890 v4, 2.20 GHz)

SPEC CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

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SPECfp_rate_base2006 = 2380

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

Test date: May-2016
Hardware Availability: Jul-2016
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The flags files that were used to format this result can be browsed at
https://pro.spec.org/private/osg/submit/cpu2006/flags/Intel-ic16.0-official-linux64.html
https://pro.spec.org/private/osg/submit/cpu2006/flags/Cisco-Platform-Settings-V1.2-revE.html

You can also download the XML flags sources by saving the following links:
https://pro.spec.org/private/osg/submit/cpu2006/flags/Intel-ic16.0-official-linux64.xml
https://pro.spec.org/private/osg/submit/cpu2006/flags/Cisco-Platform-Settings-V1.2-revE.xml

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For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Report generated on Thu May 19 03:13:19 2016 by SPEC CPU2006 PS/PDF formatter v6932.