Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2699 v4, 2.20 GHz)

SPEC® CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

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

Hardware
CPU Name: Intel Xeon E5-2699 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 44 cores, 2 chips, 22 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: 256 MB 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 16.0.0.105 of Intel C++ Studio XE for Linux;
Fortran: Version 16.0.0.105 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: ext4
System State: Run level 3 (multi-user)

SPECfp®_rate2006 = Not Run
SPECfp_rate_base2006 = 1100

Test date: Mar-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Copies

| 410.bwaves  | ss | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2450 |
|-------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 416.gamess  | ss |     |     |     |     |     |     | 662 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1620|
| 433.milc    | ss |     |     |     |     |     |     |     |     |     | 1170|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 434.zeusmp  | ss |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 435.gromacs | ss |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1940|
| 436.cactusADM | ss |     |     |     |     |     |     |     | 1360|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 437.leslie3d | ss |     |     |     |     |     |     | 498 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 444.namd    | ss |     |     |     |     |     |     |     | 1380|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 447.dealII  | ss |     |     |     |     |     |     |     | 522 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 2410|
| 450.soplex  | ss |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 2420|
| 453.povray  | ss |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 2100|
| 454.calculix| ss |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 459.GemsFDTD | ss |     |     |     |     |     |     |     | 484 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 465.tonto   | ss |     |     |     |     |     |     |     |     |     | 977 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 470.lbm     | ss |     |     |     |     |     |     |     |     |     | 834 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 481.wrf     | ss |     |     |     |     |     |     |     |     |     | 957 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 482.sphinx3 | ss |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

SPECfp_rate_base2006 = 1100

Copies

Continued on next page
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2699 v4, 2.20 GHz)

SPEC CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Cisco Systems

SPEC CFP2006 Result

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 1100

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

L3 Cache: 55 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, ECC)
Disk Subsystem: 1 x 400 GB SSD SAS
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>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>88</td>
<td>1712</td>
<td>699</td>
<td>1711</td>
<td>699</td>
<td>1712</td>
<td>699</td>
<td></td>
<td></td>
</tr>
<tr>
<td>416.gamess</td>
<td>88</td>
<td>1067</td>
<td>1620</td>
<td>1066</td>
<td>1620</td>
<td>1067</td>
<td>1610</td>
<td></td>
<td></td>
</tr>
<tr>
<td>433.milc</td>
<td>88</td>
<td>1220</td>
<td>662</td>
<td>1220</td>
<td>662</td>
<td>1220</td>
<td>662</td>
<td></td>
<td></td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>88</td>
<td>682</td>
<td>1170</td>
<td>682</td>
<td>1170</td>
<td>676</td>
<td>1180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>435.gromacs</td>
<td>88</td>
<td>322</td>
<td>1950</td>
<td>323</td>
<td>1940</td>
<td>324</td>
<td>1940</td>
<td></td>
<td></td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>88</td>
<td>775</td>
<td>1360</td>
<td>776</td>
<td>1360</td>
<td>774</td>
<td>1360</td>
<td></td>
<td></td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>88</td>
<td>1662</td>
<td>498</td>
<td>1660</td>
<td>498</td>
<td>1660</td>
<td>498</td>
<td></td>
<td></td>
</tr>
<tr>
<td>444.namd</td>
<td>88</td>
<td>509</td>
<td>1390</td>
<td>511</td>
<td>1380</td>
<td>513</td>
<td>1370</td>
<td></td>
<td></td>
</tr>
<tr>
<td>447.dealII</td>
<td>88</td>
<td>417</td>
<td>2410</td>
<td>423</td>
<td>2380</td>
<td>415</td>
<td>2430</td>
<td></td>
<td></td>
</tr>
<tr>
<td>450.soplex</td>
<td>88</td>
<td>1400</td>
<td>524</td>
<td>1406</td>
<td>522</td>
<td>1409</td>
<td>521</td>
<td></td>
<td></td>
</tr>
<tr>
<td>453.povray</td>
<td>88</td>
<td>223</td>
<td>2100</td>
<td>224</td>
<td>2090</td>
<td>222</td>
<td>2110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>454.calculix</td>
<td>88</td>
<td>300</td>
<td>2420</td>
<td>305</td>
<td>2380</td>
<td>299</td>
<td>2430</td>
<td></td>
<td></td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>88</td>
<td>1929</td>
<td>484</td>
<td>1929</td>
<td>484</td>
<td>1929</td>
<td>484</td>
<td></td>
<td></td>
</tr>
<tr>
<td>465.tonto</td>
<td>88</td>
<td>668</td>
<td>1300</td>
<td>673</td>
<td>1290</td>
<td>654</td>
<td>1320</td>
<td></td>
<td></td>
</tr>
<tr>
<td>470.lbm</td>
<td>88</td>
<td>1237</td>
<td>978</td>
<td>1237</td>
<td>977</td>
<td>1237</td>
<td>977</td>
<td></td>
<td></td>
</tr>
<tr>
<td>481.wrf</td>
<td>88</td>
<td>1179</td>
<td>834</td>
<td>1179</td>
<td>834</td>
<td>1179</td>
<td>834</td>
<td></td>
<td></td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>88</td>
<td>1793</td>
<td>957</td>
<td>1785</td>
<td>961</td>
<td>1805</td>
<td>950</td>
<td></td>
<td></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"

Platform Notes
CPU performance set to Enterprise
Power Technology set to Performance
Energy Performance BIAS setting set to Balanced Performance
Continued on next page
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2699 v4, 2.20 GHz)

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 1100

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

Platform Notes (Continued)

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-ivn4 Mon Mar 14 15:32:00 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 E5-2699 v4 @ 2.20GHz
  2 "physical id"s (chips)
  88 "processors"
core, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
  cpu cores : 22
  siblings : 44
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
  28
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
  28
  cache size : 28160 KB

From /proc/meminfo
MemTotal: 264559100 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 Mar 14 15:28

Continued on next page
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2699 v4, 2.20 GHz)

<table>
<thead>
<tr>
<th>SPECfp_rate2006</th>
<th>Not Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_rate_base2006</td>
<td>1100</td>
</tr>
</tbody>
</table>

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

Platform Notes (Continued)

SPEC is set to: /opt/cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 ext4 366G 53G 312G 15% /

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. C220M4.2.0.9.41.021820161009 02/18/2016
Memory:
16x 0xCE00 M393A2G40EB1-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:
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
runcspec command invoked through numactl i.e.:
umactl --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
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2699 v4, 2.20 GHz)

SPEC CFP2006 Result

SPECfp_rate2006 = Not Run
SPECfp_rate_base2006 = 1100

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

Test date: Mar-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

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. lesle3d: -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

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.