Cisco Systems

Cisco UCS B420 M4 (Intel Xeon E5-4640 v4 2.10 GHz)

**SPECint®2006** = 56.2
**SPECint_base2006** = 53.6

| Test sponsor: | Cisco Systems |
| Test date:    | Jan-2017      |
| Hardware Availability: | Jun-2016 |
| Tested by:    | Cisco Systems |
| Software Availability: | Sep-2016 |

| SPECint®2006 | 56.2 |
| SPECint_base2006 | 53.6 |

**Hardware**

- **CPU Name:** Intel Xeon E5-4640 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 2.60 GHz
- **CPU MHz:** 2100
- **FPU:** Integrated
- **CPU(s) enabled:** 48 cores, 4 chips, 12 cores/chip
- **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
- **L3 Cache:** 30 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
- **Disk Subsystem:** 1 x 300 GB SAS, 15K RPM
- **Other Hardware:** None

**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
- **Auto Parallel:** Yes
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32/64-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>322</td>
<td>30.3</td>
<td>323</td>
<td>30.2</td>
<td>322</td>
<td>30.3</td>
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<td>34.9</td>
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<tr>
<td>401.bzip2</td>
<td>494</td>
<td>19.5</td>
<td>495</td>
<td>19.5</td>
<td>498</td>
<td>19.4</td>
<td>488</td>
<td>19.8</td>
<td>486</td>
<td>19.8</td>
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<td>30.4</td>
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<td>30.4</td>
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<tr>
<td>429.mcf</td>
<td>161</td>
<td>55.5</td>
<td>164</td>
<td>55.6</td>
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<td>55.7</td>
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<tr>
<td>445.gobmk</td>
<td>459</td>
<td>22.9</td>
<td>458</td>
<td>22.9</td>
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<td>456.hmmer</td>
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<td>64.0</td>
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<td>64.0</td>
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<td>146</td>
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<td>472</td>
<td>25.6</td>
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<td>462.libquantum</td>
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<td>464.h264ref</td>
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<tr>
<td>471.omnetpp</td>
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<td>33.3</td>
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<td>473.astar</td>
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<td>26.8</td>
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<td>27.0</td>
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<tr>
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<td>58.3</td>
<td>117</td>
<td>59.1</td>
<td>108</td>
<td>64.0</td>
<td>108</td>
<td>63.8</td>
</tr>
</tbody>
</table>

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

Submit Notes
The config file option 'submit' was used.

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

Platform Notes
BIOS Settings:
Memory Power Saving Mode set to Disabled
CPU performance set to Enterprise
Power Technology set to Energy Efficient
Energy Performance set to Balanced Performance
Memory RAS configuration set to Maximum Performance
QPI Snoop Mode set to Home Directory Snoop with OSB
Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-1fno Wed Jan 25 09:35:13 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 E5-4640 v4 @ 2.10GHz
  4 "physical id"s (chips)
  48 "processors"

Continued on next page
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Platform Notes (Continued)
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
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 30720 KB

From /proc/meminfo
MemTotal: 1058698452 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 Jan 23 22:08

SPEC is set to: /opt/cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 xfs 280G 17G 264G 6% /

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. B420M4.3.1.2.0.052320161053 05/23/2016
Memory:
32x 0xCE00 M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz, configured at 2133 MHz
Continued on next page
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4640 v4 2.10 GHz)

SPECint2006 = 56.2
SPECint_base2006 = 53.6

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

Platform Notes (Continued)

16x 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/sh10.2"
OMP_NUM_THREADS = "48"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

Base Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
471.omnetpp: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch -auto-p32

Continued on next page
## SPEC CINT2006 Result

### Cisco Systems

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<table>
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**CPU2006 license:** 9019  
**Test sponsor:** Cisco Systems  
**Tested by:** Cisco Systems

**Test date:** Jan-2017  
**Hardware Availability:** Jun-2016  
**Software Availability:** Sep-2016

### Base Optimization Flags (Continued)

#### C++ benchmarks:
- -xCORE-AVX2  
- -ipo  
- -O3  
- -no-prec-div  
- -qopt-prefetch  
- -auto-p32  
- -Wl,-z,muldefs -L/sh10.2 -lsmartheap64

### Base Other Flags

#### C benchmarks:
- 403.gcc: -Dalloca=_alloca

### Peak Compiler Invocation

#### C benchmarks (except as noted below):
- icc -m64

#### C++ benchmarks (except as noted below):
- icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

### Peak Portability Flags

- 400.perlbench: -D_FILE_OFFSET_BITS=64  
- DSPEC_CPU_LINUX_IA32
- 401.bzip2: DSPEC_CPU_LP64
- 403.gcc: -DSPEC_CPU_LP64
- 429.mcf: DSPEC_CPU_LP64
- 445.gobmk: -D_FILE_OFFSET_BITS=64
- 456.hmmer: DSPEC_CPU_LP64
- 458.sjeng: DSPEC_CPU_LP64
- 462.libquantum: DSPEC_CPU_LP64 DSPEC_CPU_LINUX
- 464.h264ref: DSPEC_CPU_LP64
- 471.omnetpp: -D_FILE_OFFSET_BITS=64
- 473.astar: DSPEC_CPU_LP64
- 483.xalancbmk: -D_FILE_OFFSETBITS=64 DSPEC_CPU_LINUX
Cisco Systems
Cisco UCS B420 M4 (Intel Xeon E5-4640 v4 2.10 GHz)

| SPECint2006                          | 56.2 |
| SPECint_base2006                     | 53.6 |

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

Peak Optimization Flags

<table>
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<th>C benchmarks:</th>
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<tbody>
<tr>
<td>400.perlbench: -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-prefetch</td>
</tr>
<tr>
<td>401.bzip2: -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 -auto-ilp32 -qopt-prefetch</td>
</tr>
<tr>
<td>403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc -qopt-malloc-options=3 -auto-ilp32</td>
</tr>
<tr>
<td>429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch -auto-p32</td>
</tr>
<tr>
<td>445.gobmk: -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)</td>
</tr>
<tr>
<td>456.hmmer: basepeak = yes</td>
</tr>
<tr>
<td>458.sjeng: -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</td>
</tr>
<tr>
<td>462.libquantum: basepeak = yes</td>
</tr>
<tr>
<td>464.h264ref: basepeak = yes</td>
</tr>
</tbody>
</table>

C++ benchmarks:

| 471.omnetpp: -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-ra-region-strategy=block -Wl,-z,muldefs -L/sh10.2 -lsmartheap |
| 473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64 |
| 483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -Wl,-z,muldefs -L/sh10.2 -lsmartheap |

Peak Other Flags

C benchmarks:
Cisco Systems
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CPU2006 license: 9019
Test sponsor: Cisco Systems
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Test date: Jan-2017
Hardware Availability: Jun-2016
Software Availability: Sep-2016

Peak Other Flags (Continued)

403.gcc: -Dalloca=_alloca

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-revE.html

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-revE.xml

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