# SPEC® CINT2006 Result

**Fujitsu**

PRIMERGY BX2560 M2, Intel Xeon E5-2650 v4, 2.20 GHz

## SPECint®2006 = 60.2

- **SPECint_base2006 = 57.7**

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Specification Details</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, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chip</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>
<tr>
<td>L3 Cache</td>
<td>30 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x SATA, 500 GB, 7200 RPM</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Specification Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64)</td>
</tr>
<tr>
<td></td>
<td>Kernel 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C++: Version 16.0.101 of Intel C++ 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>
<tr>
<td>Base Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software</td>
<td>Microquill SmartHeap V10.2</td>
</tr>
</tbody>
</table>

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Test date: Jul-2016
Test sponsor: Fujitsu
Hardware Availability: Apr-2016
Software Availability: Sep-2015

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CPU2006 license: 19
Tested by: Fujitsu

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECint2006</th>
<th>SPECint_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>34.3</td>
<td>32.7</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>21.3</td>
<td>20.9</td>
</tr>
<tr>
<td>403.gcc</td>
<td>32.7</td>
<td>30.8</td>
</tr>
<tr>
<td>429.mcf</td>
<td>25.3</td>
<td>29.5</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>35.6</td>
<td>30.8</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>57.8</td>
<td>56.5</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>29.5</td>
<td>29.2</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>48.1</td>
<td>48.1</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>47.3</td>
<td>47.3</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>35.6</td>
<td>30.7</td>
</tr>
<tr>
<td>473.astar</td>
<td>30.7</td>
<td>31.4</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>64.4</td>
<td>64.4</td>
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</table>

**SPECint2006 = 60.2**

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Software Availability: Sep-2015
Fujitsu
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SPECint2006 = 60.2
SPECint_base2006 = 57.7

Results Table

<table>
<thead>
<tr>
<th>Benchmark</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>400.perlbench</td>
<td>285</td>
<td>34.3</td>
<td>286</td>
<td>34.2</td>
<td>284</td>
<td>34.4</td>
<td>261</td>
<td>37.4</td>
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<tr>
<td>401.bzip2</td>
<td>462</td>
<td>20.9</td>
<td>465</td>
<td>20.8</td>
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<td>20.9</td>
<td>454</td>
<td>21.3</td>
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<tr>
<td>403.gcc</td>
<td>246</td>
<td>32.7</td>
<td>247</td>
<td>32.6</td>
<td>246</td>
<td>32.7</td>
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<td>32.7</td>
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<tr>
<td>429.mcf</td>
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<td>157</td>
<td>57.9</td>
<td>158</td>
<td>57.8</td>
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<tr>
<td>445.gobmk</td>
<td>416</td>
<td>25.2</td>
<td>416</td>
<td>25.2</td>
<td>416</td>
<td>25.2</td>
<td>416</td>
<td>25.2</td>
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<tr>
<td>456.hmmer</td>
<td>132</td>
<td>70.7</td>
<td>132</td>
<td>70.9</td>
<td>132</td>
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<td>458.sjeng</td>
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<td>29.2</td>
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<td>29.2</td>
<td>411</td>
<td>29.5</td>
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<tr>
<td>462.libquantum</td>
<td>3.67</td>
<td>5650</td>
<td>3.70</td>
<td>5600</td>
<td>3.65</td>
<td>5670</td>
<td>3.67</td>
<td>5650</td>
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<tr>
<td>464.h264ref</td>
<td>461</td>
<td>48.0</td>
<td>460</td>
<td>48.1</td>
<td>459</td>
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<td>48.0</td>
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<tr>
<td>471.omnetpp</td>
<td>177</td>
<td>35.4</td>
<td>173</td>
<td>36.2</td>
<td>175</td>
<td>35.6</td>
<td>132</td>
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<tr>
<td>473.astar</td>
<td>230</td>
<td>30.5</td>
<td>228</td>
<td>30.9</td>
<td>228</td>
<td>30.7</td>
<td>228</td>
<td>30.8</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>109</td>
<td>63.4</td>
<td>107</td>
<td>64.5</td>
<td>107</td>
<td>64.4</td>
<td>96.3</td>
<td>71.7</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 configuration:
Energy Performance = Performance
Utilization Profile = Unbalanced
QPI snoop mode: Home Directory Snoop with OSB
COD Enable = Disabled, Early Snoop = Disabled, Home Snoop Dir OSB = Enabled
CPU C1E Support = Disabled
Sysinfo program: /home/SPECcpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on BX2560M2-T-313 Tue Jul 26 19:20:15 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)
48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
Continued on next page
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Platform Notes (Continued)

following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
cpu cores : 12
siblings : 24
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: 264515584 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1

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 Jul 26 19:19 last=5

SPEC is set to: /home/SPECcpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 424G 34G 390G 8% /home

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 SMI BIOS" standard.

BIOS FUJITSU // American Megatrends Inc. V5.0.0.11 R1.4.0 for D3320-B1x
03/17/2016
Memory:

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Platform Notes (Continued)
8x Hyundai Electronics (Hynix) HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
8x Micron Technology 36ASF2G72PZ-2G3A3 16 GB 2 rank 2400 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/SPECcpu2006/libs/32:/home/SPECcpu2006/libs/64:/home/SPECcpu2006/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
For information about Fujitsu please visit: http://www.fujitsu.com

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 -opt-prefetch -auto-p32

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### SPEC CINT2006 Result

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#### Base Optimization Flags (Continued)

**C++ benchmarks:**
- `-xCORE-AVX2`
- `-ipo`
- `-O3`
- `-no-prec-div`
- `-opt-prefetch`
- `-auto-p32`
- `-Wl,-z,muldefs`
- `-L/sh -lsmartheap64`

#### Base Other Flags

**C benchmarks:**
- `403.gcc`: `-Dalloca=_alloca`

#### Peak Compiler Invocation

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

**400.perlbench:**
- `icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin`

**C++ benchmarks (except as noted below):**
- `icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin`

**473.astar:**
- `icpc -m64`

#### 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:**
- `-DSPEC_CPU_LP64`

**456.hmmer:**
- `-DSPEC_CPU_LP64`

**458.sjeng:**
- `-DSPEC_CPU_LP64`

**462.libquantum:**
- `-DSPEC_CPU_LP64`

**464.h264ref:**
- `-DSPEC_CPU_LP64`

**471.omnetpp:**
- `-D_FILE_OFFSET_BITS=64`

**473.astar:**
- `-DSPEC_CPU_LP64`

**483.xalancbmk:**
- `-D_FILE_OFFSET_BITS=64`

#### Peak Optimization Flags

**C benchmarks:**

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info@spec.org
http://www.spec.org/
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Peak Optimization Flags (Continued)

400.perlbench: -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) -opt-prefetch
-ansi-alias

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div
-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32
-opt-prefetch -ansi-alias

403.gcc: basepeak = yes
429.mcf: basepeak = yes
445.gobmk: basepeak = yes
456.hmmer: basepeak = yes
458.sjeng: -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

462.libquantum: basepeak = yes
464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -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)
-opt-ra-region-strategy=block
-Wl,-z,muldefs -L/sh -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-auto-p32 -Wl,-z,muldefs -L/sh -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca
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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/Fujitsu-Platform-Settings-V1.2-BDW-RevB.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/Fujitsu-Platform-Settings-V1.2-BDW-RevB.xml

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