**Supermicro**

Supermicro C7Z170-SQ motherboard  
(C7Z170-SQ, Intel Core i5-6400)

**CPU2006 license:** 001176  
**Test date:** Nov-2015

**Test sponsor:** Supermicro  
**Hardware Availability:** Sep-2015

**Tested by:** Supermicro  
**Software Availability:** Sep-2014

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### SPECint Rate

**SPECint_rate2006 = 184**

**SPECint_rate_base2006 = 179**

---

**Other Software:** Microquill SmartHeap V10.0

---

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Core i5-6400</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.30 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2700</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>4 cores, 1 chip, 4 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1 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>6 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>16 GB (4 x 4 GB 1Rx8 PC4-2133P-U)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 400 GB SATA III SSD</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>

---

**Software**

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Red Hat Enterprise Linux Server release 7.0, Kernel 3.10.0-123.el7.x86_64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler</td>
<td>C/C++: Version 15.0.0.0.090 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>No</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-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software</td>
<td>Microquill SmartHeap V10.0</td>
</tr>
</tbody>
</table>
Supermicro C7Z170-SQ motherboard (C7Z170-SQ, Intel Core i5-6400)

CPU2006 license: 001176
Test sponsor: Supermicro
Tested by: Supermicro

SPECint_rate2006 = 184
SPECint_rate_base2006 = 179

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>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>4</td>
<td>270</td>
<td>145</td>
<td>269</td>
<td>145</td>
<td>269</td>
<td>145</td>
<td>4</td>
<td>222</td>
<td>176</td>
<td>223</td>
<td>175</td>
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<td>bzip2</td>
<td>4</td>
<td>480</td>
<td>80.4</td>
<td>480</td>
<td>80.3</td>
<td>480</td>
<td>80.3</td>
<td>4</td>
<td>459</td>
<td>84.1</td>
<td>459</td>
<td>84.2</td>
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<tr>
<td>gcc</td>
<td>4</td>
<td>230</td>
<td>140</td>
<td>229</td>
<td>141</td>
<td>229</td>
<td>141</td>
<td>4</td>
<td>227</td>
<td>142</td>
<td>228</td>
<td>141</td>
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<tr>
<td>mcf</td>
<td>4</td>
<td>172</td>
<td>212</td>
<td>173</td>
<td>211</td>
<td>172</td>
<td>212</td>
<td>4</td>
<td>172</td>
<td>212</td>
<td>172</td>
<td>212</td>
</tr>
<tr>
<td>gobmk</td>
<td>4</td>
<td>401</td>
<td>105</td>
<td>402</td>
<td>104</td>
<td>402</td>
<td>104</td>
<td>4</td>
<td>407</td>
<td>103</td>
<td>407</td>
<td>103</td>
</tr>
<tr>
<td>hammer</td>
<td>4</td>
<td>128</td>
<td>292</td>
<td>128</td>
<td>292</td>
<td>128</td>
<td>292</td>
<td>4</td>
<td>124</td>
<td>301</td>
<td>124</td>
<td>301</td>
</tr>
<tr>
<td>sjeng</td>
<td>4</td>
<td>391</td>
<td>124</td>
<td>391</td>
<td>124</td>
<td>391</td>
<td>124</td>
<td>4</td>
<td>379</td>
<td>128</td>
<td>379</td>
<td>128</td>
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<tr>
<td>libquantum</td>
<td>4</td>
<td>44.6</td>
<td>1860</td>
<td>45.7</td>
<td>1810</td>
<td>44.6</td>
<td>1860</td>
<td>4</td>
<td>44.6</td>
<td>1860</td>
<td>45.7</td>
<td>1810</td>
</tr>
<tr>
<td>h264ref</td>
<td>4</td>
<td>383</td>
<td>231</td>
<td>380</td>
<td>233</td>
<td>380</td>
<td>233</td>
<td>4</td>
<td>370</td>
<td>239</td>
<td>369</td>
<td>240</td>
</tr>
<tr>
<td>omnetpp</td>
<td>4</td>
<td>281</td>
<td>89.0</td>
<td>279</td>
<td>89.5</td>
<td>280</td>
<td>89.4</td>
<td>4</td>
<td>268</td>
<td>93.4</td>
<td>267</td>
<td>93.8</td>
</tr>
<tr>
<td>astar</td>
<td>4</td>
<td>290</td>
<td>96.7</td>
<td>290</td>
<td>96.8</td>
<td>290</td>
<td>96.8</td>
<td>4</td>
<td>290</td>
<td>96.7</td>
<td>290</td>
<td>96.8</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>4</td>
<td>126</td>
<td>218</td>
<td>126</td>
<td>219</td>
<td>127</td>
<td>218</td>
<td>4</td>
<td>126</td>
<td>218</td>
<td>126</td>
<td>219</td>
</tr>
</tbody>
</table>

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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

As tested, the system used a Supermicro CSE-732G-903B chassis. The chassis is configured with a PWS-903-PQ power supply, 1 SNK-P0051AP4 heatsink, as well as 1 FAN-0124L4 rear cooling fan. Sysinfo program /home/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Wed Nov 4 12:54:44 2015

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) Core(TM) i5-6400 CPU @ 2.70GHz
  4 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
Supermicro C7Z170-SQ motherboard
(C7Z170-SQ, Intel Core i5-6400)

SPECint_rate2006 = 184
SPECint_rate_base2006 = 179

CPU2006 license: 001176
Test sponsor: Supermicro
Tested by: Supermicro

Platform Notes (Continued)

  cpu cores : 4
  siblings : 4
  physical 0: cores 0 1 2 3
  cache size : 6144 KB

From /proc/meminfo
  MemTotal: 16170460 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.0 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="7.0"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
    ANSI_COLOR="0;31"
    CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
  redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
  Linux localhost.localdomain 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 4 12:52

SPEC is set to: /home/cpu2006
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs 318G 317G 1.2G 100% /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 SMBIOS" standard.

  BIOS American Megatrends Inc. T20151015150001 10/15/2015
  Memory:
    4x Micron 8ATF51264AZ-2G1A2 4 GB 1 rank 2133 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
  LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

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Supermicro
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Test sponsor: Supermicro
Tested by: Supermicro

Test date: Nov-2015
Hardware Availability: Sep-2015
Software Availability: Sep-2014

General Notes (Continued)
Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0
Transparent Huge Pages enabled with:
    echo always > /sys/kernel/mm/transparent_hugepage/enabled

Base Compiler Invocation
C benchmarks:
    icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
C++ benchmarks:
    icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

Base Portability Flags
400.perlbench: -DSPEC_CPU_LINUX_IA32
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags
C benchmarks:
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
C++ benchmarks:
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -Wl,-z,muldefs -L/sh -lsmartheap

Base Other Flags
C benchmarks:
    403.gcc: -Dalloca=_alloca

Peak Compiler Invocation
C benchmarks (except as noted below):
    icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
    400.perlbench: icc -m64

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**SPEC CINT2006 Result**

**Supermicro**
Supermicro C7Z170-SQ motherboard
(C7Z170-SQ, Intel Core i5-6400)

| SPECint_rate2006 | 184 |
| SPECint_rate_base2006 | 179 |

**CPU2006 license:** 001176  
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**Tested by:** Supermicro  
**Software Availability:** Sep-2014

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**Peak Compiler Invocation (Continued)**

401.bzip2: `icc -m64`
456.hmmer: `icc -m64`
458.sjeng: `icc -m64`

C++ benchmarks:

```
icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
```

---

**Peak Portability Flags**

400.perlbench: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64`
401.bzip2: `-DSPEC_CPU_LP64`
456.hmmer: `-DSPEC_CPU_LP64`
458.sjeng: `-DSPEC_CPU_LP64`
462.libquantum: `-DSPEC_CPU_LINUX`
483.xalancbmk: `-DSPEC_CPU_LINUX`

---

**Peak Optimization Flags**

C benchmarks:

400.perlbench: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32`

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

403.gcc: `-xCORE-AVX2 -ipo -O3 -no-prec-div`
429.mcf: `basepeak = yes`
445.gobmk: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -prof-use(pass 2) -ansi-alias`
456.hmmer: `-xCORE-AVX2 -ipo -O3 -no-prec-div -unroll12 -auto-ilp32`
458.sjeng: `-xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto-ilp32`
462.libquantum: `basepeak = yes`

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Peak Optimization Flags (Continued)

464.h264ref: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-o3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-unroll2 -ansi-alias

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-o3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-ansi-alias -opt-ra-region-strategy=block -Wl,-z,muldefs
-L/sh -lsmartheap

473.astar: basepeak = yes
483.xalancbmk: basepeak = yes

Peak Other Flags

C benchmarks:

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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Supermicro-Platform-Settings-V1.2-revG.20141230.00.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Supermicro-Platform-Settings-V1.2-revG.20141230.00.xml

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

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