IBM Corporation
IBM Flex System x240
(Intel Xeon E5-2670, 2.60 GHz)

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: May-2012
Hardware Availability: May-2012
Software Availability: Dec-2011

SPECfp®2006 = 87.0
SPECfp_base2006 = 83.2

Hardware

CPU Name: Intel Xeon E5-2670
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2600
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 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 KB I+D on chip per core

Software

Operating System: Red Hat Enterprise Linux Server release 6.2 (Santiago)
Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;
Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: ext4

continued on next page
**SPEC CFP2006 Result**

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**L3 Cache:** 20 MB I+D on chip per chip

**Other Cache:** None

**Memory:** 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)

**Disk Subsystem:** 1 x 300 GB SAS, 10000 RPM

**Other Hardware:** None

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**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** 32/64-bit

**Other Software:** None

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**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"

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**Platform Notes**

Operating Mode set to Maximum Performance in BIOS

Sysinfo program /cpu2006.1.2/config/sysinfo.rev6800

$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdf5032aaa42e583f96b07f99d3

running on blacktip-pete Wed May 2 02:57:04 2012

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

---

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

---

**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>
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<tr>
<td>410.bwaves</td>
<td>33.6</td>
<td>404</td>
<td>34.0</td>
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<tr>
<td>416.gamess</td>
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<td>671</td>
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<td>150</td>
<td>61.3</td>
<td>150</td>
<td>61.3</td>
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<td>22.6</td>
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<td>459.GemsFDTD</td>
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<td>465.tonto</td>
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<tr>
<td>481.wrf</td>
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<td>75.9</td>
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<td>70.1</td>
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<td>69.1</td>
</tr>
</tbody>
</table>

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Please note that the table continues on the next page with additional benchmarks and their respective results.
IBM Corporation
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Platform Notes (Continued)

model name : Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz
  2 "physical id"s (chips)
  32 "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 : 8
siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7
cache size : 20480 KB

From /proc/meminfo
MemTotal: 132136204 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.2 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)

uname -a:
   Linux blacktip-pete 2.6.32-220.el6.x86_64 #1 SMP Wed Nov 9 08:03:13 EST 2011
      x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Apr 30 12:06

SPEC is set to: /cpu2006.1.2

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Aveil</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/vg_blacktippete-lv_root</td>
<td>ext4</td>
<td>265G</td>
<td>96G</td>
<td>156G</td>
<td>38%</td>
<td>/</td>
</tr>
</tbody>
</table>

Additional information from dmidecode:
Memory:
   4x Hynix HMT31GR7CFR4C-PB 8 GB 1600 MHz 2 rank
   12x Samsung M393B1K70DH0-CK0 8 GB 1600 MHz 2 rank

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64"
OMP_NUM_THREADS = "16"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
Continued on next page
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General Notes (Continued)

memory using RHEL5.5
Transparent Huge Pages enabled with:
  echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled

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

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
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:
  -xAVX -ipo -03 -no-prec-div -static -parallel -opt-prefetch
  -ansi-alias

C++ benchmarks:
  -xAVX -ipo -03 -no-prec-div -static -opt-prefetch -ansi-alias

Continued on next page
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**Base Optimization Flags (Continued)**

Fortran benchmarks:
- xAVX
- ipo
- -O3
- -no-prec-div
- -static
- -parallel
- -opt-prefetch

Benchmarks using both Fortran and C:
- xAVX
- ipo
- -O3
- -no-prec-div
- -static
- -parallel
- -opt-prefetch
- -ansi-alias

---

**Peak Compiler Invocation**

C benchmarks:
```
icc -m64
```

C++ benchmarks:
```
icpc -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc -m64 ifort -m64
```

---

**Peak Portability Flags**

Same as Base Portability Flags

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**Peak Optimization Flags**

C benchmarks:
```
433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32
- -ansi-alias

470.lbm: basepeak = yes

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias
- parallel
```

C++ benchmarks:
```
444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2) -prof-use(pass 2) -fno-alias
- auto-ilp32
```
## IBM Corporation

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(Intel Xeon E5-2670, 2.60 GHz)  

| SPECf2006 | 87.0 |
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### Peak Optimization Flags (Continued)

- **447.dealII:** basepeak = yes  
- **450.soplex:** basepeak = yes  
- **453.povray:**  
  -xAVX(pass 2)  
  -prof-gen(pass 1)  
  -ipo(pass 2)  
  -O3(pass 2)  
  -no-prec-div(pass 2)  
  -prof-use(pass 2)  
  -unroll4 -ansi-alias

**Fortran benchmarks:**

- **410.bwaves:** basepeak = yes  
- **416.gamess:**  
  -xAVX(pass 2)  
  -prof-gen(pass 1)  
  -ipo(pass 2)  
  -O3(pass 2)  
  -no-prec-div(pass 2)  
  -prof-use(pass 2)  
  -unroll2  
  -inline-level=0 -scalar-rep- -static

- **434.zeusmp:** basepeak = yes  
- **437.leslie3d:** basepeak = yes  
- **459.GemsFDTD:**  
  -xAVX(pass 2)  
  -prof-gen(pass 1)  
  -ipo(pass 2)  
  -O3(pass 2)  
  -no-prec-div(pass 2)  
  -prof-use(pass 2)  
  -unroll2  
  -inline-level=0 -opt-prefetch -parallel

- **465.tonto:**  
  -xAVX(pass 2)  
  -prof-gen(pass 1)  
  -ipo(pass 2)  
  -O3(pass 2)  
  -no-prec-div(pass 2)  
  -prof-use(pass 2)  
  -inline-calloc  
  -opt-malloc-options=3 -auto -unroll4

**Benchmarks using both Fortran and C:**

- **435.gromacs:** basepeak = yes  
- **436.cactusADM:** basepeak = yes  
- **454.calculix:**  
  -xAVX -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

- **481.wrf:** basepeak = yes

The flags files that were used to format this result can be browsed at  
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.html  
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.html

You can also download the XML flags sources by saving the following links:  
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml  
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.xml
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<th>IBM Corporation</th>
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<th>SPECfp_base2006</th>
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</thead>
<tbody>
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<td>IBM Flex System x240</td>
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