SPEC® CFP2006 Result

IBM Corporation

IBM System x3690 X5 (Intel Xeon E7-2870, 2.40 GHz)

SPECfp®_rate2006 = NC
SPECfp_rate_base2006 = NC

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

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**IBM System x3690 X5 (Intel Xeon E7-2870, 2.40 GHz)**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon E7-8870</td>
<td>Operating System: Red Hat Enterprise Linux Server release 6.2 (Santiago) 2.6.32-220.el6.x86_64</td>
</tr>
<tr>
<td>CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz</td>
<td>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</td>
</tr>
<tr>
<td>CPU MHz: 2400</td>
<td>Auto Parallel: No</td>
</tr>
<tr>
<td>FPU: Integrated</td>
<td>File System: ext4</td>
</tr>
<tr>
<td>CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip, 2 threads/core</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>CPU(s) orderable: 1,2 chips</td>
<td>Base Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Secondary Cache: 256 KB I+D on chip per core</td>
<td>Other Software: None</td>
</tr>
<tr>
<td>L3 Cache: 30 MB I+D on chip per chip</td>
<td>Other Hardware: None</td>
</tr>
<tr>
<td>Other Cache: None</td>
<td>Memory: 256 GB (32 x 8 GB 4Rx8 PC3-8500R-7, ECC)</td>
</tr>
<tr>
<td>Disk Subsystem: 1 x 300 GB SAS, 15,000 RPM</td>
<td>Disk Subsystem: 1 x 300 GB SAS, 15,000 RPM</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 11  **Test date:** Feb-2012  
**Test sponsor:** IBM Corporation  **Hardware Availability:** May-2011  
**Tested by:** IBM Corporation  **Software Availability:** Feb-2012
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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
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<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>NC</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"
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Platform Notes

Turbo Boost Power Optimization set to Traditional in BIOS
Sysinfo program /cpu2006.1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdf55a4aa-2e583f96b07f99d3
running on megallon-pete Sun Feb 19 00:21:12 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
model name : Intel(R) Xeon(R) CPU E7-8870 @ 2.40GHz
  2 "physical id"s (chips)
  40 "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 : 10
  siblings : 20
  physical 0: cores 0 1 2 8 9 16 17 18 24 25
  physical 1: cores 0 1 2 8 9 16 17 18 24 25
cache size : 30720 KB

From /proc/meminfo
MemTotal: 164509312 kB
HugePages_Total:       0
Hugepagesize:     2048 kB

From /etc/issue
Red Hat Enterprise Linux Server release 6.2 (Santiago)

uname -a:
Linux megallon-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 Feb 15 17:35

Continued on next page
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Platform Notes (Continued)

SPEC is set to: /cpu2006.1.2
Filesystem    Type    Size  Used Avail Use% Mounted on
/dev/mapper/vg_megallonpete-lv_root  ext4  264G   85G  166G  34% /

Additional information from dmidecode:
Memory:
32x Hynix HMT31GR7BFR8A-G7 8 GB 1067 MHz 4 rank

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5
Transparent Huge Pages enabled with:
echo always > /kernel/mm/redhat_transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1> /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>

Base Compiler Invocation

C benchmarks:
icc   -m64
C++ benchmarks:
icpc  -m64
Fortran benchmarks:
ifort -m64

Continued on next page
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### Base Compiler Invocation (Continued)

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

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td><code>DSPEC_CPU_LP64</code></td>
<td></td>
</tr>
<tr>
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<tr>
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<td><code>DSPEC_CPU_LP64</code></td>
<td></td>
</tr>
<tr>
<td>434.zeusmp</td>
<td><code>DSPEC_CPU_LP64</code></td>
<td><code>nofor_main</code></td>
</tr>
<tr>
<td>435.gromacs</td>
<td><code>DSPEC_CPU_LP64</code></td>
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</tr>
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<td><code>nofor_main</code></td>
</tr>
<tr>
<td>444.namd</td>
<td><code>DSPEC_CPU_LP64</code></td>
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</tr>
<tr>
<td>447.dealII</td>
<td><code>DSPEC_CPU_LP64</code></td>
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</tr>
<tr>
<td>450.soplex</td>
<td><code>DSPEC_CPU_LP64</code></td>
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</tr>
<tr>
<td>453.povray</td>
<td><code>DSPEC_CPU_LP64</code></td>
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</tr>
<tr>
<td>454.calculix</td>
<td><code>DSPEC_CPU_LP64</code></td>
<td><code>nofor_main</code></td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td><code>DSPEC_CPU_LP64</code></td>
<td></td>
</tr>
<tr>
<td>465.tonto</td>
<td><code>DSPEC_CPU_LP64</code></td>
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<tr>
<td>470.lbm</td>
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<tr>
<td>481.wrf</td>
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</tr>
<tr>
<td>482.sphinx3</td>
<td><code>DSPEC_CPU_LP64</code></td>
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</tr>
</tbody>
</table>

### Base Optimization Flags

**C benchmarks:**
- `-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32`
- `-ansi-alias -opt-mem-layout-trans=3`

**C++ benchmarks:**
- `-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32`
- `-ansi-alias -opt-mem-layout-trans=3`

**Fortran benchmarks:**
- `-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch`

Continued on next page
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Peak Portability Flags (Continued)

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

Peak Optimization Flags

C benchmarks:
433.milc: basepeak = yes
470.lbm: basepeak = yes
482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3 -unroll2

C++ benchmarks:
444.namd: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -fno-alias -auto-ilp32
447.dealII: basepeak = yes
-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-malloc-options=3
453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:
410.bwaves: basepeak = yes
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Peak Optimization Flags (Continued)

416.gamess: -xsSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll12
-inline-level=0 -scalar-rep -static

434.zeusmp: basepeak = yes

437.leslie3d: -xsSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xsSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll14 -auto
-inline-level=0 -scalar-rep -static

Benchmarks using both Fortran and C:

435.gromacs: -xsSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)
-prec-gen(pass 1) -opt-prefetch -static -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

451.Lwr: -xsSE4.2 -ipo -O3 -no-prec-div -static -auto-ilp32

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

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-WSM-A.20120328.xml
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