



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

IBM System x3850 X5 (Intel Xeon E7-4870, 2.40 GHz)

SPECfp<sup>®</sup>\_rate2006 = 757

SPECfp\_rate\_base2006 = 739

CPU2006 license: 11

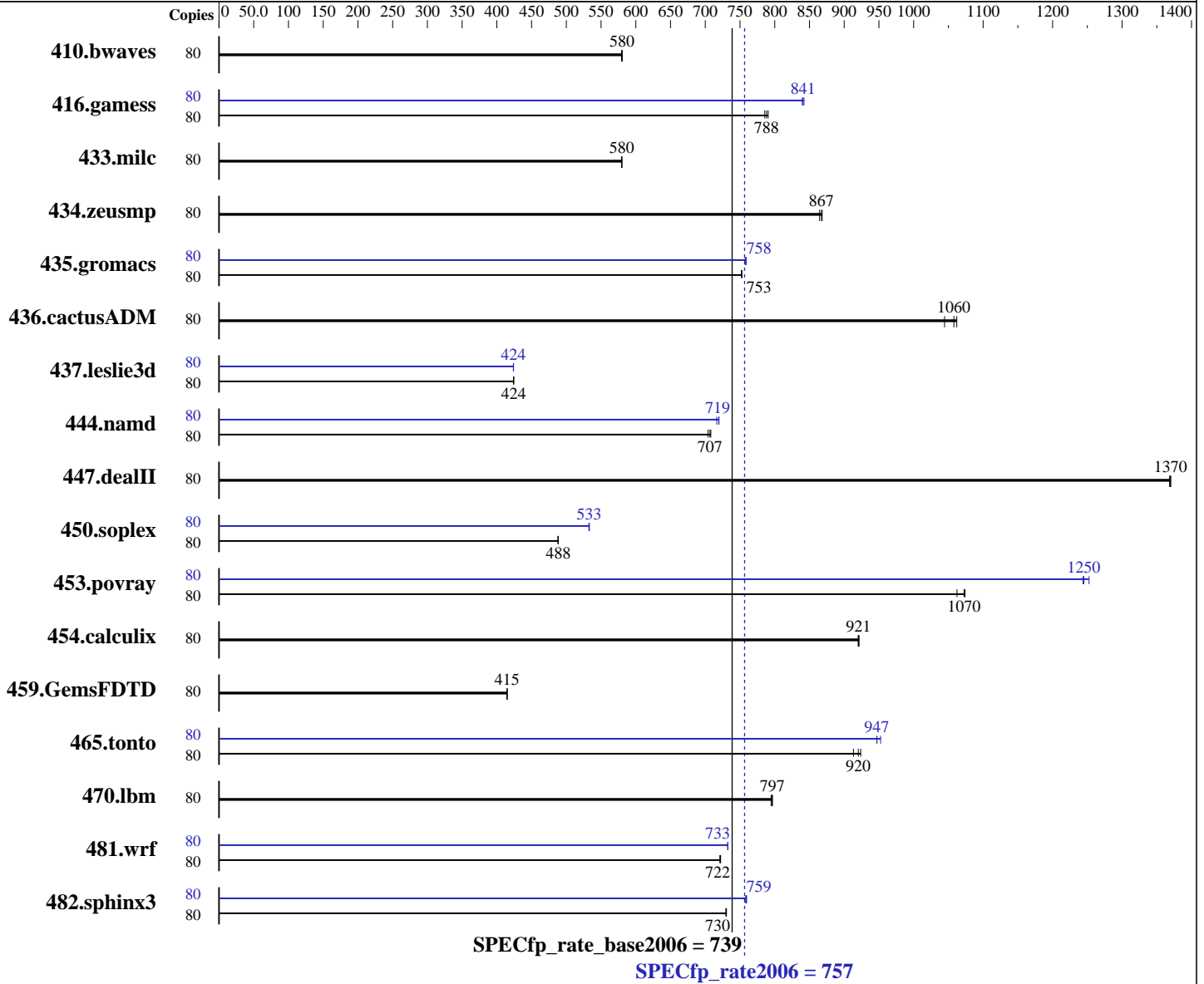
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Feb-2012

Hardware Availability: May-2011

Software Availability: Feb-2012



### Hardware

CPU Name: Intel Xeon E7-4870  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2,3,4 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core

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### Software

Operating System: Red Hat Enterprise Linux Server release 6.2 (Santiago)  
 2.6.32-220.el6.x86\_64  
 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: No  
 File System: ext4

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L3 Cache: 30 MB I+D on chip per chip  
Other Cache: None  
Memory: 512 GB (64 x 8 GB 4Rx8 PC3L-8500R-7, ECC)  
Disk Subsystem: 1 x 300 GB SAS, 10000 RPM  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	80	1876	579	<b><u>1874</u></b>	<b><u>580</u></b>	1873	581	80	1876	579	<b><u>1874</u></b>	<b><u>580</u></b>	1873	581		
416.gamess	80	1994	786	<b><u>1987</u></b>	<b><u>788</u></b>	1981	791	80	1860	842	1866	840	<b><u>1863</u></b>	<b><u>841</u></b>		
433.milc	80	1267	580	<b><u>1267</u></b>	<b><u>580</u></b>	1266	580	80	1267	580	<b><u>1267</u></b>	<b><u>580</u></b>	1266	580		
434.zeusmp	80	842	865	838	868	<b><u>839</u></b>	<b><u>867</u></b>	80	842	865	838	868	<b><u>839</u></b>	<b><u>867</u></b>		
435.gromacs	80	759	753	<b><u>759</u></b>	<b><u>753</u></b>	759	752	80	<b><u>753</u></b>	<b><u>758</u></b>	754	757	753	759		
436.cactusADM	80	915	1040	900	1060	<b><u>904</u></b>	<b><u>1060</u></b>	80	915	1040	900	1060	<b><u>904</u></b>	<b><u>1060</u></b>		
437.leslie3d	80	<b><u>1773</u></b>	<b><u>424</u></b>	1772	424	1774	424	80	1773	424	<b><u>1775</u></b>	<b><u>424</u></b>	1775	424		
444.namd	80	911	704	<b><u>908</u></b>	<b><u>707</u></b>	906	708	80	896	716	891	720	<b><u>892</u></b>	<b><u>719</u></b>		
447.dealII	80	<b><u>668</u></b>	<b><u>1370</u></b>	668	1370	669	1370	80	<b><u>668</u></b>	<b><u>1370</u></b>	668	1370	669	1370		
450.soplex	80	<b><u>1366</u></b>	<b><u>488</u></b>	1366	489	1368	488	80	1251	533	<b><u>1252</u></b>	<b><u>533</u></b>	1253	532		
453.povray	80	<b><u>397</u></b>	<b><u>1070</u></b>	396	1070	401	1060	80	<b><u>342</u></b>	<b><u>1250</u></b>	340	1250	342	1240		
454.calculix	80	<b><u>717</u></b>	<b><u>921</u></b>	717	920	716	921	80	<b><u>717</u></b>	<b><u>921</u></b>	717	920	716	921		
459.GemsFDTD	80	2047	415	2046	415	<b><u>2047</u></b>	<b><u>415</u></b>	80	2047	415	2046	415	<b><u>2047</u></b>	<b><u>415</u></b>		
465.tonto	80	<b><u>855</u></b>	<b><u>920</u></b>	852	924	862	913	80	827	952	831	947	<b><u>831</u></b>	<b><u>947</u></b>		
470.lbm	80	1383	795	1380	797	<b><u>1380</u></b>	<b><u>797</u></b>	80	1383	795	1380	797	<b><u>1380</u></b>	<b><u>797</u></b>		
481.wrf	80	1237	722	1239	721	<b><u>1238</u></b>	<b><u>722</u></b>	80	1220	733	<b><u>1220</u></b>	<b><u>733</u></b>	1220	732		
482.sphinx3	80	2134	731	<b><u>2136</u></b>	<b><u>730</u></b>	2137	730	80	2057	758	<b><u>2054</u></b>	<b><u>759</u></b>	2053	760		

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"

## 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 #\$ 6f2ebdff5032aaa42e583f96b07f99d3

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CPU2006 license: 11  
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Test date: Feb-2012  
Hardware Availability: May-2011  
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### Platform Notes (Continued)

running on ghidorah-pete Sun Feb 12 00:35:07 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- 4870 @ 2.40GHz
 4 "physical id"s (chips)
 80 "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
  physical 2: cores 0 1 2 8 9 16 17 18 24 25
  physical 3: cores 0 1 2 8 9 16 17 18 24 25
cache size : 30720 KB
```

```
From /proc/meminfo
MemTotal:      529211640 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)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux ghidorah-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 9 09:13

```
SPEC is set to: /cpu2006.1.2
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/mapper/vg_ghidorahpete-lv_root
                ext4      264G  157G   94G  63% /
```

```
Additional information from dmidecode:
Memory:
64x Hynix HMT31GR7BFR8A-G7 8 GB 1067 MHz 4 rank
```

(End of data from sysinfo program)



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## 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 > /sys/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

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.deallI: -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



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## 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

Benchmarks using both Fortran and C:

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

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m64

482.sphinx3: icc -m32

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## Peak 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.deallI: -DSPEC\_CPU\_LP64

453.povray: -DSPEC\_CPU\_LP64

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**Software Availability:** Feb-2012

## 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.dealIII: basepeak = yes  
 450.soplex: -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  
 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) -unroll2  
 -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

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## Peak Optimization Flags (Continued)

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) -unroll4 -auto  
-inline-calloc -opt-malloc-options=3

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)  
-prof-use(pass 2) -opt-prefetch -static -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -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>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-WSM-A.20120328.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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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