



# SPEC® CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp®\_rate2006 = 167

PowerEdge T320 (Intel Xeon E5-2440, 2.40 GHz)

SPECfp\_rate\_base2006 = 163

CPU2006 license: 55

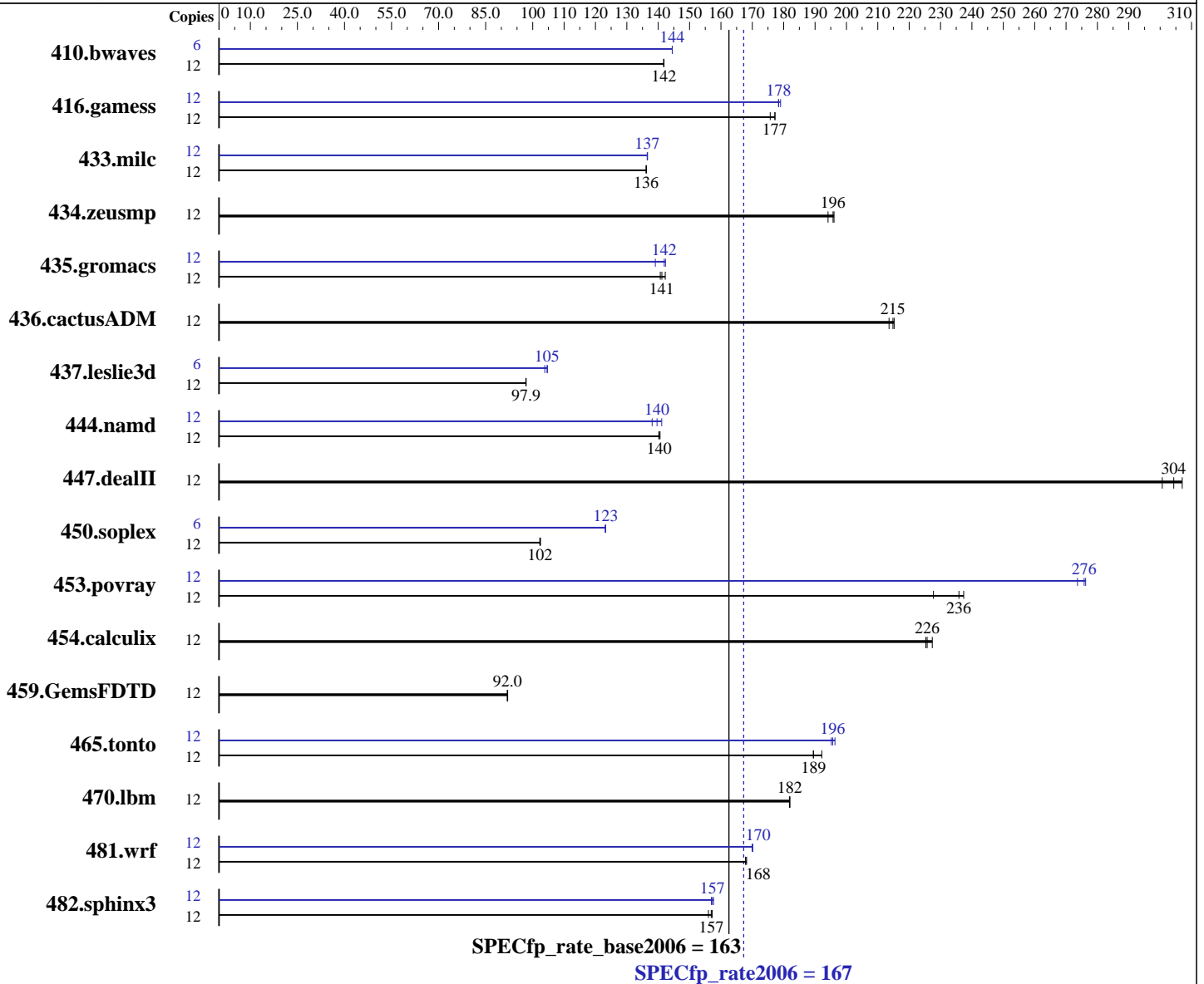
Test date: May-2012

Test sponsor: Dell Inc.

Hardware Availability: Jun-2012

Tested by: Dell Inc.

Software Availability: Feb-2012



### Hardware

CPU Name: Intel Xeon E5-2440  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.90 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 6 cores, 1 chip, 6 cores/chip, 2 threads/core  
 CPU(s) orderable: 1 chip  
 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: SUSE Linux Enterprise Server 11 SP2(x86\_64)  
 3.0.13-0.27-default  
 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: ext3  
 System State: Run level 3 (multi-user)

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L3 Cache: 15 MB I+D on chip per chip  
Other Cache: None  
Memory: 48 GB (6 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1333 MHz)  
Disk Subsystem: 1 x 300 GB 15000 RPM SAS  
Other Hardware: None

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	12	1150	142	<b><u>1150</u></b>	<b><u>142</u></b>	1151	142	6	<b><u>564</u></b>	<b><u>144</u></b>	564	144	564	145		
416.gamess	12	<b><u>1326</u></b>	<b><u>177</u></b>	1337	176	1326	177	12	1313	179	<b><u>1317</u></b>	<b><u>178</u></b>	1317	178		
433.milc	12	809	136	<b><u>809</u></b>	<b><u>136</u></b>	809	136	12	806	137	<b><u>807</u></b>	<b><u>137</u></b>	807	136		
434.zeusmp	12	<b><u>558</u></b>	<b><u>196</u></b>	557	196	562	194	12	<b><u>558</u></b>	<b><u>196</u></b>	557	196	562	194		
435.gromacs	12	602	142	609	141	<b><u>607</u></b>	<b><u>141</u></b>	12	<b><u>604</u></b>	<b><u>142</u></b>	602	142	616	139		
436.cactusADM	12	<b><u>668</u></b>	<b><u>215</u></b>	671	214	666	215	12	<b><u>668</u></b>	<b><u>215</u></b>	671	214	666	215		
437.leslie3d	12	<b><u>1153</u></b>	<b><u>97.9</u></b>	1152	97.9	1153	97.8	6	<b><u>539</u></b>	<b><u>105</u></b>	539	105	543	104		
444.namd	12	685	141	686	140	<b><u>686</u></b>	<b><u>140</u></b>	12	682	141	697	138	<b><u>689</u></b>	<b><u>140</u></b>		
447.dealII	12	<b><u>451</u></b>	<b><u>304</u></b>	457	301	447	307	12	<b><u>451</u></b>	<b><u>304</u></b>	457	301	447	307		
450.soplex	12	979	102	<b><u>978</u></b>	<b><u>102</u></b>	977	102	6	406	123	<b><u>406</u></b>	<b><u>123</u></b>	407	123		
453.povray	12	<b><u>271</u></b>	<b><u>236</u></b>	280	228	269	237	12	233	274	<b><u>231</u></b>	<b><u>276</u></b>	231	276		
454.calculix	12	439	225	435	227	<b><u>439</u></b>	<b><u>226</u></b>	12	439	225	435	227	<b><u>439</u></b>	<b><u>226</u></b>		
459.GemsFDTD	12	<b><u>1385</u></b>	<b><u>92.0</u></b>	1386	91.9	1383	92.0	12	<b><u>1385</u></b>	<b><u>92.0</u></b>	1386	91.9	1383	92.0		
465.tonto	12	623	189	615	192	<b><u>623</u></b>	<b><u>189</u></b>	12	601	196	<b><u>604</u></b>	<b><u>196</u></b>	605	195		
470.lbm	12	907	182	<b><u>906</u></b>	<b><u>182</u></b>	906	182	12	907	182	<b><u>906</u></b>	<b><u>182</u></b>	906	182		
481.wrf	12	797	168	798	168	<b><u>798</u></b>	<b><u>168</u></b>	12	<b><u>788</u></b>	<b><u>170</u></b>	789	170	788	170		
482.sphinx3	12	1499	156	<b><u>1491</u></b>	<b><u>157</u></b>	1488	157	12	<b><u>1487</u></b>	<b><u>157</u></b>	1490	157	1484	158		

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

CPU Power Management set to Maximum Performance  
Memory Frequency set to Maximum Performance  
Turbo Boost set to Enabled

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## Platform Notes (Continued)

C States/C1E set to Enabled  
Sysinfo program /root/CPU2006-1.2/config/sysinfo.rev6800  
\$Rev: 6800 \$ \$Date:: 2011-10-11 # \$ 6f2ebdff5032aaa42e583f96b07f99d3  
running on linux-sxkz Tue May 22 21:31:14 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 E5-2440 0 @ 2.40GHz
 1 "physical id"s (chips)
 12 "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 : 6
  siblings  : 12
  physical 0: cores 0 1 2 3 4 5
  cache size : 15360 KB
```

```
From /proc/meminfo
MemTotal:      49348896 kB
HugePages_Total:    0
Hugepagesize:    2048 kB
```

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 11 (x86_64)
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 11 (x86_64)
VERSION = 11
PATCHLEVEL = 2
```

```
uname -a:
Linux linux-sxkz 3.0.13-0.27-default #1 SMP Wed Feb 15 13:33:49 UTC 2012
(d73692b) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 May 21 09:06 last=S
```

```
SPEC is set to: /root/CPU2006-1.2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        ext3  271G   40G  218G  16% /
```

Additional information from dmidecode:

(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 = "/root/CPU2006-1.2/libs/32:/root/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/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>  
The Dell PowerEdge T320 and the Bull NovaScale T820 F3 models are electronically equivalent.  
The results have been measured on a Dell PowerEdge T320 model

## 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.lelie3d: -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

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## Base Portability Flags (Continued)

482.sphinx3: -DSPEC\_CPU\_LP64

## Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

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

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -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

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## Peak Portability Flags (Continued)

```

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
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

```

## 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
-opt-mem-layout-trans=3

```

```

470.lbm: basepeak = yes

```

```

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2

```

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

```

```

447.dealII: basepeak = yes

```

```

450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

```

```

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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -static

```

```

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

```

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## Peak Optimization Flags (Continued)

434.zeusmp: basepeak = yes

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

459.GemsFDTD: basepeak = yes

465.tonto: -xAVX(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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch  
-static -auto-ilp32 -opt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -static -auto-ilp32  
-opt-mem-layout-trans=3

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/Dell-Platform-Settings-V1.2-revA.20120410.00.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/Dell-Platform-Settings-V1.2-revA.20120410.00.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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