SPEC® CFP2006 Result
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Bull SAS

NovaScale R430 F2 (Intel Xeon E5603, 1.6 GHz)

$SPECfp^{®}2006 =$ 30.4
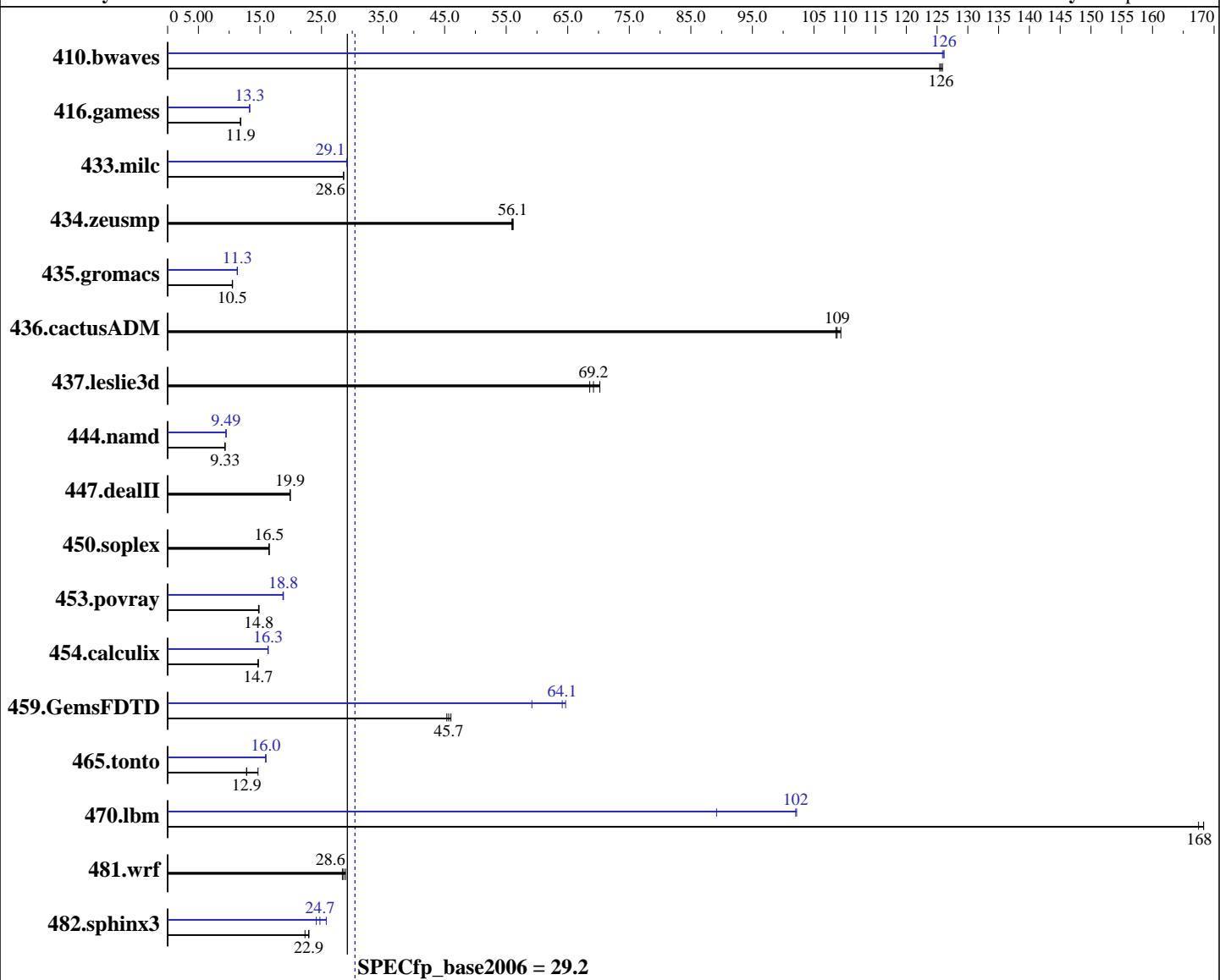
$SPECfp\_base2006 =$ 29.2

CPU2006 license: 20
Test sponsor: Bull SAS
Tested by: Dell Inc.

Test date: Mar-2011
Hardware Availability: Feb-2011
Software Availability: Apr-2011

SPECfp_base2006 = 29.2
SPECfp2006 = 30.4

410.bwaves	126 / 126
416.gamess	13.3 / 11.9
433.milc	29.1 / 28.6
434.zeusmp	56.1
435.gromacs	11.3 / 10.5
436.cactusADM	109
437.leslie3d	69.2
444.namd	9.49 / 9.33
447.dealII	19.9
450.soplex	16.5
453.povray	18.8 / 14.8
454.calculix	16.3 / 14.7
459.GemsFDTD	64.1 / 45.7
465.tonto	16.0 / 12.9
470.lbm	102 / 168
481.wrf	28.6
482.sphinx3	24.7 / 22.9

Hardware

CPU Name:	Intel Xeon E5603
CPU Characteristics:	
CPU MHz:	1600
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
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

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 11 SP1 (x86_64), Kernel 2.6.32.12-0.7-default
Compiler:	Intel C++ and Fortran Intel 64 Compiler XE for applications running on Intel 64 Version 12.0 Update 3
Auto Parallel:	Yes
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit

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L3 Cache:	4 MB I+D on chip per chip
Other Cache:	None
Memory:	48 GB (6 x 8 GB 2Rx4 PC3-10600R-9, ECC, running at 1066 MHz)
Disk Subsystem:	1 x 146 GB 15000 RPM SAS
Other Hardware:	None
Peak Pointers:	32/64-bit
Other Software:	None

Results Table

Benchmark	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
410.bwaves	108	125	108	126	**108**	**126**	108	126	**108**	**126**	108	126
416.gamess	1650	11.9	**1651**	**11.9**	1654	11.8	**1469**	**13.3**	1469	13.3	1472	13.3
433.milc	322	28.5	**321**	**28.6**	321	28.6	315	29.1	315	29.2	**315**	**29.1**
434.zeusmp	163	55.9	162	56.1	**162**	**56.1**	163	55.9	162	56.1	**162**	**56.1**
435.gromacs	680	10.5	**679**	**10.5**	676	10.6	**630**	**11.3**	630	11.3	631	11.3
436.cactusADM	**110**	**109**	109	109	110	109	**110**	**109**	109	109	110	109
437.leslie3d	134	70.2	137	68.6	**136**	**69.2**	134	70.2	137	68.6	**136**	**69.2**
444.namd	**859**	**9.33**	861	9.31	859	9.33	845	9.49	845	9.49	**845**	**9.49**
447.dealII	575	19.9	574	19.9	**574**	**19.9**	575	19.9	574	19.9	**574**	**19.9**
450.soplex	506	16.5	505	16.5	**506**	**16.5**	506	16.5	505	16.5	**506**	**16.5**
453.povray	**359**	**14.8**	360	14.8	358	14.9	284	18.7	**283**	**18.8**	283	18.8
454.calculix	561	14.7	560	14.7	**561**	**14.7**	**505**	**16.3**	505	16.3	506	16.3
459.GemsFDTD	**232**	**45.7**	234	45.4	231	46.0	**165**	**64.1**	179	59.2	164	64.7
465.tonto	670	14.7	**766**	**12.9**	768	12.8	617	16.0	**617**	**16.0**	617	15.9
470.lbm	82.0	167	81.6	168	**81.6**	**168**	134	102	154	89.2	**135**	**102**
481.wrf	386	28.9	**390**	**28.6**	393	28.4	386	28.9	**390**	**28.6**	393	28.4
482.sphinx3	849	23.0	**851**	**22.9**	873	22.3	756	25.8	807	24.1	**788**	**24.7**

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

Operating System Notes

```
'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
'mount -t hugetlbfs nodev /mnt/hugepages' was used to enable large pages
echo 900 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
```

Platform Notes

```
BIOS Settings:
Power Management = Maximum Performance (Default = Active Power Controller)
Data Reuse = Disabled (Default = Enabled)
```

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General Notes

```
OMP_NUM_THREADS set to number of cores
Binaries were compiled on RHEL5.5
The Dell PowerEdge R410 and
the Bull NovaScale R430 F2 models are electronically equivalent.
The results have been measured on a Dell PowerEdge R410 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.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:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias
```

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Tested by: Dell Inc.	**Software Availability:** Apr-2011

Base Optimization Flags (Continued)

C++ benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias
```

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

Benchmarks using both Fortran and C:
```
-xSSE4.2 -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
```

Peak Optimization Flags

C benchmarks:

433.milc: `-xSSE4.2(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: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)`
`-no-prec-div(pass 2) -prof-use(pass 2) -parallel`
`-ansi-alias -static -auto-ilp32`

482.sphinx3: `-xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias`
`-parallel`

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Peak Optimization Flags (Continued)

C++ benchmarks:

```
444.namd: -xSSE4.2(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: basepeak = yes

453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
          -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias
          -B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT
```

Fortran benchmarks:

```
410.bwaves: -xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -parallel
          -static

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: basepeak = yes

459.GemsFDTD: -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 -opt-prefetch -parallel
          -B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT

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) -inline-calloc
          -opt-malloc-options=3 -auto -unroll4
          -B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT
```

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) -prof-use(pass 2) -static -auto-ilp32
          -ansi-alias

436.cactusADM: basepeak = yes

454.calculix: -xSSE4.2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

481.wrf: basepeak = yes
```

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The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.html
http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20110524.00.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.xml
http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20110524.00.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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