SPEC® CFP2006 Result

Bull SAS

NovaScale R470 F3 (Intel Xeon E5-4640, 2.40 GHz)

$SPECfp^{®}\_rate2006 =$ 811

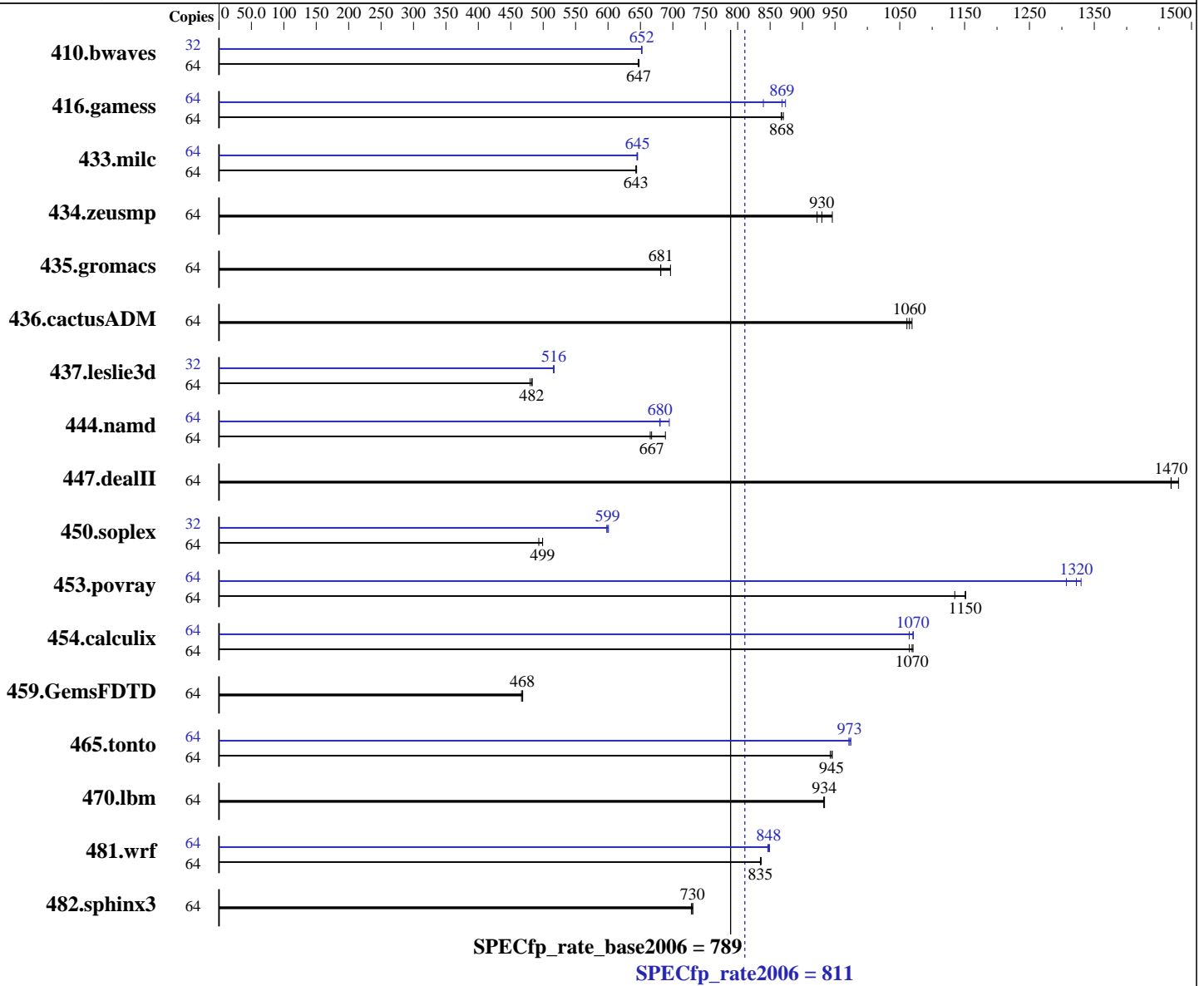$SPECfp\_rate\_base2006 =$ 789

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

Test date: Mar-2012
Hardware Availability: May-2012
Software Availability: Feb-2012

Benchmark	Copies	Result
410.bwaves	32	652
	64	647
416.gamess	64	869
	64	868
433.milc	64	645
	64	643
434.zeusmp	64	930
435.gromacs	64	681
436.cactusADM	64	1060
437.leslie3d	32	516
	64	482
444.namd	64	680
	64	667
447.dealII	64	1470
450.soplex	32	599
	64	499
453.povray	64	1320
	64	1150
454.calculix	64	1070
	64	1070
459.GemsFDTD	64	468
465.tonto	64	973
	64	945
470.lbm	64	934
481.wrf	64	848
	64	835
482.sphinx3	64	730

SPECfp_rate_base2006 = 789

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Hardware

CPU Name: Intel Xeon E5-4640
CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz: 2400
FPU: Integrated
CPU(s) enabled: 32 cores, 4 chips, 8 cores/chip, 2 threads/core
CPU(s) orderable: 2,4 chip
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 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)
Continued on next page

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L3 Cache:	20 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)	Other Software:	None
Disk Subsystem:	4 x 300 GB 10000 RPM SAS, RAID 0		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	1345	647	**1344**	**647**	1342	648	32	667	652	**667**	**652**	667	652
416.gamess	64	1445	867	1439	871	**1444**	**868**	64	1492	840	**1443**	**869**	1434	874
433.milc	64	914	643	**913**	**643**	912	644	64	910	646	**910**	**645**	911	645
434.zeusmp	64	616	946	631	922	**626**	**930**	64	616	946	631	922	**626**	**930**
435.gromacs	64	656	696	671	681	**671**	**681**	64	656	696	671	681	**671**	**681**
436.cactusADM	64	**718**	**1060**	715	1070	721	1060	64	**718**	**1060**	715	1070	721	1060
437.leslie3d	64	1245	483	1254	480	**1247**	**482**	32	582	517	583	516	**583**	**516**
444.namd	64	745	689	**769**	**667**	772	665	64	755	680	**754**	**680**	739	695
447.dealII	64	**498**	**1470**	495	1480	499	1470	64	**498**	**1470**	495	1480	499	1470
450.soplex	64	1069	499	**1069**	**499**	1082	493	32	446	598	444	601	**445**	**599**
453.povray	64	296	1150	300	1130	**296**	**1150**	64	256	1330	260	1310	**257**	**1320**
454.calculix	64	**494**	**1070**	493	1070	496	1060	64	**493**	**1070**	496	1060	493	1070
459.GemsFDTD	64	1455	467	1450	468	**1451**	**468**	64	1455	467	1450	468	**1451**	**468**
465.tonto	64	668	943	666	946	**666**	**945**	64	648	972	**647**	**973**	646	975
470.lbm	64	**942**	**934**	942	934	943	933	64	**942**	**934**	942	934	943	933
481.wrf	64	856	835	855	836	**856**	**835**	64	**843**	**848**	842	849	845	846
482.sphinx3	64	**1708**	**730**	1707	731	1712	728	64	**1708**	**730**	1707	731	1712	728

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

    System Profile set to Custom
    CPU Power Management set to Maximum Performance
    Memory Frequency set to Maximum Performance

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Platform Notes (Continued)

```
Turbo Boost set to Enabled
C States/C1E set to Enabled
Sysinfo program /root/CPU2006-1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on icon4p Sat Mar 10 08:25:59 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 E5-4640 0 @ 2.40GHz
      4 "physical id"s (chips)
      64 "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
      physical 2: cores 0 1 2 3 4 5 6 7
      physical 3: cores 0 1 2 3 4 5 6 7
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:       264501512 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 icon4p 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 Mar 9 18:04 last=S

SPEC is set to: /root/CPU2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       ext3  1.1T  123G  917G  12% /

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 R820 and
 the Bull NovaScale R470 F3 Models are electronically equivalent.
 The results have been measured on a Dell PowerEdge R820 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
```

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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:
    icc   -m64

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

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Peak Portability Flags (Continued)

```
      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
       482.sphinx3: -DSPEC_CPU_LP64
```

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: basepeak = yes
```

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

       434.zeusmp: basepeak = yes
```

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Peak Optimization Flags (Continued)

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: `basepeak = yes`

436.cactusADM: `basepeak = yes`

454.calculix: `-xAVX -ipo -O3 -no-prec-div -static -auto-ilp32`
`-opt-mem-layout-trans=3`

481.wrf: `Same as 454.calculix`

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

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

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