SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R820 (Intel Xeon E5-4610 v2, 2.30 GHz)

$SPECfp^{®}2006 =$ 79.5

$SPECfp\_base2006 =$ 75.5

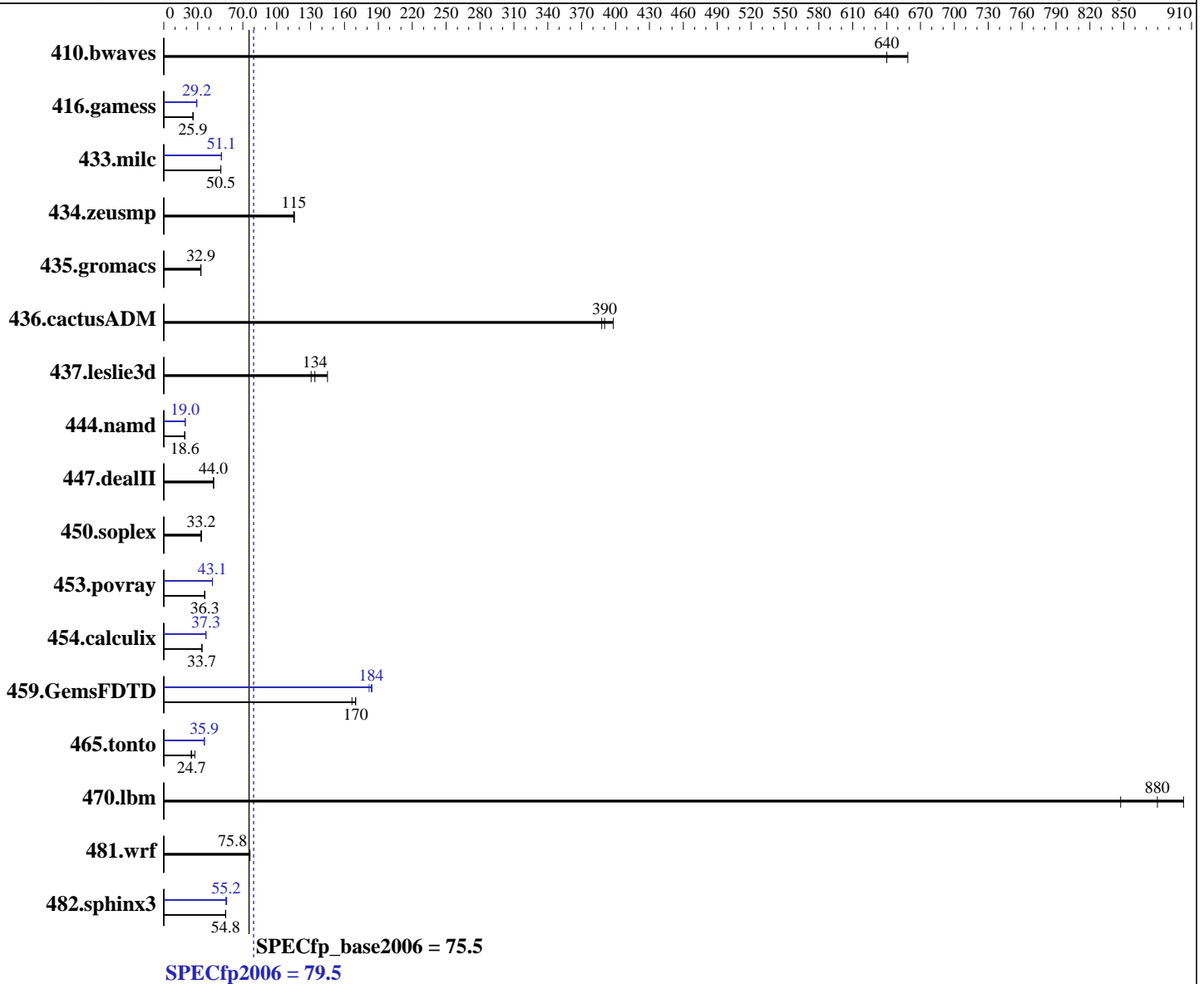|			
CPU2006 license:	55	**Test date:**	Mar-2014
Test sponsor:	Dell Inc.	**Hardware Availability:**	Mar-2014
Tested by:	Dell Inc.	**Software Availability:**	Aug-2013

Results graph (scale 0 to 910):

- 410.bwaves: 640
- 416.gamess: 29.2 / 25.9
- 433.milc: 51.1 / 50.5
- 434.zeusmp: 115
- 435.gromacs: 32.9
- 436.cactusADM: 390
- 437.leslie3d: 134
- 444.namd: 19.0 / 18.6
- 447.dealII: 44.0
- 450.soplex: 33.2
- 453.povray: 43.1 / 36.3
- 454.calculix: 37.3 / 33.7
- 459.GemsFDTD: 184 / 170
- 465.tonto: 35.9 / 24.7
- 470.lbm: 880
- 481.wrf: 75.8
- 482.sphinx3: 55.2 / 54.8

SPECfp_base2006 = 75.5

SPECfp2006 = 79.5

Hardware

CPU Name:	Intel Xeon E5-4610 v2
CPU Characteristics:	Intel Turbo Boost Technology up to 2.70 GHz
CPU MHz:	2300
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 (x86_64) 3.0.76-0.11-default
Compiler:	C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux; Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	ext2
System State:	Run level 3 (multi-user)

Continued on next page

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L3 Cache:	16 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	512 GB (32 x 16 GB 2Rx4 PC3-14900R-13, ECC)	Other Software:	None
Disk Subsystem:	1 x 160 GB SATA SSD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	**21.2**	**640**	20.6	659	21.2	640	**21.2**	**640**	20.6	659	21.2	640
416.gamess	757	25.9	**757**	**25.9**	753	26.0	672	29.2	670	29.2	**671**	**29.2**
433.milc	182	50.5	182	50.5	**182**	**50.5**	179	51.2	180	50.9	**180**	**51.1**
434.zeusmp	78.7	116	**79.1**	**115**	79.1	115	78.7	116	**79.1**	**115**	79.1	115
435.gromacs	217	32.9	219	32.6	**217**	**32.9**	217	32.9	219	32.6	**217**	**32.9**
436.cactusADM	30.0	398	**30.6**	**390**	30.8	388	30.0	398	**30.6**	**390**	30.8	388
437.leslie3d	64.9	145	**70.3**	**134**	72.1	130	64.9	145	**70.3**	**134**	72.1	130
444.namd	431	18.6	**431**	**18.6**	432	18.6	**422**	**19.0**	422	19.0	427	18.8
447.dealII	**260**	**44.0**	259	44.1	260	44.0	**260**	**44.0**	259	44.1	260	44.0
450.soplex	**251**	**33.2**	251	33.2	252	33.1	**251**	**33.2**	251	33.2	252	33.1
453.povray	146	36.4	**147**	**36.3**	147	36.1	124	43.0	123	43.1	**124**	**43.1**
454.calculix	244	33.8	245	33.6	**245**	**33.7**	222	37.2	**221**	**37.3**	221	37.4
459.GemsFDTD	62.5	170	**62.5**	**170**	63.7	167	57.6	184	58.4	182	**57.8**	**184**
465.tonto	357	27.5	**399**	**24.7**	407	24.2	274	36.0	**274**	**35.9**	275	35.7
470.lbm	16.2	847	**15.6**	**880**	15.2	903	16.2	847	**15.6**	**880**	15.2	903
481.wrf	148	75.4	**147**	**75.8**	146	76.4	148	75.4	**147**	**75.8**	146	76.4
482.sphinx3	355	54.8	**356**	**54.8**	357	54.7	**353**	**55.2**	350	55.7	354	55.1

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

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

Platform Notes

```
BIOS settings:
Virtualization Technology disabled
Execute Disable disabled
System Profile set to Custom
C1E enabled
C States enabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on linux Tue Mar 18 17:06:01 2014
```

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Platform Notes (Continued)

```
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 E5-4610 v2 @ 2.30GHz
      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 : 16384 KB

From /proc/meminfo
   MemTotal:       529392212 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 = 3

uname -a:
   Linux linux 3.0.76-0.11-default #1 SMP Fri Jun 14 08:21:43 UTC 2013 (ccab990)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 18 17:04 last=S

SPEC is set to: /root/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       ext2  139G   20G  118G  15% /

Additional information from dmidecode:
  BIOS Dell Inc. 2.0.20 01/16/2014
  Memory:
   32x 00AD00B300AD HMT42GR7AFR4C-RD 16 GB 1600 MHz

(End of data from sysinfo program)
```

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General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"
OMP_NUM_THREADS = "32"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RedHat EL 6.4
 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>
```

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
```

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Base Optimization Flags

C benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -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: `-xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)`
             `-no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32`
             `-ansi-alias`

      470.lbm: `basepeak = yes`

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

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Peak Optimization Flags (Continued)

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: basepeak = yes

> 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: basepeak = yes

> 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-`

> 434.zeusmp: basepeak = yes

> 437.leslie3d: basepeak = yes

> 459.GemsFDTD: `-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` `-opt-prefetch` `-parallel`

> 465.tonto: `-xAVX`(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`

Benchmarks using both Fortran and C:

> 435.gromacs: basepeak = yes

> 436.cactusADM: basepeak = yes

> 454.calculix: `-xAVX` `-ipo` `-O3` `-no-prec-div` `-auto-ilp32` `-ansi-alias`

> 481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revC.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revC.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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