SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R320 (Intel Xeon E5-2440 v2, 1.90 GHz)

$SPECfp®_rate2006 = $ 195

$SPECfp_rate_base2006 = $ 191
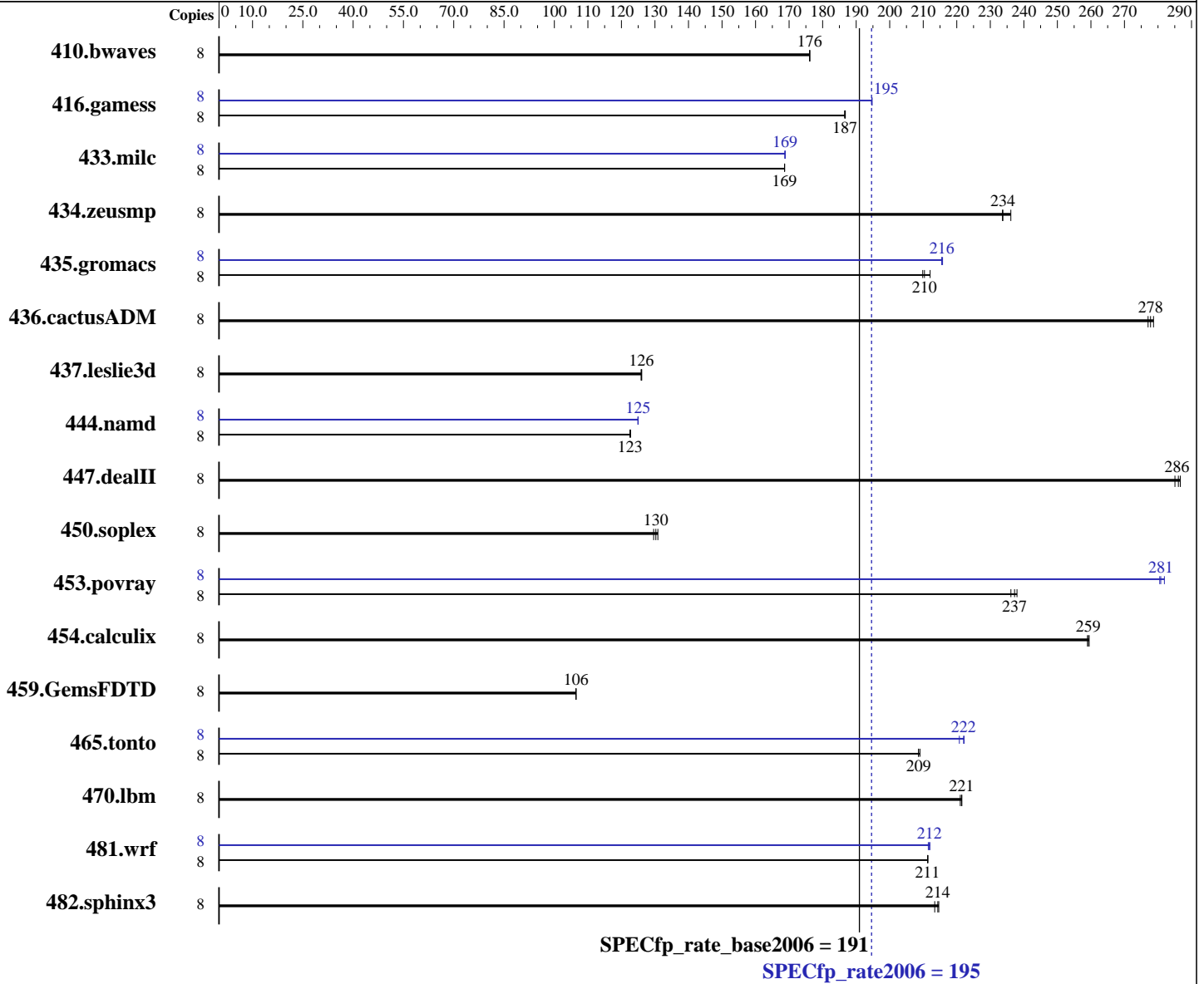
CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Oct-2013
Hardware Availability: Jan-2014
Software Availability: Sep-2013

Copies 0 10.0 25.0 40.0 55.0 70.0 85.0 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 290

Benchmark	Copies	Result
410.bwaves	8	176
416.gamess	8	195
416.gamess	8	187
433.milc	8	169
433.milc	8	169
434.zeusmp	8	234
435.gromacs	8	216
435.gromacs	8	210
436.cactusADM	8	278
437.leslie3d	8	126
444.namd	8	125
444.namd	8	123
447.dealII	8	286
450.soplex	8	130
453.povray	8	281
453.povray	8	237
454.calculix	8	259
459.GemsFDTD	8	106
465.tonto	8	222
465.tonto	8	209
470.lbm	8	221
481.wrf	8	212
481.wrf	8	211
482.sphinx3	8	214

SPECfp_rate_base2006 = 191

SPECfp_rate2006 = 195

Hardware

CPU Name: Intel Xeon E5-2440 v2
CPU Characteristics: Intel Turbo Boost Technology up to 2.40 GHz
CPU MHz: 1900
FPU: Integrated
CPU(s) enabled: 8 cores, 1 chip, 8 cores/chip
CPU(s) orderable: 1,2 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: No
File System: ext2
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:	96 GB (6 x 16 GB 2Rx4 PC3L-12800R-11, ECC)	Other Software:	None
Disk Subsystem:	1 x 300 GB 15000 RPM SAS		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	**617**	**176**	617	176	617	176	8	**617**	**176**	617	176	617	176
416.gamess	8	840	187	**839**	**187**	839	187	8	804	195	805	195	**805**	**195**
433.milc	8	436	169	435	169	**435**	**169**	8	435	169	435	169	**435**	**169**
434.zeusmp	8	308	236	**311**	**234**	312	234	8	308	236	**311**	**234**	312	234
435.gromacs	8	272	210	269	212	**272**	**210**	8	**265**	**216**	265	216	265	216
436.cactusADM	8	345	277	**344**	**278**	343	279	8	345	277	**344**	**278**	343	279
437.leslie3d	8	598	126	597	126	**597**	**126**	8	598	126	597	126	**597**	**126**
444.namd	8	523	123	**523**	**123**	523	123	8	514	125	**513**	**125**	513	125
447.dealII	8	**320**	**286**	319	287	321	285	8	**320**	**286**	319	287	321	285
450.soplex	8	510	131	**512**	**130**	515	130	8	510	131	**512**	**130**	515	130
453.povray	8	179	238	180	236	**179**	**237**	8	**152**	**281**	151	282	152	281
454.calculix	8	**255**	**259**	254	259	255	259	8	**255**	**259**	254	259	255	259
459.GemsFDTD	8	797	106	797	106	**797**	**106**	8	797	106	797	106	**797**	**106**
465.tonto	8	377	209	**377**	**209**	377	209	8	354	222	**355**	**222**	357	221
470.lbm	8	**496**	**221**	497	221	496	222	8	**496**	**221**	497	221	496	222
481.wrf	8	**423**	**211**	423	211	423	211	8	422	212	423	211	**422**	**212**
482.sphinx3	8	**727**	**214**	731	213	726	215	8	**727**	**214**	731	213	726	215

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"

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Platform Notes

```
BIOS settings:
Virtualization Technology disabled
Execute Disable disabled
Logical Processor disabled
System Profile set to Performance
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on linux Sat Oct 19 18:25:25 2013

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 v2 @ 1.90GHz
      1 "physical id"s (chips)
      8 "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  : 8
      physical 0: cores 0 1 2 3 4 5 6 7
   cache size : 20480 KB

From /proc/meminfo
   MemTotal:       99123704 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 5 Oct 19 09:33 last=3

SPEC is set to: /root/cpu2006-1.2
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda2      ext2  267G   16G  251G   6% /

Additional information from dmidecode:
   BIOS Dell Inc. 2.0.21 09/23/2013
   Memory:
```

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Platform Notes (Continued)

```
    6x 00CE00B300CE M393B2G70BH0-YK0 16 GB 1600 MHz

  (End of data from sysinfo program)
```

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:/root/cpu2006-1.2/sh"

 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/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.dealII: -DSPEC_CPU_LP64
     450.soplex: -DSPEC_CPU_LP64
     453.povray: -DSPEC_CPU_LP64
    454.calculix: -DSPEC_CPU_LP64 -nofor_main
```

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CPU2006 license: 55		**Test date:**	Oct-2013
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Base Portability Flags (Continued)

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

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

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

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

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
```

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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) `-opt-mem-layout-trans=3`(pass 2)
`-prof-use`(pass 2) `-auto-ilp32`

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) `-opt-mem-layout-trans=3`(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) `-opt-mem-layout-trans=3`(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: `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) `-opt-mem-layout-trans=3`(pass 2)
`-prof-use`(pass 2) `-opt-prefetch` `-auto-ilp32`

436.cactusADM: `basepeak = yes`

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Peak Optimization Flags (Continued)

454.calculix: basepeak = yes

481.wrf: `-xAVX -ipo -O3 -no-prec-div -auto-ilp32`

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-revB.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-revB.xml`

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