SPEC® CFP2006 Result

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Dell Inc.

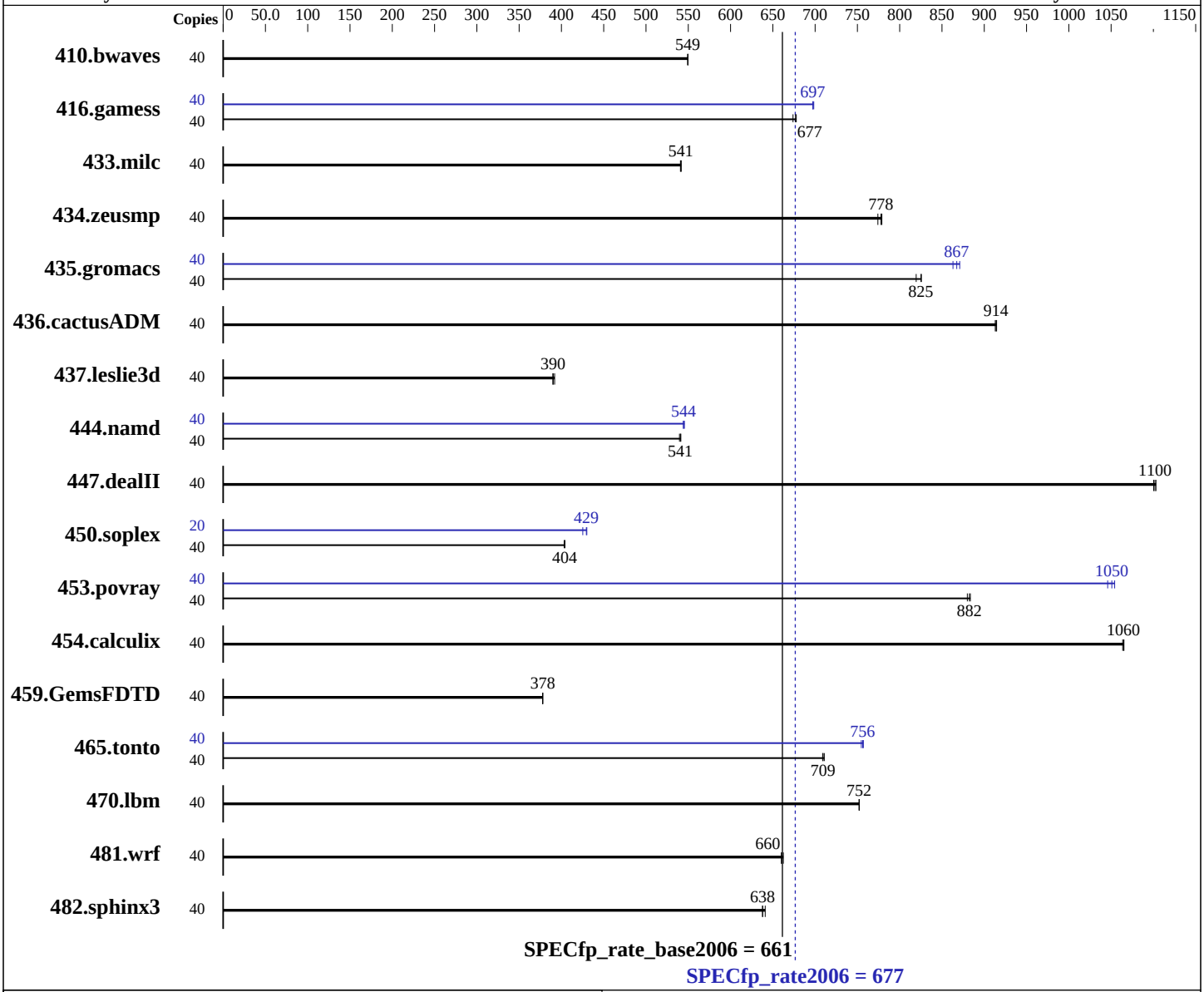
PowerEdge R630 (Intel Xeon E5-2630 v4, 2.20 GHz)

SPECfp®_rate2006 = 677

SPECfp_rate_base2006 = 661

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Aug-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016



Hardware

CPU Name:	Intel Xeon E5-2630 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.10 GHz
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 cores/chip, 2 threads/core
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:	Red Hat Enterprise Linux Server release 7.2 (Maipo) 3.10.0-327.el7.x86_64
Compiler:	C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.2.181 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	xfs

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L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem: 1 x 400 GB SATA SSD
Other Hardware: None

System State: Run level 3 (multi-user)
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	40	989	550	**989**	**549**	990	549	40	989	550	**989**	**549**	990	549
416.gamess	40	**1157**	**677**	1162	674	1156	678	40	1123	697	1121	698	**1123**	**697**
433.milc	40	678	542	**678**	**541**	679	541	40	678	542	**678**	**541**	679	541
434.zeusmp	40	470	774	**468**	**778**	467	779	40	470	774	**468**	**778**	467	779
435.gromacs	40	346	826	349	819	**346**	**825**	40	**329**	**867**	331	863	328	871
436.cactusADM	40	523	915	524	913	**523**	**914**	40	523	915	524	913	**523**	**914**
437.leslie3d	40	**963**	**390**	959	392	964	390	40	**963**	**390**	959	392	964	390
444.namd	40	593	541	595	540	**593**	**541**	40	590	544	**589**	**544**	588	545
447.dealII	40	**415**	**1100**	416	1100	415	1100	40	**415**	**1100**	416	1100	415	1100
450.soplex	40	826	404	827	403	**826**	**404**	20	**388**	**429**	392	425	388	430
453.povray	40	242	880	**241**	**882**	241	884	40	202	1050	203	1050	**203**	**1050**
454.calculix	40	**310**	**1060**	310	1060	310	1070	40	**310**	**1060**	310	1060	310	1070
459.GemsFDTD	40	**1123**	**378**	1123	378	1124	378	40	**1123**	**378**	1123	378	1124	378
465.tonto	40	554	711	555	709	**555**	**709**	40	**520**	**756**	520	757	522	755
470.lbm	40	**731**	**752**	731	752	731	752	40	**731**	**752**	731	752	731	752
481.wrf	40	**677**	**660**	675	662	677	660	40	**677**	**660**	675	662	677	660
482.sphinx3	40	**1222**	**638**	1216	641	1222	638	40	**1222**	**638**	1216	641	1222	638

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

```
BIOS settings:
Snoop Mode set to Cluster on Die
Virtualization Technology disabled
```

Continued on next page

Platform Notes (Continued)

```
System Profile set to custom
CPU Performance set to Hardware P States
C States set to Autonomous
C1E disabled
Energy Efficient Turbo disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Balanced Performance
Memory Patrol Scrub disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Tue Aug 23 05:41:55 2016

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 E5-2630 v4 @ 2.20GHz
      2 "physical id"s (chips)
      40 "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 : 10
      siblings  : 20
      physical 0: cores 0 1 2 3 4 8 9 10 11 12
      physical 1: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       264040556 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.2 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.2"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29
   EDT 2015 x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
 run-level 3 Aug 22 17:39

 SPEC is set to: /root/cpu2006-1.2
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   272G  8.6G  263G   4% /
 Additional information from dmidecode:

    Warning: Use caution when you interpret this section. The 'dmidecode' program
    reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to
    hardware, firmware, and the "DMTF SMBIOS" standard.

   BIOS Dell Inc. 2.1.7 06/16/2016
   Memory:
    13x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 2133
    MHz
    3x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133
    MHz
    8x Not Specified Not Specified

 (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 Intel Core i7-4790K CPU + 32GB
 memory using RedHat EL 7.2 glibc 2.17
 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

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -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 (except as noted below):
icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

Continued on next page

Peak Compiler Invocation (Continued)

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
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -D_FILE_OFFSET_BITS=64
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: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

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Peak Optimization Flags (Continued)

450.soplex: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -opt-malloc-options=3

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4 -auto -inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2) -prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.xml

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