SPEC® CFP2006 Result
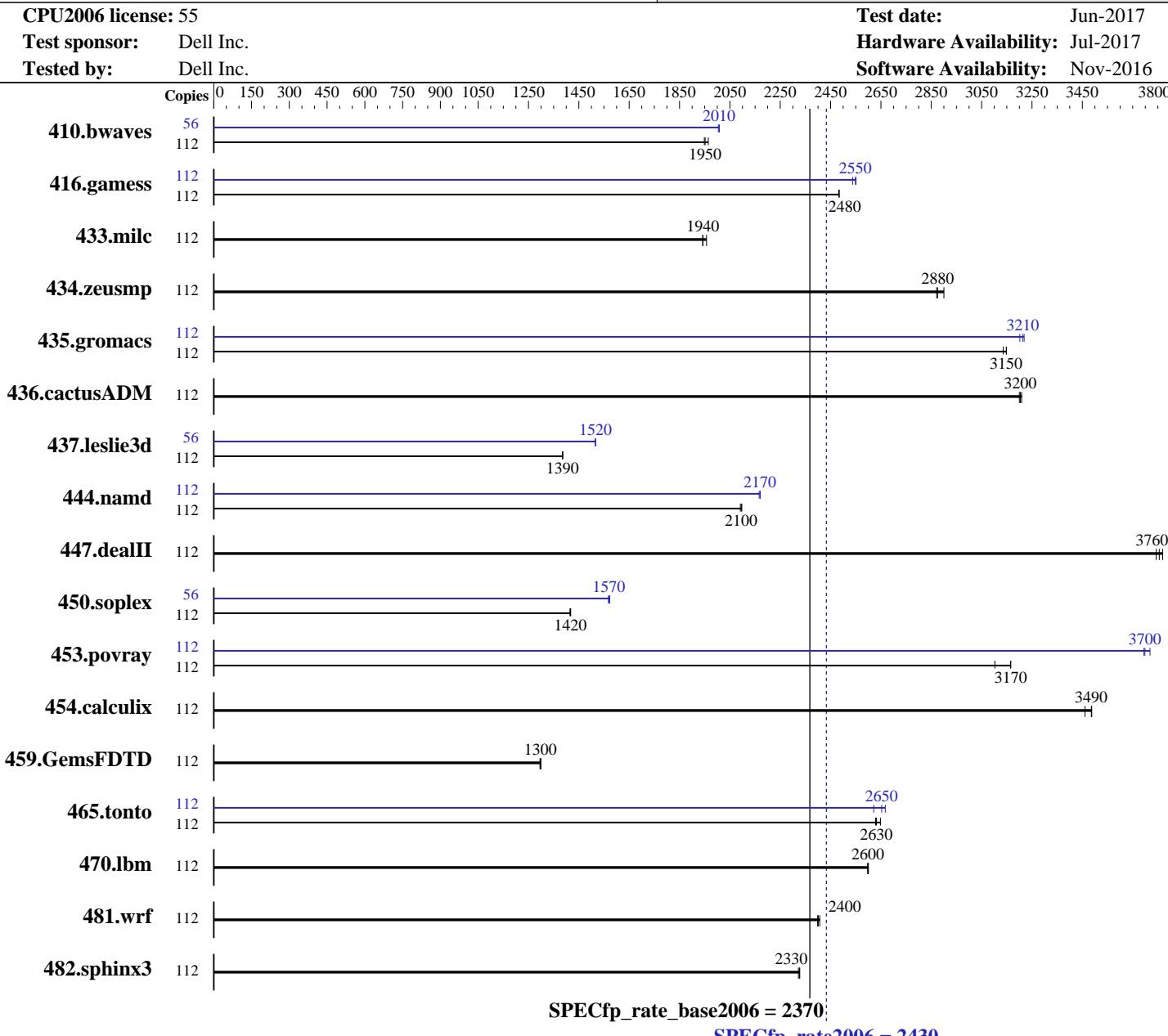Copyright 2006-2017 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R940 (Intel Xeon Gold 6132, 2.60 GHz)

$SPECfp^®\_rate2006 =$ 2430

$SPECfp\_rate\_base2006 =$ 2370

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

Test date: Jun-2017
Hardware Availability: Jul-2017
Software Availability: Nov-2016

SPECfp_rate_base2006 = 2370

SPECfp_rate2006 = 2430

Hardware

CPU Name: Intel Xeon Gold 6132
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 2600
FPU: Integrated
CPU(s) enabled: 56 cores, 4 chips, 14 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: 1 MB I+D on chip per core

Continued on next page

Software

Operating System: SUSE Linux Enterprise Server 12 SP2
4.4.21-69-default
Compiler: C/C++: Version 17.0.3.191 of Intel C/C++
Compiler for Linux;
Fortran: Version 17.0.3.191 of Intel Fortran
Compiler for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)

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L3 Cache:	19.25 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)	Other Software:	None
Disk Subsystem:	1 x 960 GB SATA SSD		
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	112	775	1960	**780**	**1950**	781	1950	56	**379**	**2010**	380	2000	379	2010
416.gamess	112	**883**	**2480**	883	2480	883	2480	112	864	2540	**861**	**2550**	860	2550
433.milc	112	525	1960	529	1940	**529**	**1940**	112	525	1960	529	1940	**529**	**1940**
434.zeusmp	112	351	2900	**354**	**2880**	355	2870	112	351	2900	**354**	**2880**	355	2870
435.gromacs	112	255	3140	**254**	**3150**	254	3150	112	**249**	**3210**	248	3220	250	3200
436.cactusADM	112	**418**	**3200**	417	3210	418	3200	112	**418**	**3200**	417	3210	418	3200
437.leslie3d	112	760	1390	760	1390	**760**	**1390**	56	347	1520	**347**	**1520**	347	1520
444.namd	112	**429**	**2100**	428	2100	429	2090	112	415	2170	414	2170	**414**	**2170**
447.dealII	112	**341**	**3760**	340	3770	342	3740	112	**341**	**3760**	340	3770	342	3740
450.soplex	112	660	1410	659	1420	**659**	**1420**	56	298	1570	**298**	**1570**	297	1570
453.povray	112	**188**	**3170**	192	3100	188	3170	112	161	3690	160	3720	**161**	**3700**
454.calculix	112	265	3490	267	3460	**265**	**3490**	112	265	3490	267	3460	**265**	**3490**
459.GemsFDTD	112	917	1300	**916**	**1300**	915	1300	112	917	1300	**916**	**1300**	915	1300
465.tonto	112	416	2650	**419**	**2630**	419	2630	112	420	2620	413	2670	**415**	**2650**
470.lbm	112	593	2600	**592**	**2600**	592	2600	112	593	2600	**592**	**2600**	592	2600
481.wrf	112	520	2410	**521**	**2400**	522	2400	112	520	2410	**521**	**2400**	522	2400
482.sphinx3	112	938	2330	940	2320	**938**	**2330**	112	938	2330	940	2320	**938**	**2330**

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:
Sub NUMA Cluster enabled
Virtualization Technology disabled

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Platform Notes (Continued)

```
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/cpu2006-1.2_ic17u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-b14r Sun Jun  4 08:00:32 2017

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) Gold 6132 CPU @ 2.60GHz
      4 "physical id"s (chips)
      112 "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 : 14
      siblings  : 28
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
      physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
   cache size : 19712 KB

From /proc/meminfo
   MemTotal:      791001296 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
      # This file is deprecated and will be removed in a future service pack or
      release.
      # Please check /etc/os-release for details about this release.
   os-release:
      NAME="SLES"
      VERSION="12-SP2"
```

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Platform Notes (Continued)

```
        VERSION_ID="12.2"
        PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

   uname -a:
      Linux linux-b14r 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
      (9464f67) x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Jun 3 22:14

   SPEC is set to: /home/cpu2006-1.2_ic17u3
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sda4       xfs   852G  8.5G  843G   1% /home
   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. 1.0.0 05/16/2017
    Memory:
    48x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz

   (End of data from sysinfo program)
```

General Notes

```
 Environment variables set by runspec before the start of the run:
 LD_LIBRARY_PATH = "/home/cpu2006-1.2_ic17u3/lib/ia32:/home/cpu2006-1.2_ic17u3/lib/intel64:/home/cpu2006-1.2_ic17u3/sh10.2"

  Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
  memory using Redhat Enterprise Linux 7.2
  Transparent Huge Pages enabled by default
  Filesystem page cache cleared with:
  shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
  runspec command invoked through numactl i.e.:
  numactl --interleave=all runspec <etc>
```

Base Compiler Invocation

C benchmarks:
    icc -m64

C++ benchmarks:
    icpc -m64

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Base Compiler Invocation (Continued)

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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

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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_2017/linux/lib/ia32

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:

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Peak Optimization Flags (Continued)

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -fno-alias -auto-ilp32
-qopt-mem-layout-trans=3

447.dealII: basepeak = yes

450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-malloc-options=3
-qopt-mem-layout-trans=3

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4 -qopt-mem-layout-trans=3

Fortran benchmarks:

410.bwaves: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: Same as 410.bwaves

459.GemsFDTD: basepeak = yes

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4 -auto -inline-calloc
-qopt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
-par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32
-qopt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

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-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge14G-revB.xml

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Tested with SPEC CPU2006 v1.2.
Report generated on Wed Jul 12 12:12:26 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 11 July 2017.