SPEC® CFP2006 Result

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

$SPECfp®_rate2006 = $ 3260

$SPECfp_rate_base2006 = $ 3180
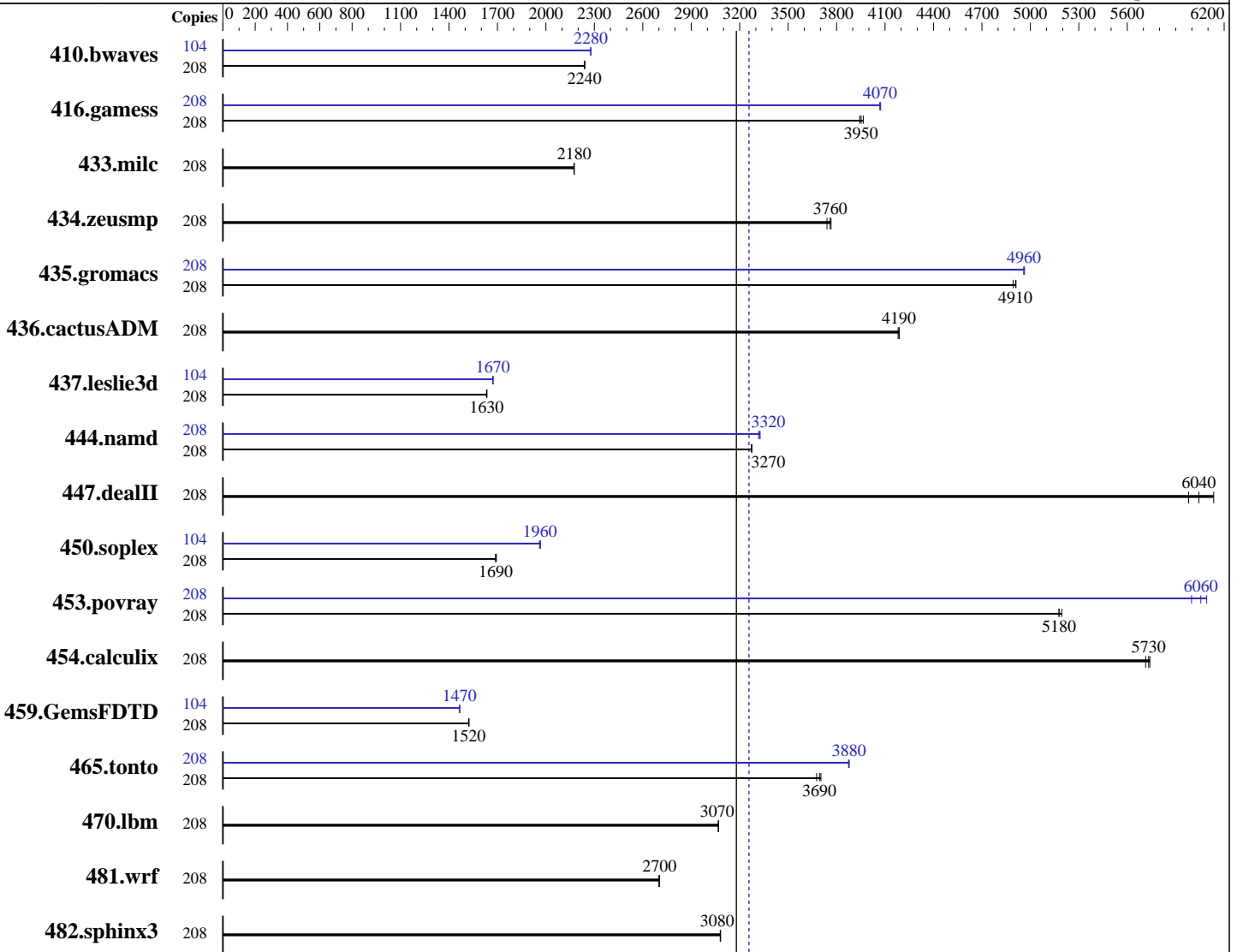
CPU2006 license: 55

Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Oct-2017

Hardware Availability: Jul-2017

Software Availability: Apr-2017

Copies	Benchmark	Result
104	410.bwaves	2280
208	410.bwaves	2240
208	416.gamess	4070
208	416.gamess	3950
208	433.milc	2180
208	434.zeusmp	3760
208	435.gromacs	4960
208	435.gromacs	4910
208	436.cactusADM	4190
104	437.leslie3d	1670
208	437.leslie3d	1630
208	444.namd	3320
208	444.namd	3270
208	447.dealII	6040
104	450.soplex	1960
208	450.soplex	1690
208	453.povray	6060
208	453.povray	5180
208	454.calculix	5730
104	459.GemsFDTD	1470
208	459.GemsFDTD	1520
208	465.tonto	3880
208	465.tonto	3690
208	470.lbm	3070
208	481.wrf	2700
208	482.sphinx3	3080

SPECfp_rate_base2006 = 3180

SPECfp_rate2006 = 3260

Hardware

CPU Name:	Intel Xeon Platinum 8170
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	104 cores, 4 chips, 26 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 (x86_64) 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)

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

$SPECfp\_rate2006 =$ 3260

$SPECfp\_rate\_base2006 =$ 3180

CPU2006 license: 55	**Test date:** Oct-2017
Test sponsor: Dell Inc.	**Hardware Availability:** Jul-2017
Tested by: Dell Inc.	**Software Availability:** Apr-2017

L3 Cache:	35.75 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 900 GB 15K RPM SAS12		
Other Hardware:	None		

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	208	1262	2240	1262	2240	**1262**	**2240**	104	620	2280	**620**	**2280**	621	2280
416.gamess	208	**1030**	**3950**	1027	3970	1033	3940	208	1001	4070	**1001**	**4070**	1000	4070
433.milc	208	878	2170	**878**	**2180**	878	2180	208	878	2170	**878**	**2180**	878	2180
434.zeusmp	208	506	3740	**503**	**3760**	503	3770	208	506	3740	**503**	**3760**	503	3770
435.gromacs	208	304	4890	**303**	**4910**	302	4910	208	299	4960	299	4960	**299**	**4960**
436.cactusADM	208	595	4180	**594**	**4190**	594	4190	208	595	4180	**594**	**4190**	594	4190
437.leslie3d	208	1196	1640	**1197**	**1630**	1198	1630	104	584	1670	585	1670	**585**	**1670**
444.namd	208	509	3270	**510**	**3270**	510	3270	208	501	3330	503	3320	**502**	**3320**
447.dealII	208	388	6140	398	5980	**394**	**6040**	208	388	6140	398	5980	**394**	**6040**
450.soplex	208	**1027**	**1690**	1027	1690	1024	1690	104	**442**	**1960**	442	1960	441	1970
453.povray	208	214	5180	213	5190	**214**	**5180**	208	182	6090	184	6000	**183**	**6060**
454.calculix	208	**299**	**5730**	299	5740	300	5710	208	**299**	**5730**	299	5740	300	5710
459.GemsFDTD	208	1450	1520	1448	1520	**1450**	**1520**	104	**753**	**1470**	752	1470	753	1470
465.tonto	208	**554**	**3690**	557	3680	553	3700	208	528	3880	528	3870	**528**	**3880**
470.lbm	208	931	3070	932	3070	**931**	**3070**	208	931	3070	932	3070	**931**	**3070**
481.wrf	208	861	2700	859	2700	**859**	**2700**	208	861	2700	859	2700	**859**	**2700**
482.sphinx3	208	**1316**	**3080**	1315	3080	1317	3080	208	**1316**	**3080**	1315	3080	1317	3080

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

Kernel boot parameter: nohz_full=1-207
Stack size set to unlimited using "ulimit -s unlimited"

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

$SPECfp_rate2006 = $ 3260

$SPECfp_rate_base2006 = $ 3180

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

Test date: Oct-2017
Hardware Availability: Jul-2017
Software Availability: Apr-2017

Platform Notes

```
BIOS settings:
Logical Processor Enabled
Virtualization Technology Disabled
Sub NUMA Cluster Enabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C1E Disabled
C States set to Autonomous
Uncore Frequency set to Dynamic
Memory Patrol Scrub Disabled
Energy Efficiency Policy set to Performance
CPU Interconnect Bus Link Power Management Disabled
PCI ASPM L1 Link Power Management Disabled
Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-2h8y Thu Oct 19 05:49:56 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) Platinum 8170 CPU @ 2.10GHz
      4 "physical id"s (chips)
      208 "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 : 26
      siblings  : 52
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
      physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
      physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
   cache size : 36608 KB

From /proc/meminfo
   MemTotal:       791224272 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
```

Continued on next page

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

$SPECfp\_rate2006 =$ 3260

$SPECfp\_rate\_base2006 =$ 3180

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

Test date: Oct-2017
Hardware Availability: Jul-2017
Software Availability: Apr-2017

Platform Notes (Continued)

```
        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"
        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-2h8y 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 Oct 18 18:05

    SPEC is set to: /home/cpu2006
        Filesystem      Type  Size  Used Avail Use% Mounted on
        /dev/sda4       xfs   796G   17G  779G   3% /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. 1.1.7 08/10/2017
        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/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/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>
```

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

$SPECfp\_rate2006 =$ 3260

$SPECfp\_rate\_base2006 =$ 3180

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

Test date: Oct-2017
Hardware Availability: Jul-2017
Software Availability: Apr-2017

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 -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3
```

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

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

SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

SPECfp_rate2006 = 3260

SPECfp_rate_base2006 = 3180

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

Test date: Oct-2017
Hardware Availability: Jul-2017
Software Availability: Apr-2017

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-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_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:

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

SPECfp_rate2006 =   3260

SPECfp_rate_base2006 = 3180

CPU2006 license: 55   **Test date:**   Oct-2017
Test sponsor: Dell Inc.   **Hardware Availability:**   Jul-2017
Tested by: Dell Inc.   **Software Availability:**   Apr-2017

Peak Optimization Flags (Continued)

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

    444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(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-AVX2(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-AVX2(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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

    416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(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: Same as 410.bwaves

      465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(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-AVX2(pass 2)
          -par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32
          -qopt-mem-layout-trans=3

Dell Inc.

PowerEdge R940
(Intel Xeon Platinum 8170, 2.10 GHz)

SPECfp_rate2006 = 3260

SPECfp_rate_base2006 = 3180

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

Test date: Oct-2017
Hardware Availability: Jul-2017
Software Availability: Apr-2017

Peak Optimization Flags (Continued)

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

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

Tested with SPEC CPU2006 v1.2.
Report generated on Wed Nov 15 10:58:46 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 14 November 2017.