SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R640 (Intel Xeon Platinum 8153, 2.00 GHz)

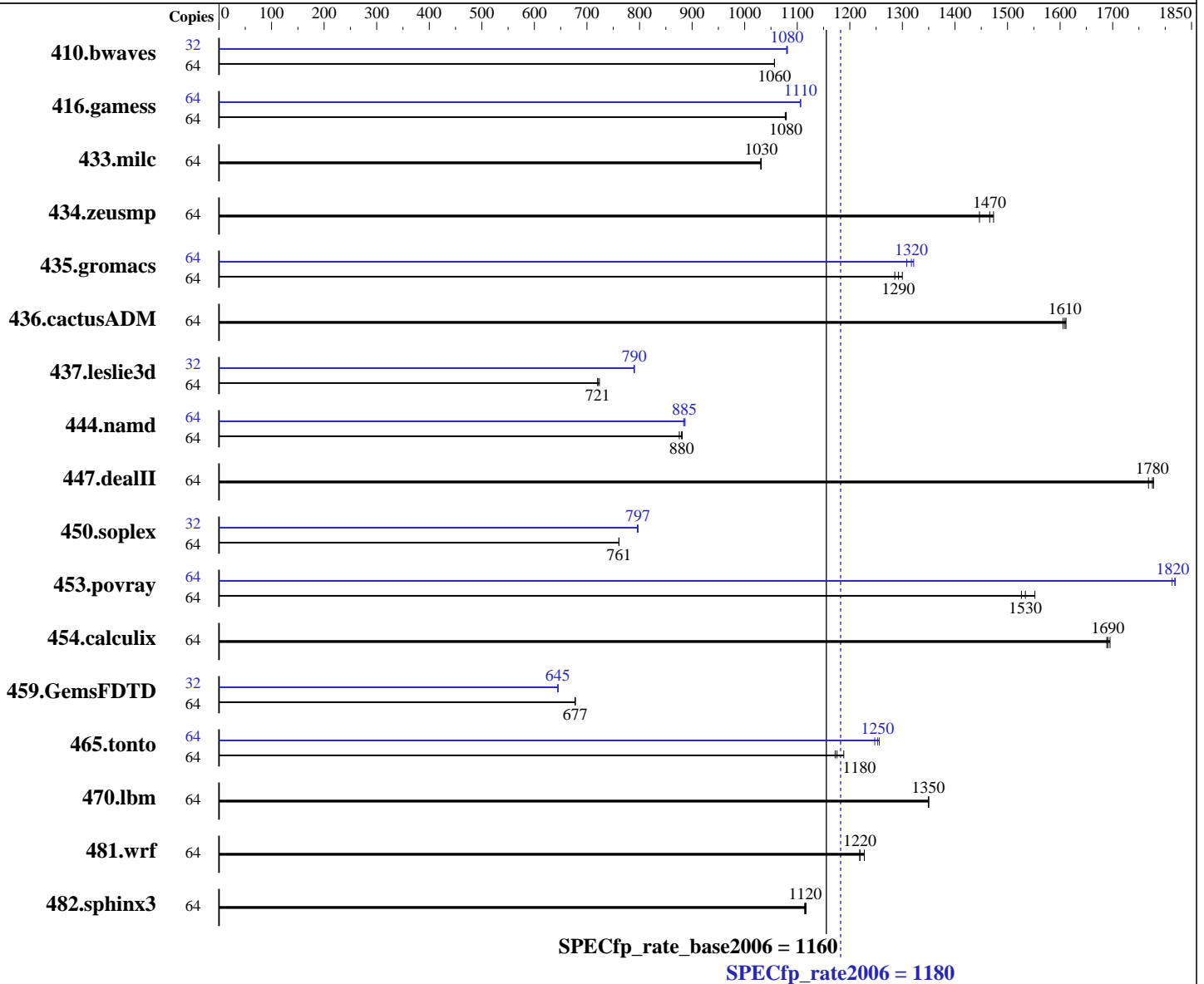$SPECfp^{®}\_rate2006 = 1180$

$SPECfp\_rate\_base2006 = 1160$

CPU2006 license:	55	**Test date:**	May-2017
Test sponsor:	Dell Inc.	**Hardware Availability:**	Jul-2017
Tested by:	Dell Inc.	**Software Availability:**	Nov-2016

Results by benchmark (Copies):

- **410.bwaves**: 32 copies = 1080; 64 copies = 1060
- **416.gamess**: 64 copies = 1110; 64 copies = 1080
- **433.milc**: 64 copies = 1030
- **434.zeusmp**: 64 copies = 1470
- **435.gromacs**: 64 copies = 1320; 64 copies = 1290
- **436.cactusADM**: 64 copies = 1610
- **437.leslie3d**: 32 copies = 790; 64 copies = 721
- **444.namd**: 64 copies = 885; 64 copies = 880
- **447.dealII**: 64 copies = 1780
- **450.soplex**: 32 copies = 797; 64 copies = 761
- **453.povray**: 64 copies = 1820; 64 copies = 1530
- **454.calculix**: 64 copies = 1690
- **459.GemsFDTD**: 32 copies = 645; 64 copies = 677
- **465.tonto**: 64 copies = 1250; 64 copies = 1180
- **470.lbm**: 64 copies = 1350
- **481.wrf**: 64 copies = 1220
- **482.sphinx3**: 64 copies = 1120

SPECfp_rate_base2006 = 1160

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Hardware

CPU Name:	Intel Xeon Platinum 8153
CPU Characteristics:	Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz:	2000
FPU:	Integrated
CPU(s) enabled:	32 cores, 2 chips, 16 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 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 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 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:	22 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)	Other Software:	None
Disk Subsystem:	1 x 400 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	64	**823**	**1060**	823	1060	823	1060	32	402	1080	403	1080	**402**	**1080**
416.gamess	64	**1162**	**1080**	1163	1080	1161	1080	64	**1133**	**1110**	1132	1110	1133	1110
433.milc	64	570	1030	570	1030	**570**	**1030**	64	570	1030	570	1030	**570**	**1030**
434.zeusmp	64	403	1450	**397**	**1470**	395	1470	64	403	1450	**397**	**1470**	395	1470
435.gromacs	64	355	1290	352	1300	**354**	**1290**	64	349	1310	346	1320	**347**	**1320**
436.cactusADM	64	476	1610	475	1610	**475**	**1610**	64	476	1610	475	1610	**475**	**1610**
437.leslie3d	64	835	720	831	724	**835**	**721**	32	381	790	381	790	**381**	**790**
444.namd	64	582	881	586	876	**583**	**880**	64	579	887	**580**	**885**	581	884
447.dealII	64	**412**	**1780**	412	1780	414	1770	64	**412**	**1780**	412	1780	414	1770
450.soplex	64	701	761	702	761	**702**	**761**	32	**335**	**797**	335	796	335	797
453.povray	64	223	1530	219	1550	**222**	**1530**	64	187	1820	**187**	**1820**	188	1810
454.calculix	64	313	1690	**312**	**1690**	312	1690	64	313	1690	**312**	**1690**	312	1690
459.GemsFDTD	64	**1002**	**677**	1002	678	1002	677	32	526	645	**527**	**645**	527	645
465.tonto	64	530	1190	537	1170	**536**	**1180**	64	505	1250	501	1260	**503**	**1250**
470.lbm	64	651	1350	**652**	**1350**	652	1350	64	651	1350	**652**	**1350**	652	1350
481.wrf	64	**586**	**1220**	586	1220	582	1230	64	**586**	**1220**	586	1220	582	1230
482.sphinx3	64	**1118**	**1120**	1120	1110	1117	1120	64	**1118**	**1120**	1120	1110	1117	1120

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
     Energy Efficient Turbo disabled
     Uncore Frequency set to Dynamic
     Energy Efficiency Policy set to Performance
     Memory Patrol Scrub disabled
     Logical Processor enabled
     Sysinfo program /root/cpu2006-1.2_ic17u1/config/sysinfo.rev6993
     Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
     running on linux-6cje Fri May 12 10:08:05 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 8153 CPU @ 2.00GHz
           2 "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 : 16
           siblings  : 32
           physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
           physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
        cache size : 22528 KB

     From /proc/meminfo
        MemTotal:       394732800 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"
           VERSION_ID="12.2"
           PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
           ID="sles"
```

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Platform Notes (Continued)

```
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
     Linux linux-6cje 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 May 12 10:07

  SPEC is set to: /root/cpu2006-1.2_ic17u1
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda3      xfs   370G   13G  358G   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. 0.5.5 04/27/2017
  Memory:
   12x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz
   12x 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 = "/root/cpu2006-1.2_ic17u1/libs/32:/root/cpu2006-1.2_ic17u1/libs/64:/root/cpu2006-1.2_ic17u1/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:
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

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Base Compiler Invocation (Continued)

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
```

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
```

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Peak Compiler Invocation (Continued)

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:

```
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
```

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Peak Optimization Flags (Continued)

```
      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

    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

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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.

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