SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R640 (Intel Xeon Platinum 8160, 2.10 GHz)

$SPECfp^{®}\_rate2006 =$ Not Run

$SPECfp\_rate\_base2006 =$ 1560
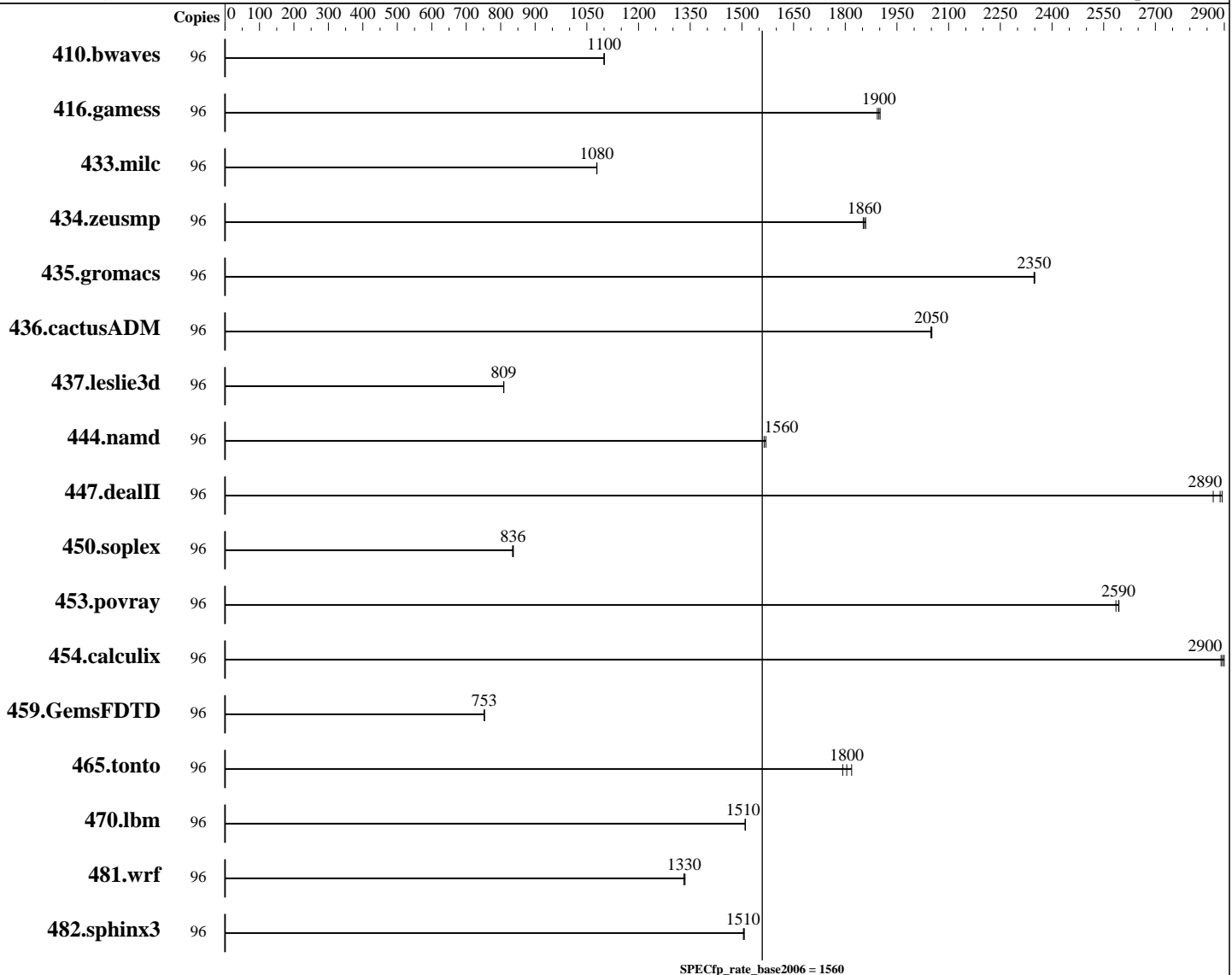
CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

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

Benchmark	Copies	Result
410.bwaves	96	1100
416.gamess	96	1900
433.milc	96	1080
434.zeusmp	96	1860
435.gromacs	96	2350
436.cactusADM	96	2050
437.leslie3d	96	809
444.namd	96	1560
447.dealII	96	2890
450.soplex	96	836
453.povray	96	2590
454.calculix	96	2900
459.GemsFDTD	96	753
465.tonto	96	1800
470.lbm	96	1510
481.wrf	96	1330
482.sphinx3	96	1510

SPECfp_rate_base2006 = 1560

Hardware

CPU Name: Intel Xeon Platinum 8160
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 48 cores, 2 chips, 24 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 17.0.3.191 of Intel C/C++
Compiler for Linux;
Fortran: Version 17.0.3.191 of Intel Fortran
Compiler for Linux
Auto Parallel: No
File System: xfs
System State: Run level 3 (multi-user)

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L3 Cache:	33 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 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	96	**1186**	**1100**	1185	1100	1186	1100							
416.gamess	96	989	1900	**991**	**1900**	993	1890							
433.milc	96	817	1080	**817**	**1080**	817	1080							
434.zeusmp	96	**471**	**1860**	470	1860	472	1850							
435.gromacs	96	292	2350	292	2350	**292**	**2350**							
436.cactusADM	96	560	2050	**560**	**2050**	559	2050							
437.leslie3d	96	1116	809	**1116**	**809**	1115	809							
444.namd	96	492	1560	490	1570	**492**	**1560**							
447.dealII	96	380	2890	**380**	**2890**	383	2870							
450.soplex	96	960	834	**958**	**836**	957	837							
453.povray	96	197	2590	**197**	**2590**	198	2590							
454.calculix	96	274	2890	273	2900	**274**	**2900**							
459.GemsFDTD	96	1354	752	1353	753	**1353**	**753**							
465.tonto	96	527	1790	519	1820	**524**	**1800**							
470.lbm	96	874	1510	873	1510	**874**	**1510**							
481.wrf	96	805	1330	**805**	**1330**	803	1340							
482.sphinx3	96	**1242**	**1510**	1244	1500	1242	1510							

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:
Virtualization Technology disabled
System Profile set to Custom

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Platform Notes (Continued)

```
      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 /root/cpu2006-1.2_ic17u3/config/sysinfo.rev6993
      Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
      running on linux-bo7a Tue Aug 15 19:02:21 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 8160 CPU @ 2.10GHz
            2 "physical id"s (chips)
            96 "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 : 24
            siblings  : 48
            physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
            27 28 29
            physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
            27 28 29
         cache size : 33792 KB

      From /proc/meminfo
         MemTotal:       394736736 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"
```

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Platform Notes (Continued)

```
        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-bo7a 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 Aug 15 13:16

  SPEC is set to: /root/cpu2006-1.2_ic17u3
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda2       xfs   892G   36G  857G   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. 1.0.8 07/11/2017
   Memory:
     24x 00AD00B300AD HMA82GR7AFR8N-VK 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_ic17u3/lib/ia32:/root/cpu2006-1.2_ic17u3/lib/intel64:/root/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
```

Continued on next page

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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-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
```

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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-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

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For other inquiries, please contact webmaster@spec.org.

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