<table>
<thead>
<tr>
<th>SPECf®_rate2006</th>
<th>1280</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECf_rate_base2006</td>
<td>1250</td>
</tr>
</tbody>
</table>

Dell Inc.

PowerEdge FC830 (Intel Xeon E5-4655 v4, 2.50 GHz)

- CPU2006 license: 55
- Test sponsor: Dell Inc.
- Tested by: Dell Inc.
- Test date: Apr-2016
- Hardware Availability: Jun-2016
- Software Availability: Mar-2016

### Hardware

- **CPU Name:** Intel Xeon E5-4655 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.20 GHz
- **CPU MHz:** 2500
- **FPU:** Integrated
- **CPU(s) enabled:** 32 cores, 4 chips, 8 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:** 256 KB I+D on chip per core

### Software

- **Operating System:** SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default
- **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:** btrfs
- **System State:** Run level 3 (multi-user)
Dell Inc.

PowerEdge FC830 (Intel Xeon E5-4655 v4, 2.50 GHz)

SPEC CFP2006 Result

SPECfp_rate2006 = 1280

SPECfp_rate_base2006 = 1250

CPU2006 license: 55
Test sponsor: Dell Inc.
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L3 Cache: 30 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx8 PC4-2400T-R)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None

Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>751</td>
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<tr>
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<td>1230</td>
<td>64</td>
<td>1018</td>
<td>1230</td>
<td>1013</td>
</tr>
</tbody>
</table>

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 Home Snoop
Virtualization Technology disabled

Continued on next page
Dell Inc.

PowerEdge FC830 (Intel Xeon E5-4655 v4, 2.50 GHz)

SPECfp_rate2006 = 1280
SPECfp_rate_base2006 = 1250

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

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

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 linux-4pvp Wed Apr 20 02:00:52 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 E5-4655 v4 @ 2.50GHz
  4 "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 : 8
  siblings : 16
  physical 0: cores 0 1 3 5 8 10 12 13
  physical 1: cores 0 1 3 5 8 10 12 13
  physical 2: cores 0 1 3 5 8 10 12 13
  physical 3: cores 0 1 3 5 8 10 12 13
  cache size : 30720 KB

From /proc/meminfo
MemTotal:       529326748 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 1
  # 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-SP1"
    VERSION_ID="12.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
    Continuation on next page
**SPEC CFP2006 Result**

**Dell Inc.**

PowerEdge FC830 (Intel Xeon E5-4655 v4, 2.50 GHz)

**SPECfp_rate2006 = 1280**

**SPECfp_rate_base2006 = 1250**

- **CPU2006 license**: 55
- **Test sponsor**: Dell Inc.
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- **Test date**: Apr-2016
- **Hardware Availability**: Jun-2016
- **Software Availability**: Mar-2016

### Platform Notes (Continued)

```
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"
```

```
uname -a:
  (8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Apr 19 15:05
```

```
SPEC is set to: /root/cpu2006-1.2
Filesystem        Type  Size  Used Avail Use% Mounted on
/dev/sda2      xfs   271G   12G  260G   5% /
```

### 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
```
runcspec command invoked through numactl i.e.:
```
numactl --interleave=all runspec <etc>
```

### Base Compiler Invocation

```
C benchmarks:
  icc  -m64
```
Dell Inc.

PowerEdge FC830 (Intel Xeon E5-4655 v4, 2.50 GHz)

<table>
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<tr>
<th>SPECfp_rate2006 = 1280</th>
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</table>

CPU2006 license: 55          Test date: Apr-2016
Test sponsor: Dell Inc.     Hardware Availability: Jun-2016
Tested by: Dell Inc.        Software Availability: Mar-2016

### Base Compiler Invocation (Continued)

C++ benchmarks:
```
icpc  -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc   -m64 ifort -m64
```

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>416.gamess</td>
<td>-DSPEC_CPU_LP64</td>
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<tr>
<td>433.milc</td>
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<tr>
<td>434.zeusmp</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
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<tr>
<td>444.namd</td>
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<tr>
<td>447.dealII</td>
<td>-DSPEC_CPU_LP64</td>
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<tr>
<td>450.soplex</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>453.povray</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>454.calculix</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
</tbody>
</table>

### 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
```
SPEC CFP2006 Result

Dell Inc. PowerEdge FC830 (Intel Xeon E5-4655 v4, 2.50 GHz)

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CPU2006 license: 55
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Software Availability: Mar-2016

Peak Compiler Invocation

C benchmarks:
  icc  -m64

C++ benchmarks:
  icpc  -m64

Fortran benchmarks:
  ifort  -m64

Benchmarks using both Fortran and C:
  icc  -m64 ifort  -m64

Peak Portability Flags

Same as Base Portability Flags

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
  450.soplex: basepeak = yes

Fortran benchmarks:
  410.bwaves: basepeak = yes

Continued on next page
Dell Inc. PowerEdge FC830 (Intel Xeon E5-4655 v4, 2.50 GHz)

SPECfp\_rate2006 = 1280
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Peak Optimization Flags (Continued)

- 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 \(-opt-malloc-options=3\)

Benmarks 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

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

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