# SPEC® CFP2006 Result

## Dell Inc.

### PowerEdge M640 (Intel Xeon Silver 4112, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECfp®_rate2006</th>
<th>SPECfp_rate_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>427</td>
<td>413</td>
</tr>
</tbody>
</table>

### CPU2006 license: 55

- **Test sponsor:** Dell Inc.
- **Tested by:** Dell Inc.
- **Hardware Availability:** Sep-2017
- **Software Availability:** Sep-2017

### Software

- **Operating System:** SUSE Linux Enterprise Server 12 SP3 (x86_64) 4.4.70-2-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:** btrfs
- **System State:** Run level 3 (multi-user)

### Hardware

- **CPU Name:** Intel Xeon Silver 4112
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.00 GHz
- **CPU MHz:** 2600
- **FPU:** Integrated
- **CPU(s) enabled:** 8 cores, 2 chips, 4 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

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECfp_rate2006</th>
<th>SPECfp_rate_base2006</th>
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<tbody>
<tr>
<td>410.bwaves</td>
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<td>353</td>
<td>421</td>
</tr>
<tr>
<td>416.gamess</td>
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** copied
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4112, 2.60 GHz)

SPEC CFP2006 Result

SPECfp_rate2006 = 427
SPECfp_rate_base2006 = 413

CPUp06 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

L3 Cache: 8.25 MB I+D on chip per chip
Other Cache: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400 MT/s)
Disk Subsystem: 1 x 960 GB SATA SSD
Other Hardware: None

Test date: Sep-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Results Table

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<thead>
<tr>
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</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:
Sub NUMA Cluster disabled
Virtualization Technology disabled

Continued on next page
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
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-8d7c Mon Sep 4 11:29:09 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) Silver 4112 CPU @ 2.60GHz
- 2 "physical id"s (chips)
- 16 "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: 4
  - siblings: 8
  - physical 0: cores 1 2 4 5
  - physical 1: cores 1 2 4 5
- cache size: 8448 KB

From /proc/meminfo
- MemTotal: 196682072 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release*/ etc/*version*
- SuSE-release:
  - SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 3
  - 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-SP3"
  - VERSION_ID="12.3"
  - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
  - ID="sles"
  - ANSI_COLOR="0;32"

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Platform Notes (Continued)

CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
    Linux linux-8d7c 4.4.70-2-default #1 SMP Wed Jun 7 15:12:06 UTC 2017
    (4502c76) x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Sep 4 02:06

SPEC is set to: /root/cpu2006-1.2_ic17u3
    Filesystem Type   Size  Used Avail Use% Mounted on
    /dev/sda3   btrfs  855G  7.0G  848G   1% /

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 08/10/2017
Memory:
    12x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz, configured at 2400
    MHz
    4x Not Specified Not Specified

(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

Fortran benchmarks:
    IFORT -m64

Continued on next page
## SPEC CFP2006 Result

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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.gamesp: -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.GemsFDAT: -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
```
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4112, 2.60 GHz)

SPECfp_rate2006 = 427
SPECfp_rate_base2006 = 413

CPU2006 license: 55
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Peak Compiler Invocation (Continued)

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: -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: basepeak = yes
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: basepeak = yes
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-
Dell Inc.  
PowerEdge M640 (Intel Xeon Silver 4112, 2.60 GHz)  

**Peak Optimization Flags (Continued)**

434.zeusmp: basepeak = yes

437.leslie3d: -xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch

459.GemsFDTD: basepeak = yes

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


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


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

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