# SPEC® CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

$SPECfp®\_rate2006 = \quad 418$

$SPECfp\_rate\_base2006 = \quad 468$
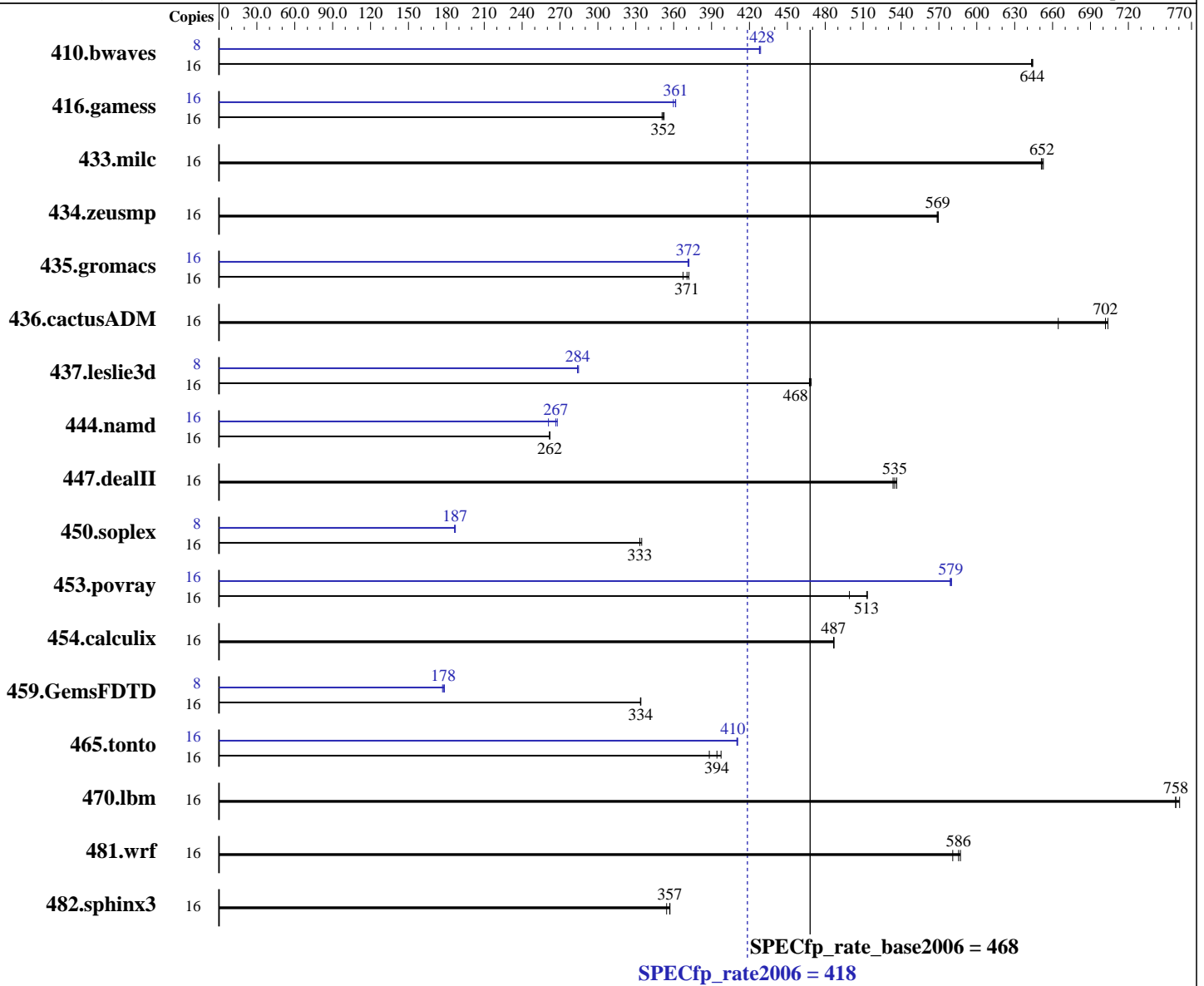
**CPU2006 license:** 55     **Test date:** Aug-2017
**Test sponsor:** Dell Inc.     **Hardware Availability:** Sep-2017
**Tested by:** Dell Inc.     **Software Availability:** Sep-2017



| Benchmark | Copies | Result |
|---|---|---|
| 410.bwaves | 8 | 428 |
| 410.bwaves | 16 | 644 |
| 416.gamess | 16 | 361 |
| 416.gamess | 16 | 352 |
| 433.milc | 16 | 652 |
| 434.zeusmp | 16 | 569 |
| 435.gromacs | 16 | 372 |
| 435.gromacs | 16 | 371 |
| 436.cactusADM | 16 | 702 |
| 437.leslie3d | 8 | 284 |
| 437.leslie3d | 16 | 468 |
| 444.namd | 16 | 267 |
| 444.namd | 16 | 262 |
| 447.dealII | 16 | 535 |
| 450.soplex | 8 | 187 |
| 450.soplex | 16 | 333 |
| 453.povray | 16 | 579 |
| 453.povray | 16 | 513 |
| 454.calculix | 16 | 487 |
| 459.GemsFDTD | 8 | 178 |
| 459.GemsFDTD | 16 | 334 |
| 465.tonto | 16 | 410 |
| 465.tonto | 16 | 394 |
| 470.lbm | 16 | 758 |
| 481.wrf | 16 | 586 |
| 482.sphinx3 | 16 | 357 |

**SPECfp_rate_base2006 = 468**
SPECfp_rate2006 = 418

## Hardware
CPU Name: Intel Xeon Bronze 3106
CPU Characteristics:
CPU MHz: 1700
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip
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 SP3
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)

*Continued on next page*

# SPEC CFP2006 Result

Copyright 2006-2017 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

$SPECfp\_rate2006 = $ 418

$SPECfp\_rate\_base2006 = $ 468

| | |
|---|---|
| **CPU2006 license:** 55 | **Test date:** Aug-2017 |
| **Test sponsor:** Dell Inc. | **Hardware Availability:** Sep-2017 |
| **Tested by:** Dell Inc. | **Software Availability:** Sep-2017 |

| | | | |
|---|---|---|---|
| L3 Cache: | 11 MB I+D on chip per chip | Base Pointers: | 32/64-bit |
| Other Cache: | None | Peak Pointers: | 32/64-bit |
| Memory: | 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133 MT/s) | 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 | 16 | 337 | 644 | 338 | 643 | **338** | **644** | 8 | 254 | 428 | 254 | 429 | **254** | **428** |
| 416.gamess | 16 | 893 | 351 | **891** | **352** | 889 | 352 | 16 | **867** | **361** | 866 | 362 | 871 | 360 |
| 433.milc | 16 | 225 | 653 | **225** | **652** | 226 | 651 | 16 | 225 | 653 | **225** | **652** | 226 | 651 |
| 434.zeusmp | 16 | 256 | 569 | 256 | 569 | **256** | **569** | 16 | 256 | 569 | 256 | 569 | **256** | **569** |
| 435.gromacs | 16 | 311 | 367 | 307 | 372 | **308** | **371** | 16 | 308 | 371 | **307** | **372** | 307 | 372 |
| 436.cactusADM | 16 | 288 | 664 | **272** | **702** | 272 | 704 | 16 | 288 | 664 | **272** | **702** | 272 | 704 |
| 437.leslie3d | 16 | 322 | 467 | 321 | 469 | **322** | **468** | 8 | 264 | 285 | 265 | 284 | **265** | **284** |
| 444.namd | 16 | **490** | **262** | 490 | 262 | 490 | 262 | 16 | **481** | **267** | 479 | 268 | 492 | 261 |
| 447.dealII | 16 | 343 | 534 | **342** | **535** | 341 | 537 | 16 | 343 | 534 | **342** | **535** | 341 | 537 |
| 450.soplex | 16 | **400** | **333** | 399 | 335 | 400 | 333 | 8 | 357 | 187 | **357** | **187** | 358 | 187 |
| 453.povray | 16 | 166 | 513 | **166** | **513** | 171 | 499 | 16 | 147 | 579 | 147 | 580 | **147** | **579** |
| 454.calculix | 16 | 271 | 487 | **271** | **487** | 271 | 487 | 16 | 271 | 487 | **271** | **487** | 271 | 487 |
| 459.GemsFDTD | 16 | 508 | 334 | 509 | 334 | **508** | **334** | 8 | 476 | 178 | 480 | 177 | **478** | **178** |
| 465.tonto | 16 | 406 | 388 | 396 | 398 | **399** | **394** | 16 | **384** | **410** | 384 | 410 | 383 | 411 |
| 470.lbm | 16 | 290 | 757 | **290** | **758** | 289 | 761 | 16 | 290 | 757 | **290** | **758** | 289 | 761 |
| 481.wrf | 16 | 308 | 581 | **305** | **586** | 304 | 587 | 16 | 308 | 581 | **305** | **586** | 304 | 587 |
| 482.sphinx3 | 16 | 880 | 354 | 873 | 357 | **874** | **357** | 16 | 880 | 354 | 873 | 357 | **874** | **357** |

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

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

$SPECfp\_rate2006 = $ 418

$SPECfp\_rate\_base2006 = $ 468

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

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

## 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
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-wds7 Sat Aug 26 06:20:58 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) Bronze 3106 CPU @ 1.70GHz
      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 : 8
      siblings  : 8
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
   cache size : 11264 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"
      CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

# SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

SPECfp_rate2006 = 418

SPECfp_rate_base2006 = 468

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

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

## Platform Notes (Continued)

```
uname -a:
   Linux linux-wds7 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 Aug 25 19:26

SPEC is set to: /root/cpu2006-1.2_ic17u3
   Filesystem      Type   Size  Used Avail Use% Mounted on
   /dev/sda3       btrfs  855G  6.9G  846G   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:
   6x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz, configured at 2133
   MHz
   6x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz, configured at 2133
   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
```

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

SPECfp_rate2006 =     418

SPECfp_rate_base2006 =   468

**CPU2006 license:** 55

**Test sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test date:** Aug-2017

**Hardware Availability:** Sep-2017

**Software Availability:** Sep-2017

# 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
```

# SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

$SPECfp\_rate2006 =$ 418

$SPECfp\_rate\_base2006 =$ 468

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

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

# 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:

```
      433.milc: basepeak = yes
```

```
      470.lbm: basepeak = yes
```

```
    482.sphinx3: basepeak = yes
```

C++ benchmarks:

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

$SPECfp\_rate2006 = $  418

$SPECfp\_rate\_base2006 = $  468

| | | | |
|---|---|---|---|
| **CPU2006 license:** 55 | | **Test date:** | Aug-2017 |
| **Test sponsor:** Dell Inc. | | **Hardware Availability:** | Sep-2017 |
| **Tested by:** Dell Inc. | | **Software Availability:** | Sep-2017 |

# Peak Optimization Flags (Continued)

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`

436.cactusADM: `basepeak = yes`

454.calculix: `basepeak = yes`

481.wrf: `basepeak = yes`

# SPEC CFP2006 Result
Copyright 2006-2017 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge M640 (Intel Xeon Bronze 3106, 1.70 GHz)

SPECfp_rate2006 = 418

SPECfp_rate_base2006 = 468

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

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

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

SPEC and SPECfp are registered trademarks of the Standard Performance
Evaluation Corporation.  All other brand and product names appearing in
this result are trademarks or registered trademarks of their respective
holders.

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 Sep 20 11:02:14 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 19 September 2017.