SPEC® CFP2006 Result
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Dell Inc.

PowerEdge FC430 (Intel Xeon E5-2603 v4, 1.70 GHz)

$SPECfp^{®}2006 =$ 66.9

$SPECfp\_base2006 =$ 65.3

CPU2006 license: 55	**Test date:** Jun-2016
Test sponsor: Dell Inc.	**Hardware Availability:** Jun-2016
Tested by: Dell Inc.	**Software Availability:** Nov-2015

Results graph (values in seconds / ratio scale 0 to 430):

- 410.bwaves: 345
- 416.gamess: 22.8 / 21.3
- 433.milc: 49.3
- 434.zeusmp: 136
- 435.gromacs: 30.6
- 436.cactusADM: 418
- 437.leslie3d: 153
- 444.namd: 15.4 / 15.0
- 447.dealII: 34.9
- 450.soplex: 27.4
- 453.povray: 34.5 / 30.4
- 454.calculix: 32.5 / 31.9
- 459.GemsFDTD: 162 / 147
- 465.tonto: 29.7 / 27.1
- 470.lbm: 427
- 481.wrf: 62.0
- 482.sphinx3: 49.6

SPECfp_base2006 = 65.3
SPECfp2006 = 66.9

Hardware

CPU Name:	Intel Xeon E5-2603 v4
CPU Characteristics:	
CPU MHz:	1700
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 cores/chip
CPU(s) orderable:	1,2 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:	Red Hat Enterprise Linux Server release 7.2 (Maipo)
	3.10.0-327.el7.x86_64
Compiler:	C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;
	Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel:	Yes
File System:	xfs

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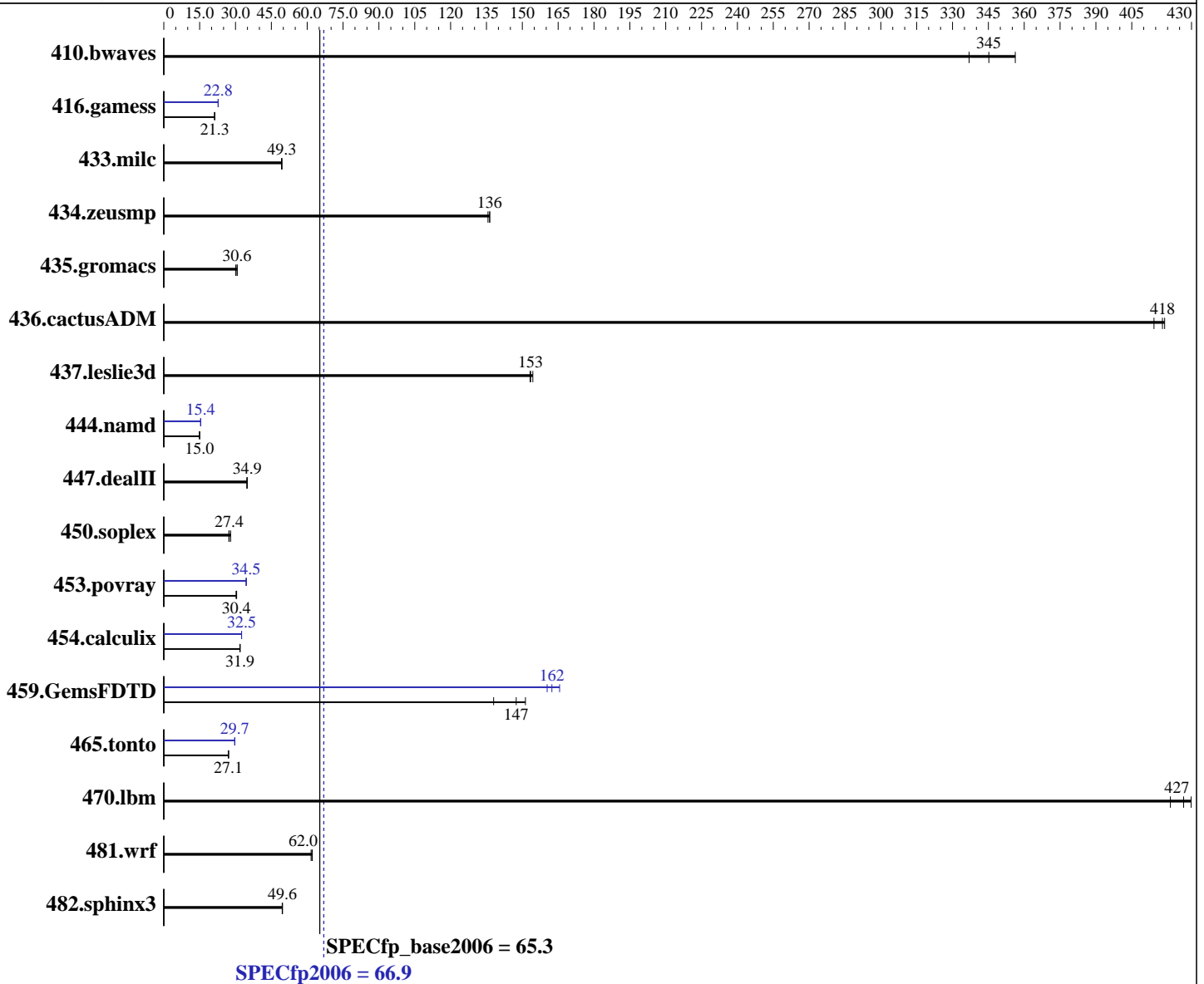**CPU2006 license:** 55　　　　　　　　　　　　　　　　　　　　　　　**Test date:** Jun-2016
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L3 Cache:	15 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other Cache:	None	Base Pointers:	64-bit
Memory:	256 GB (8 x 32 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)	Peak Pointers:	32/64-bit
		Other Software:	None
Disk Subsystem:	1 x 240 GB SATA SSD		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	40.3	337	38.1	356	**39.4**	**345**	40.3	337	38.1	356	**39.4**	**345**
416.gamess	918	21.3	923	21.2	**919**	**21.3**	862	22.7	**861**	**22.8**	860	22.8
433.milc	**186**	**49.3**	186	49.3	186	49.4	**186**	**49.3**	186	49.3	186	49.4
434.zeusmp	**66.7**	**136**	67.1	136	66.7	136	**66.7**	**136**	67.1	136	66.7	136
435.gromacs	233	30.7	238	30.1	**233**	**30.6**	233	30.7	238	30.1	**233**	**30.6**
436.cactusADM	28.8	414	**28.6**	**418**	28.5	419	28.8	414	**28.6**	**418**	28.5	419
437.leslie3d	**61.2**	**153**	60.9	154	61.3	153	**61.2**	**153**	60.9	154	61.3	153
444.namd	536	15.0	536	15.0	**536**	**15.0**	520	15.4	**520**	**15.4**	520	15.4
447.dealII	328	34.9	329	34.7	**328**	**34.9**	328	34.9	329	34.7	**328**	**34.9**
450.soplex	298	28.0	**305**	**27.4**	306	27.2	298	28.0	**305**	**27.4**	306	27.2
453.povray	175	30.5	**175**	**30.4**	176	30.2	**154**	**34.5**	154	34.5	154	34.4
454.calculix	**259**	**31.9**	259	31.9	258	31.9	253	32.6	**254**	**32.5**	254	32.5
459.GemsFDTD	70.1	151	76.9	138	**72.0**	**147**	**65.3**	**162**	66.2	160	64.1	166
465.tonto	364	27.0	**363**	**27.1**	363	27.1	**331**	**29.7**	331	29.7	332	29.7
470.lbm	32.6	421	**32.2**	**427**	32.0	430	32.6	421	**32.2**	**427**	32.0	430
481.wrf	181	61.6	180	62.1	**180**	**62.0**	181	61.6	180	62.1	**180**	**62.0**
482.sphinx3	393	49.6	**393**	**49.6**	393	49.5	393	49.6	**393**	**49.6**	393	49.5

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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
System Profile set to custom
CPU Power Management set to Maximum Performance
C States set to Autonomous
C1E disabled
Energy Efficient Turbo disabled
Uncore Frequency set to Dynamic
```

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Platform Notes (Continued)

```
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Fri Jun 24 03:35:14 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 E5-2603 v4@ 1.70GHz
      2 "physical id"s (chips)
      12 "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 : 6
      siblings  : 6
      physical 0: cores 0 1 2 3 4 5
      physical 1: cores 0 1 2 3 4 5
   cache size : 15360 KB

From /proc/meminfo
   MemTotal:       264039400 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.2 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.2"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
   redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

uname -a:
   Linux localhost.localdomain 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29
   EDT 2015 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 23 18:07

SPEC is set to: /root/cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       xfs   234G  9.8G  225G   5% /
Additional information from dmidecode:
```
Continued on next page

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Platform Notes (Continued)

```
   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. 2.2.1 06/07/2016
   Memory:
   8x 00CE00B300CE M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz, configured at 1866
   MHz

 (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"
OMP_NUM_THREADS = "12"

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

Base Compiler Invocation

```
C benchmarks:
     icc   -m64
```

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

```
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
```

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Software Availability: Nov-2015

Base Portability Flags (Continued)

```
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 -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

Fortran benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias
```

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
```

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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) -prof-use(pass 2) -fno-alias
                -auto-ilp32

     447.dealII: basepeak = yes

     450.soplex: basepeak = yes

     453.povray: -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
                 -ansi-alias
```

Fortran benchmarks:

```
     410.bwaves: basepeak = yes

     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: -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 -opt-prefetch -parallel

      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) -inline-calloc
```

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Peak Optimization Flags (Continued)

465.tonto (continued):
```
-opt-malloc-options=3 -auto -unroll4
```

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: `-xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias`

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
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.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-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.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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