SPEC® CFP2006 Result

Dell Inc.

$SPECfp^{®}2006 =$ 124

PowerEdge R630 (Intel Xeon E5-2697 v4, 2.30 GHz)

$SPECfp\_base2006 =$ 117

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

Benchmark	Result
410.bwaves	653
416.gamess	47.8 / 37.7
433.milc	75.3
434.zeusmp	203
435.gromacs	47.6
436.cactusADM	839
437.leslie3d	347
444.namd	32.7 / 31.7
447.dealII	67.5
450.soplex	49.1
453.povray	72.6 / 64.4
454.calculix	60.4 / 53.9
459.GemsFDTD	271 / 234
465.tonto	58.9 / 41.6
470.lbm	891
481.wrf	119
482.sphinx3	70.6

SPECfp_base2006 = 117

SPECfp2006 = 124
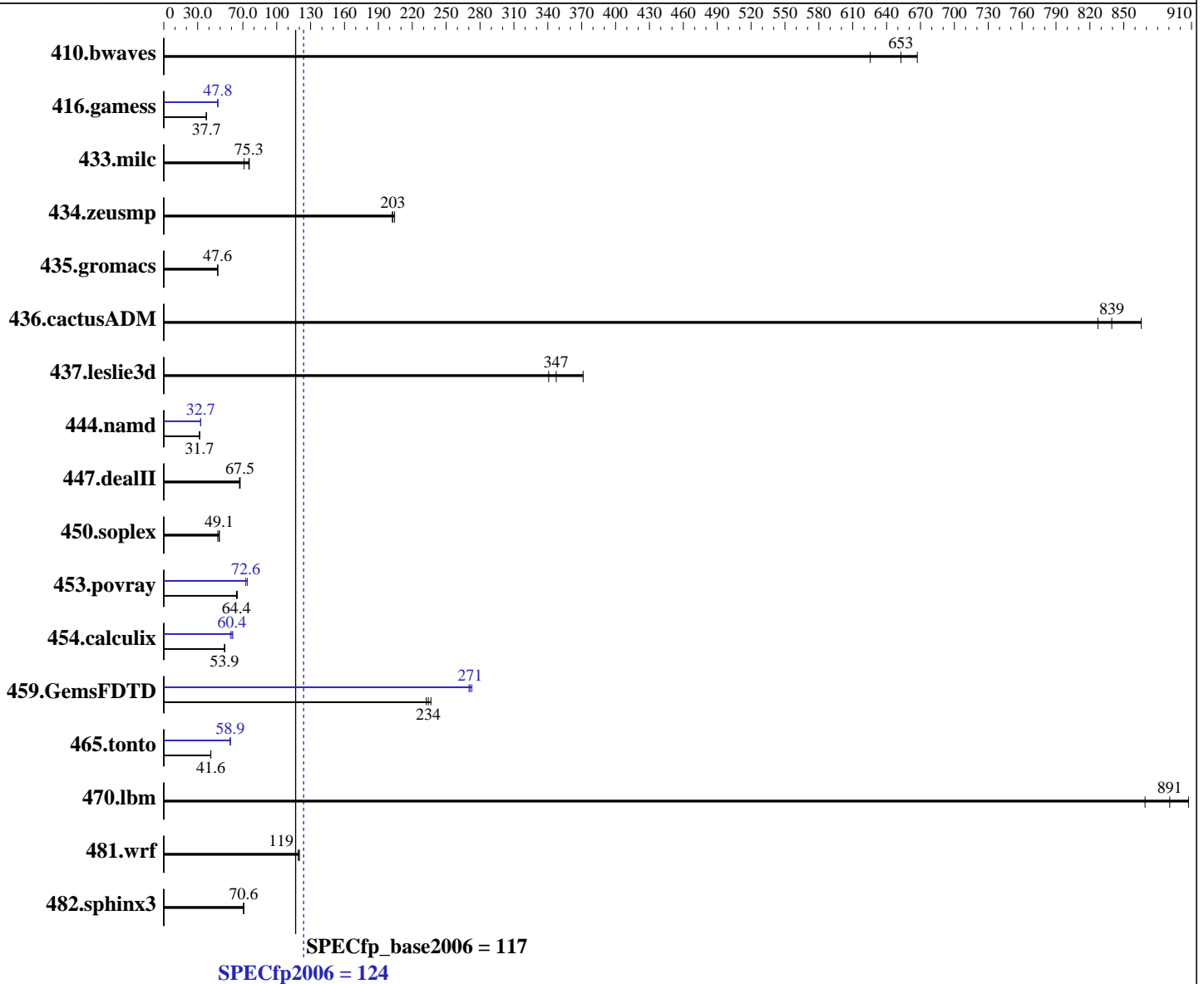
Hardware

CPU Name:	Intel Xeon E5-2697 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	36 cores, 2 chips, 18 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:	256 KB I+D on chip per core

Continued on next page

Software

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

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L3 Cache:	45 MB I+D on chip per chip	Base Pointers:	64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)	Other Software:	None
Disk Subsystem:	1 x 480 GB SATA SSD		
Other Hardware:	None		

Results Table

	Base						Peak					
Benchmark	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**	**Seconds**	**Ratio**
410.bwaves	21.7	626	**20.8**	**653**	20.4	667	21.7	626	**20.8**	**653**	20.4	667
416.gamess	**519**	**37.7**	519	37.8	520	37.6	410	47.8	409	47.9	**409**	**47.8**
433.milc	129	71.1	**122**	**75.3**	121	75.7	129	71.1	**122**	**75.3**	121	75.7
434.zeusmp	45.0	202	44.5	204	**44.9**	**203**	45.0	202	44.5	204	**44.9**	**203**
435.gromacs	**150**	**47.6**	150	47.6	149	47.9	**150**	**47.6**	150	47.6	149	47.9
436.cactusADM	13.8	866	14.4	827	**14.2**	**839**	13.8	866	14.4	827	**14.2**	**839**
437.leslie3d	**27.1**	**347**	25.3	371	27.6	341	**27.1**	**347**	25.3	371	27.6	341
444.namd	**253**	**31.7**	254	31.6	253	31.7	**246**	**32.7**	245	32.7	246	32.6
447.dealII	169	67.5	**169**	**67.5**	171	67.0	169	67.5	**169**	**67.5**	171	67.0
450.soplex	**170**	**49.1**	174	47.8	169	49.2	**170**	**49.1**	174	47.8	169	49.2
453.povray	**82.6**	**64.4**	81.7	65.1	82.7	64.4	**73.3**	**72.6**	71.9	74.0	73.3	72.6
454.calculix	153	54.0	**153**	**53.9**	154	53.7	140	59.0	**137**	**60.4**	135	61.1
459.GemsFDTD	**45.3**	**234**	45.7	232	44.9	237	38.9	273	**39.1**	**271**	39.3	270
465.tonto	**236**	**41.6**	237	41.6	236	41.7	167	58.8	**167**	**58.9**	167	59.0
470.lbm	**15.4**	**891**	15.8	869	15.1	907	**15.4**	**891**	15.8	869	15.1	907
481.wrf	93.0	120	**93.6**	**119**	93.7	119	93.0	120	**93.6**	**119**	93.7	119
482.sphinx3	276	70.5	275	70.9	**276**	**70.6**	276	70.5	275	70.9	**276**	**70.6**

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 Opportunistic Snoop Broadcast
Virtualization Technology disabled
CPU Power Management set to Maximum Performance
Memory Patrol Scrub disabled
C states set to Autonomous
Energy Efficient Policy set to Performance
Energy Efficient Turbo disabled
C1E disabled
Uncore Frequency set to Dynamic

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Platform Notes (Continued)

```
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-m662 Sun Mar 20 01:01:25 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 E5-2697 v4 @ 2.30GHz
      2 "physical id"s (chips)
      72 "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 : 18
      siblings  : 36
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
   cache size : 46080 KB

From /proc/meminfo
   MemTotal:       529333472 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"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
   Linux linux-m662 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
   (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 19 20:14
```

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Platform Notes (Continued)

```
  SPEC is set to: /root/cpu2006-1.2
    Filesystem      Type   Size   Used Avail Use% Mounted on
    /dev/sda2       xfs    439G   9.1G  430G   3% /
  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. 2.0.1 02/12/2016
  Memory:
   16x 00AD063200AD HMA84GR7MFR4N-UH 32 GB 2 rank 2400 MHz
    8x Not Specified Not Specified

 (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 = "36"

 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
```

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Base Portability Flags (Continued)

```
   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 -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
```

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
```

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 Tue Apr 5 14:55:47 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 5 April 2016.