SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R730xd (Intel Xeon E5-2695 v4, 2.10 GHz)
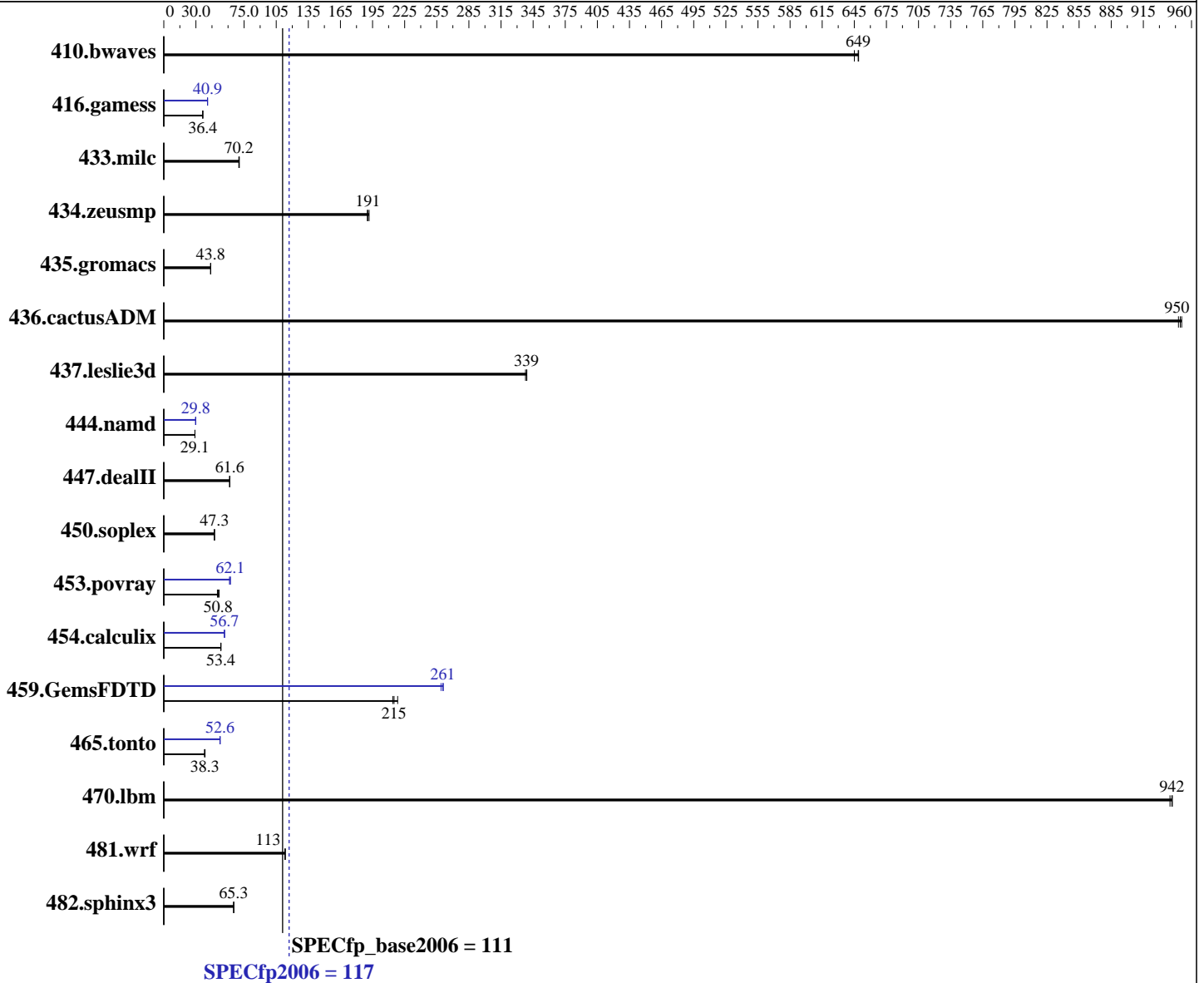
$SPECfp^®2006 =$ 117

$SPECfp\_base2006 =$ 111

CPU2006 license: 55	**Test date:** Feb-2017
Test sponsor: Dell Inc.	**Hardware Availability:** Oct-2016
Tested by: Dell Inc.	**Software Availability:** Sep-2016

Graph scale: 0 30.0 75.0 105 135 165 195 225 255 285 315 345 375 405 435 465 495 525 555 585 615 645 675 705 735 765 795 825 855 885 915 960

- 410.bwaves: 649
- 416.gamess: 40.9 / 36.4
- 433.milc: 70.2
- 434.zeusmp: 191
- 435.gromacs: 43.8
- 436.cactusADM: 950
- 437.leslie3d: 339
- 444.namd: 29.8 / 29.1
- 447.dealII: 61.6
- 450.soplex: 47.3
- 453.povray: 62.1 / 50.8
- 454.calculix: 56.7 / 53.4
- 459.GemsFDTD: 261 / 215
- 465.tonto: 52.6 / 38.3
- 470.lbm: 942
- 481.wrf: 113
- 482.sphinx3: 65.3

SPECfp_base2006 = 111

SPECfp2006 = 117

Hardware

CPU Name:	Intel Xeon E5-2695 v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	36 cores, 2 chips, 18 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

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 12 3.12.28-4-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux; Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel:	Yes
File System:	ext4
System State:	Run level 3 (multi user)

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L3 Cache:	45 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)
Disk Subsystem:	2 x 2000 GB 7200 RPM SAS RAID 0
Other Hardware:	None

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

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	21.1	645	**21.0**	**649**	20.9	649	21.1	645	**21.0**	**649**	20.9	649
416.gamess	**538**	**36.4**	537	36.4	538	36.4	**479**	**40.9**	479	40.9	480	40.8
433.milc	**131**	**70.2**	130	70.6	131	70.2	**131**	**70.2**	130	70.6	131	70.2
434.zeusmp	**47.8**	**191**	47.9	190	47.4	192	**47.8**	**191**	47.9	190	47.4	192
435.gromacs	163	43.8	163	43.7	**163**	**43.8**	163	43.8	163	43.7	**163**	**43.8**
436.cactusADM	**12.6**	**950**	12.6	951	12.6	948	**12.6**	**950**	12.6	951	12.6	948
437.leslie3d	**27.7**	**339**	27.8	338	27.7	339	**27.7**	**339**	27.8	338	27.7	339
444.namd	**276**	**29.1**	275	29.1	276	29.1	269	29.8	269	29.8	**269**	**29.8**
447.dealII	**186**	**61.6**	186	61.5	186	61.6	**186**	**61.6**	186	61.5	186	61.6
450.soplex	176	47.3	**176**	**47.3**	177	47.2	176	47.3	**176**	**47.3**	177	47.2
453.povray	106	50.1	**105**	**50.8**	103	51.7	85.6	62.2	**85.7**	**62.1**	86.8	61.3
454.calculix	155	53.4	**155**	**53.4**	155	53.2	145	56.7	**146**	**56.7**	146	56.7
459.GemsFDTD	48.6	218	**49.3**	**215**	49.6	214	40.6	261	41.0	259	**40.7**	**261**
465.tonto	**257**	**38.3**	259	38.0	255	38.5	187	52.7	**187**	**52.6**	188	52.4
470.lbm	14.6	940	**14.6**	**942**	14.6	942	14.6	940	**14.6**	**942**	14.6	942
481.wrf	98.7	113	98.4	114	**98.6**	**113**	98.7	113	98.4	114	**98.6**	**113**
482.sphinx3	299	65.2	298	65.4	**298**	**65.3**	299	65.2	298	65.4	**298**	**65.3**

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
    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

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Platform Notes (Continued)

```
Memory Patrol Scrub disabled
Logical Processor disabled
Sysinfo program /root/previous-cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-0171 Fri Feb 24 20:33:36 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) CPU E5-2695 v4 @ 2.10GHz
      2 "physical id"s (chips)
      36 "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  : 18
      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:       264567484 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

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

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 0
      # 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"
      VERSION_ID="12"
      PRETTY_NAME="SUSE Linux Enterprise Server 12"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
   Linux linux-0171 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
   (9879bd4) x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
run-level 3 Feb 24 14:45

SPEC is set to: /root/previous-cpu2006-1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       ext4  246G   19G  226G   8% /
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. 2.3.4 11/08/2016
  Memory:
  7x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz
  9x 00CE00B300CE M393A2K43BB1-CRC 16 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,scatter"
LD_LIBRARY_PATH = "/root/previous-cpu2006-1.2/libs/32:/root/previous-cpu2006-1.2/libs/64:/root/previous-cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "36"
The Dell PowerEdge R730 and the PowerEdge R730xd models are electronically equivalent.
The results have been measured on a Dell PowerEdge R730xd model.
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 with:
echo never > /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

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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 -parallel -qopt-prefetch
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
```

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: -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

>   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 -ansi-alias

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-

>   434.zeusmp: basepeak = yes

>   437.leslie3d: basepeak = yes

>   459.GemsFDTD: -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
>   -qopt-prefetch -parallel

>   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) -inline-calloc -qopt-malloc-options=3
>   -auto -unroll4

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Peak Optimization Flags (Continued)

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

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.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge13G-revE.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.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Flags-PowerEdge13G-revE.xml

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

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