SPEC® CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

$SPECfp^{®}\_rate2006 = 952$
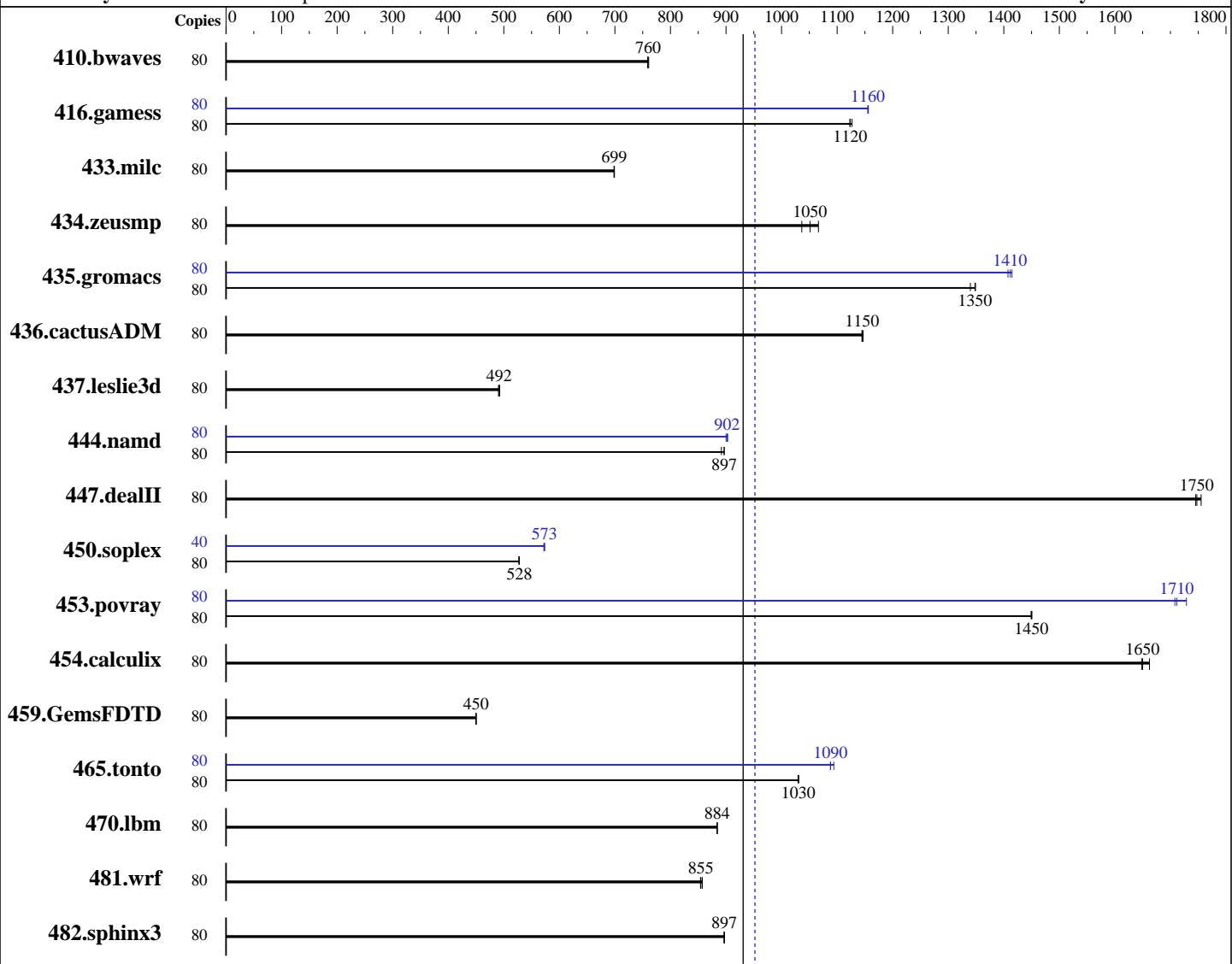
$SPECfp\_rate\_base2006 = 931$

CPU2006 license: 9017　　　　　　　　　　　　　　　　　**Test date:** Jul-2016
Test sponsor: Lenovo Group Limited　　　　　　　　**Hardware Availability:** Jun-2016
Tested by: Lenovo Group Limited　　　　　　　　　**Software Availability:** Mar-2016

SPECfp_rate_base2006 = 931

SPECfp_rate2006 = 952

Hardware

CPU Name: Intel Xeon E7-4820 v4
CPU Characteristics:
CPU MHz: 2000
FPU: Integrated
CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable: 2,4 chips
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 (x86_64)
Kernel 3.12.49-11-default
Compiler: C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux;
Fortran: Version 16.0.2.181 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: xfs
System State: Run level 3 (multi-user)

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

$SPECfp\_rate2006 =$ 952

$SPECfp\_rate\_base2006 =$ 931

CPU2006 license: 9017	**Test date:** Jul-2016
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Jun-2016
Tested by: Lenovo Group Limited	**Software Availability:** Mar-2016

L3 Cache:	25 MB I+D on chip per chip	Base Pointers:	32/64-bit
Other Cache:	None	Peak Pointers:	32/64-bit
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-2133P-R, running at 1333 MHz)	Other Software:	None
Disk Subsystem:	1 x 800 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	80	1429	761	1433	759	**1431**	**760**	80	1429	761	1433	759	**1431**	**760**
416.gamess	80	1390	1130	**1394**	**1120**	1395	1120	80	**1356**	**1160**	1356	1160	1355	1160
433.milc	80	1050	699	1052	698	**1051**	**699**	80	1050	699	1052	698	**1051**	**699**
434.zeusmp	80	**693**	**1050**	702	1040	683	1070	80	**693**	**1050**	702	1040	683	1070
435.gromacs	80	**424**	**1350**	423	1350	426	1340	80	404	1410	**405**	**1410**	406	1410
436.cactusADM	80	835	1140	834	1150	**835**	**1150**	80	835	1140	834	1150	**835**	**1150**
437.leslie3d	80	**1530**	**492**	1526	493	1533	490	80	**1530**	**492**	1526	493	1533	490
444.namd	80	715	897	**716**	**897**	720	892	80	713	900	**711**	**902**	711	903
447.dealII	80	524	1750	521	1760	**524**	**1750**	80	524	1750	521	1760	**524**	**1750**
450.soplex	80	1266	527	1264	528	**1264**	**528**	40	582	574	**582**	**573**	583	572
453.povray	80	**294**	**1450**	293	1450	294	1450	80	249	1710	246	1730	**249**	**1710**
454.calculix	80	**400**	**1650**	400	1650	397	1660	80	**400**	**1650**	400	1650	397	1660
459.GemsFDTD	80	1887	450	**1886**	**450**	1884	450	80	1887	450	**1886**	**450**	1884	450
465.tonto	80	**764**	**1030**	765	1030	764	1030	80	**723**	**1090**	724	1090	719	1090
470.lbm	80	1243	884	1244	884	**1243**	**884**	80	1243	884	1244	884	**1243**	**884**
481.wrf	80	1046	854	**1045**	**855**	1042	857	80	1046	854	**1045**	**855**	1042	857
482.sphinx3	80	1739	896	1738	897	**1738**	**897**	80	1739	896	1738	897	**1738**	**897**

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"
Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
 echo 1 > /proc/sys/vm/drop_caches

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

SPECfp_rate2006 =   952

SPECfp_rate_base2006 =   931

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Jul-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

Platform Notes

```
BIOS Configuration:
 Operating Mode set to "Maximum Performance"
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on Draco-02 Sun Jul 17 02:16:39 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 E7-4820 v4 @ 2.00GHz
      4 "physical id"s (chips)
      80 "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 : 10
      siblings  : 20
      physical 0: cores 0 1 2 3 4 8 9 10 11 12
      physical 1: cores 0 1 2 3 4 8 9 10 11 12
      physical 2: cores 0 1 2 3 4 8 9 10 11 12
      physical 3: cores 0 1 2 3 4 8 9 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       529161640 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

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 Draco-02 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 Jul 16 10:53
```

Continued on next page

SPEC CFP2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

$SPECfp\_rate2006 =$ 952

$SPECfp\_rate\_base2006 =$ 931

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Jul-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

Platform Notes (Continued)

```
  SPEC is set to: /home/cpu2006-1.2-ic16.0
    Filesystem      Type   Size   Used Avail Use% Mounted on
    /dev/sda4       xfs    688G   5.0G  683G   1% /home
  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 LENOVO -[A9E135CUS-3.10]- 06/16/2016
  Memory:
  16x Hynix HMA84GR7MFR4N-UH 32 GB 2 rank 2400 MHz, configured at 1333 MHz
  80x NO DIMM Unknown

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"

 Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB
 memory using RedHat EL 7.2 glibc 2.17
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
 Filesystem page cache cleared with:
 echo 1>        /proc/sys/vm/drop_caches
 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
```

Benchmarks using both Fortran and C:
```
    icc   -m64 ifort -m64
```

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

$SPECfp\_rate2006 =$ 952

$SPECfp\_rate\_base2006 =$ 931

CPU2006 license: 9017	**Test date:** Jul-2016
Test sponsor: Lenovo Group Limited	**Hardware Availability:** Jun-2016
Tested by: Lenovo Group Limited	**Software Availability:** Mar-2016

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 -opt-prefetch -auto-p32
    -ansi-alias -opt-mem-layout-trans=3
```

C++ benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
    -ansi-alias -opt-mem-layout-trans=3
```

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

Benchmarks using both Fortran and C:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
    -ansi-alias -opt-mem-layout-trans=3
```

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_2016/linux/compiler/lib/ia32_lin
```

Continued on next page

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

$SPECfp_rate2006 = $ 952

$SPECfp_rate_base2006 = $ 931

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Jul-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

Peak Compiler Invocation (Continued)

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:

        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) -opt-mem-layout-trans=3(pass 2)
                -prof-use(pass 2) -fno-alias -auto-ilp32

        447.dealII: basepeak = yes

Continued on next page

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

$SPECfp\_rate2006 =$ 952

$SPECfp\_rate\_base2006 =$ 931

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Jul-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

Peak Optimization Flags (Continued)

450.soplex: -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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-malloc-options=3

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) -opt-mem-layout-trans=3(pass 2)
-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: basepeak = yes

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) -unroll4 -auto
-inline-calloc -opt-malloc-options=3

Benchmarks using both Fortran and C:

435.gromacs: -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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-prefetch -auto-ilp32

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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.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/Lenovo-Platform-Flags-V1.2-BDW-B.xml

Lenovo Group Limited

Lenovo System x3850 X6 Essential
(2.00 GHz, Intel Xeon E7-4820 v4)

$\text{SPECfp\_rate2006} = \quad 952$

$\text{SPECfp\_rate\_base2006} = \quad 931$

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Jul-2016
Hardware Availability: Jun-2016
Software Availability: Mar-2016

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 Sep 6 16:58:36 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 6 September 2016.