



SPEC[®] CFP2006 Result

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Lenovo Group Limited

Lenovo System x3950 X6
(2.10 GHz, Intel Xeon E7-8855 v4)

SPECfp[®]_rate2006 = 3150

SPECfp_rate_base2006 = 3080

CPU2006 license: 9017

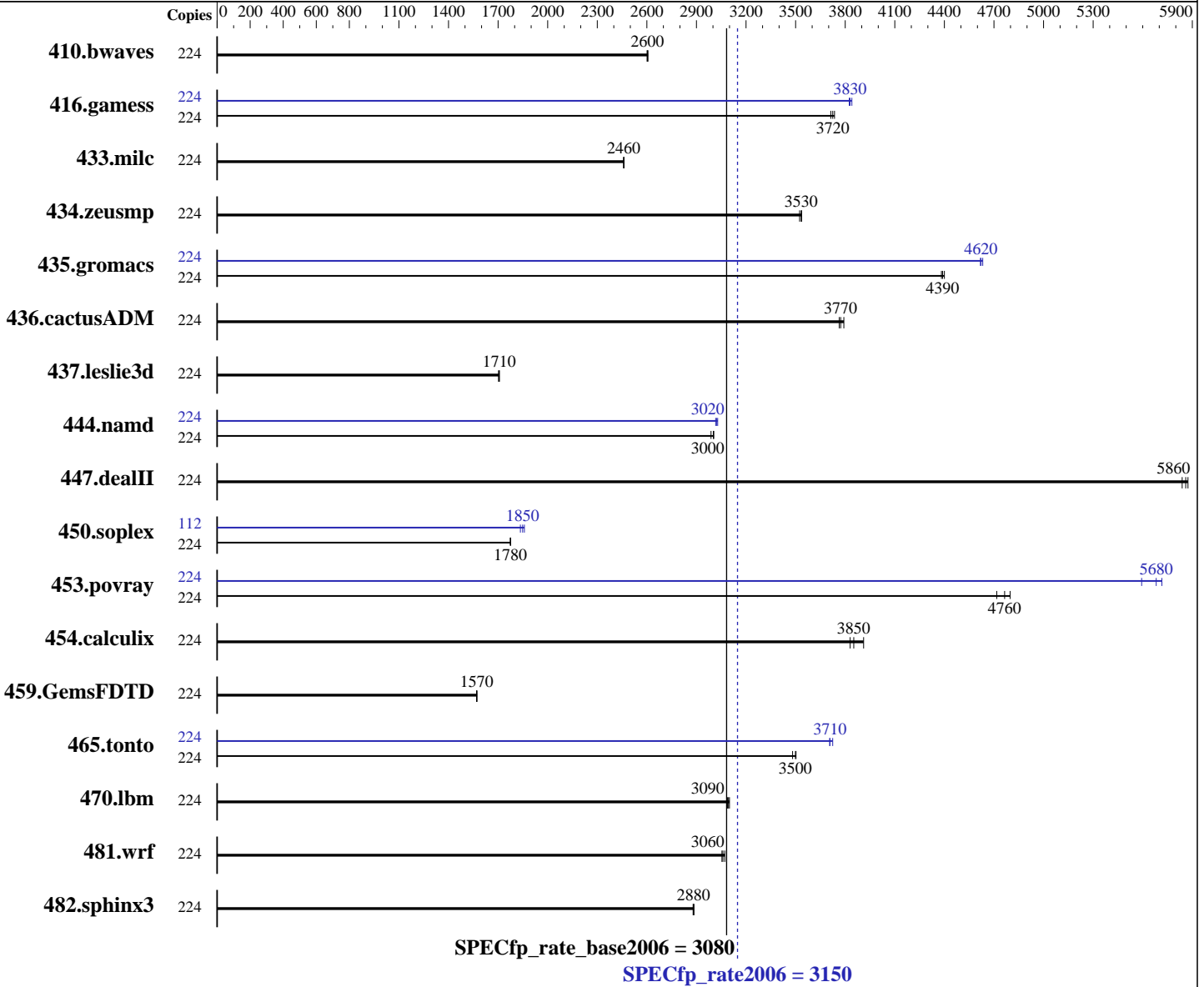
Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Jul-2016

Hardware Availability: Jun-2016

Software Availability: Mar-2016



Hardware

CPU Name: Intel Xeon E7-8855 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz
 CPU MHz: 2100
 FPU: Integrated
 CPU(s) enabled: 112 cores, 8 chips, 14 cores/chip, 2 threads/core
 CPU(s) orderable: 4,8 chips
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 256 KB I+D on chip per core

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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)

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L3 Cache: 35 MB I+D on chip per chip
Other Cache: None
Memory: 1 TB (64 x 16 GB 2Rx4 PC4-2133P-R, running at 1333 MHz)
Disk Subsystem: 2 x 600 GB 15000 RPM SAS, RAID 1
Other Hardware: None

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

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	224	1170	2600	1168	2610	1169	2600	224	1170	2600	1168	2610	1169	2600
416.gamess	224	1178	3720	1174	3740	1181	3710	224	1142	3840	1147	3820	1145	3830
433.milc	224	835	2460	836	2460	836	2460	224	835	2460	836	2460	836	2460
434.zeusmp	224	578	3520	577	3530	576	3540	224	578	3520	577	3530	576	3540
435.gromacs	224	364	4390	365	4380	363	4400	224	346	4620	345	4630	346	4620
436.cactusADM	224	710	3770	706	3790	711	3760	224	710	3770	706	3790	711	3760
437.leslie3d	224	1234	1710	1233	1710	1237	1700	224	1234	1710	1233	1710	1237	1700
444.namd	224	598	3010	598	3000	601	2990	224	596	3020	595	3020	593	3030
447.dealII	224	437	5860	439	5840	436	5870	224	437	5860	439	5840	436	5870
450.soplex	224	1052	1780	1052	1780	1053	1770	112	509	1830	505	1850	502	1860
453.povray	224	250	4760	253	4720	248	4800	224	213	5590	210	5680	208	5720
454.calculix	224	480	3850	483	3830	472	3910	224	480	3850	483	3830	472	3910
459.GemsFDTD	224	1514	1570	1511	1570	1513	1570	224	1514	1570	1511	1570	1513	1570
465.tonto	224	630	3500	629	3500	633	3480	224	592	3720	595	3710	594	3710
470.lbm	224	993	3100	995	3090	997	3090	224	993	3100	995	3090	997	3090
481.wrf	224	818	3060	819	3050	815	3070	224	818	3060	819	3050	815	3070
482.sphinx3	224	1516	2880	1515	2880	1513	2890	224	1516	2880	1515	2880	1513	2890

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



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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 X3950-01-SLES12SP1 Fri Jul 8 23:56:08 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 E7-8855 v4 @ 2.10GHz
 8 "physical id"s (chips)
224 "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      : 14
siblings       : 28
physical 0:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 2:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 3:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 4:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 5:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 6:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 7:    : cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
cache size     : 35840 KB
```

From /proc/meminfo

```
MemTotal:      1058545676 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:

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Platform Notes (Continued)

```
Linux X3950-01-SLES12SP1 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 8 10:05
```

```
SPEC is set to: /home/cpu2006-1.2-ic16.0
```

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4        xfs   512G  6.5G  506G   2% /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 IBM -[A9E135CUS-3.10]- 06/16/2016
```

Memory:

```
128x NO DIMM Unknown
```

```
64x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz, configured at 1333 MHz
```

(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
```



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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 -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

```

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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

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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>



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