SPEC® CFP2006 Result

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Lenovo Group Limited

(Test Sponsor: Intel Corporation)

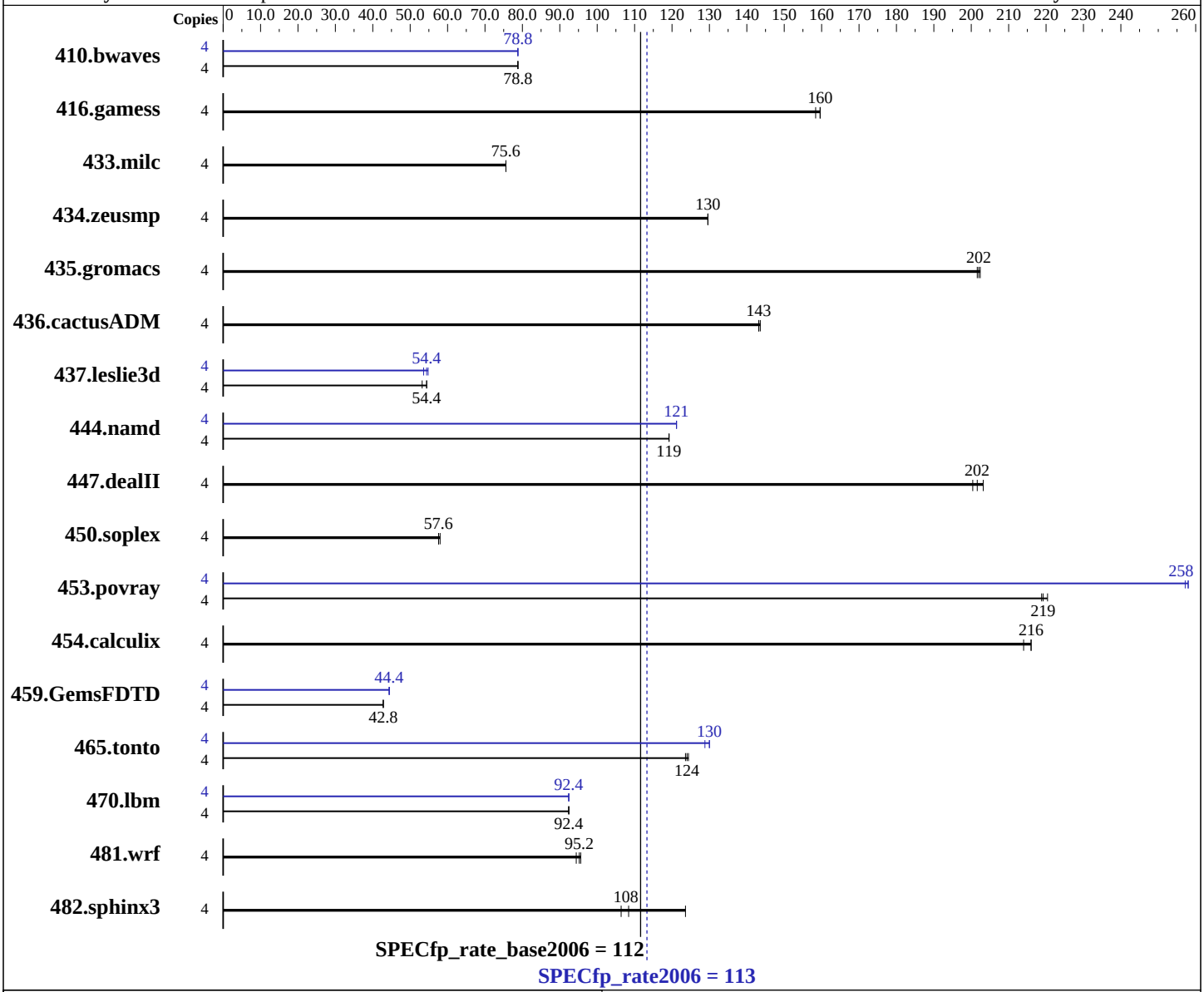
Lenovo Thinkpad T460p 20FW002DUS (Intel Core i5-6440HQ)

SPECfp®_rate2006 = 113

SPECfp_rate_base2006 = 112

CPU2006 license: 13
Test sponsor: Intel Corporation
Tested by: Intel Corporation

Test date: Apr-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015



Hardware

CPU Name:	Intel Core i5-6440HQ
CPU Characteristics:	Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz:	2600
FPU:	Integrated
CPU(s) enabled:	4 cores, 1 chip, 4 cores/chip
CPU(s) orderable:	1 chip
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:	Microsoft Windows 10 Pro 10.0.10586 N/A Build 10586
Compiler:	C/C++: Version 16.0.0.110 of Intel C++ Studio XE for Windows; Fortran: Version 16.0.0.110 of Intel Fortran Studio XE for Windows; Libraries: Version 18.00.30723 of Microsoft Visual Studio 2013
Auto Parallel:	No

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L3 Cache: 6 MB I+D on chip per chip
Other Cache: None
Memory: 8 GB (1 x 8 GB 2Rx4 PC4-2133P-E)
Disk Subsystem: Toshiba MQ01ACF050 500GB SATA, 7200RPM
Other Hardware: None

File System: NTFS
System State: Default
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: SmartHeap Library Version 11.0 from http://www.microquill.com/

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	4	690	78.8	**690**	**78.8**	689	78.8	4	**691**	**78.8**	691	78.8	691	78.8
416.gamess	4	495	158	491	160	**491**	**160**	4	495	158	491	160	**491**	**160**
433.milc	4	485	75.6	**486**	**75.6**	486	75.6	4	485	75.6	**486**	**75.6**	486	75.6
434.zeusmp	4	281	130	281	130	**281**	**130**	4	281	130	281	130	**281**	**130**
435.gromacs	4	142	202	141	202	**141**	**202**	4	142	202	141	202	**141**	**202**
436.cactusADM	4	**334**	**143**	334	143	333	144	4	**334**	**143**	334	143	333	144
437.leslie3d	4	705	53.2	690	54.4	**690**	**54.4**	4	703	53.6	**690**	**54.4**	688	54.8
444.namd	4	**269**	**119**	270	119	269	119	4	265	121	**265**	**121**	265	121
447.dealII	4	225	203	228	200	**227**	**202**	4	225	203	228	200	**227**	**202**
450.soplex	4	578	57.6	577	58.0	**577**	**57.6**	4	578	57.6	577	58.0	**577**	**57.6**
453.povray	4	97.2	219	**97.1**	**219**	96.6	220	4	82.8	257	82.5	258	**82.5**	**258**
454.calculix	4	153	216	**153**	**216**	154	214	4	153	216	**153**	**216**	154	214
459.GemsFDTD	4	988	42.8	992	42.8	**991**	**42.8**	4	**958**	**44.4**	960	44.4	958	44.4
465.tonto	4	**317**	**124**	318	124	317	124	4	**303**	**130**	302	130	305	129
470.lbm	4	594	92.4	**594**	**92.4**	594	92.4	4	594	92.4	**594**	**92.4**	594	92.4
481.wrf	4	**469**	**95.2**	473	94.4	468	95.6	4	**469**	**95.2**	473	94.4	468	95.6
482.sphinx3	4	734	106	**720**	**108**	631	124	4	734	106	**720**	**108**	631	124

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

Compiler Invocation Notes

```
To compile these binaries, the Intel Compiler 16.0 was set up to
generate 64-bit binaries with the command:
"psxevars.bat intel64" (shortcut provided in the Intel(r)
Parallel Studio XE 2016 program folder)
```

Platform Notes

```
Sysinfo program C:\SPEC16.0/Docs/sysinfo
$Rev: 6775 $ $Date:: 2011-08-16 #$ \8787f7622badcf24e01c368b1db4377c
running on Clt507B9DA65255 Sat Apr 30 21:51:27 2016

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

Continued on next page

Platform Notes (Continued)

```
    http://www.spec.org/cpu2006/Docs/config.html#sysinfo

  Trying 'systeminfo'
  OS Name       : Microsoft Windows 10 Pro
  OS Version    : 10.0.10586 N/A Build 10586
  System Manufacturer: LENOVO
  System Model  : 20FW002DUS
  Processor(s)  : 1 Processor(s) Installed.
       [01]: Intel64 Family 6 Model 94 Stepping 3 GenuineIntel ~2600 Mhz
  BIOS Version  : LENOVO R07ET62W (2.02 ), 3/4/2016
  Total Physical Memory: 8,058 MB

  Trying 'wmic cpu get /value'
  DeviceID      : CPU0
  L2CacheSize   : 1024
  L3CacheSize   : 6144
  MaxClockSpeed : 2601
  Name          : Intel(R) Core(TM) i5-6440HQ CPU @ 2.60GHz
  NumberOfCores : 4
  NumberOfLogicalProcessors: 4

  (End of data from sysinfo program)
```

Component Notes

```
  Tested systems can be used with Shin-G ATX case,
  PC Power and Cooling 1200W power supply
```

General Notes

```
450.soplex (base): "getline_test" src.alt was used.

447.dealII (base): "max_prototype" src.alt was used.
447.dealII (base): "cxx11_make_pair" src.alt was used.

450.soplex (base): "getline_test" src.alt was used.

447.dealII (base): "max_prototype" src.alt was used.
447.dealII (base): "cxx11_make_pair" src.alt was used.

 Binaries compiled on a system with 1x Intel Xeon E5-2699 v3 CPU
 + 64GB memory using Windows 8.1 Enterprise 64-bit
```

Base Compiler Invocation

C benchmarks:

```
    icl -Qvc12 -Qstd=c99
```

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Base Compiler Invocation (Continued)

C++ benchmarks:
icl -Qvc12

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
icl -Qvc12 -Qstd=c99 ifort

Base Portability Flags

410.bwaves: -DSPEC_CPU_P64
416.gamess: -DSPEC_CPU_P64
433.milc: -DSPEC_CPU_P64
434.zeusmp: -DSPEC_CPU_P64
435.gromacs: -DSPEC_CPU_P64
436.cactusADM: -DSPEC_CPU_P64 /names:lowercase /assume:underscore
437.leslie3d: -DSPEC_CPU_P64
444.namd: -DSPEC_CPU_P64 /TP
447.dealII: -DSPEC_CPU_P64 -DDEAL_II_MEMBER_VAR_SPECIALIZATION_BUG -DSPEC_CPU_BOOST_CONFIG_MSC_VER -DSPEC_NEED_ALGORITHM
450.soplex: -DSPEC_CPU_P64 -DSPEC_GETLINE_TEST
453.povray: -DSPEC_CPU_P64
454.calculix: -DSPEC_CPU_P64 -DSPEC_CPU_NOZMODIFIER /names:lowercase
459.GemsFDTD: -DSPEC_CPU_P64
465.tonto: -DSPEC_CPU_P64
470.lbm: -DSPEC_CPU_P64
481.wrf: -DSPEC_CPU_P64 -DSPEC_CPU_WINDOWS_ICL
482.sphinx3: -DSPEC_CPU_P64

Base Optimization Flags

C benchmarks:
-QxCORE-AVX2 -Qipo -O3 -Qprec-div- -Qansi-alias -Qopt-prefetch -Qauto-ilp32 /F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

C++ benchmarks:
-QxCORE-AVX2 -Qipo -O3 -Qprec-div- -Qansi-alias -Qopt-prefetch -Qcxx-features -Qauto-ilp32 /F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

Fortran benchmarks:
-QxCORE-AVX2 -Qipo -O3 -Qprec-div- -Qansi-alias -Qopt-prefetch /F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

Continued on next page

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
-QxCORE-AVX2 -Qipo -O3 -Qprec-div- -Qansi-alias -Qopt-prefetch
-Qauto-ilp32 /F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

Peak Compiler Invocation

C benchmarks:
icl -Qvc12 -Qstd=c99

C++ benchmarks:
icl -Qvc12

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
icl -Qvc12 -Qstd=c99 ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -QxCORE-AVX2 -Qprof_gen(pass 1) -Qprof_use(pass 2) -Qipo
-O3 -Qprec-div- -Qansi-alias -Qopt-prefetch -Qauto-ilp32
/F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -QxCORE-AVX2(pass 2) -Qprof_gen(pass 1) -Qprof_use(pass 2)
-Qipo -O3 -Qprec-div- -Oa -Qauto-ilp32 /F1000000000
shlW64M.lib -link /FORCE:MULTIPLE

447.dealII: basepeak = yes

450.soplex: basepeak = yes

Continued on next page

Peak Optimization Flags (Continued)

453.povray: -QxCORE-AVX2(pass 2) -Qprof_gen(pass 1) -Qprof_use(pass 2) -Qipo -O3 -Qprec-div- -Qopt-prefetch -Qauto-ilp32 /F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

Fortran benchmarks:

410.bwaves: -QxCORE-AVX2 -Qprof_gen(pass 1) -Qprof_use(pass 2) -Qipo -O3 -Qprec-div- -Qansi-alias -Qopt-prefetch /F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

416.gamess: basepeak = yes

434.zeusmp: basepeak = yes

437.leslie3d: Same as 410.bwaves

459.GemsFDTD: Same as 410.bwaves

465.tonto: -QxCORE-AVX2(pass 2) -Qprof_gen(pass 1) -Qprof_use(pass 2) -Qipo -O3 -Qprec-div- -Qunroll4 -Qauto /F1000000000 shlW64M.lib -link /FORCE:MULTIPLE

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: basepeak = yes

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-windows.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-windows.xml

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