SPEC® CFP2006 Result
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ASUSTeK Computer Inc.
(Test Sponsor: Intel Corporation)

$SPECfp®\_rate2006 = 158$

ASUS Z170MPLUS motherboard (Intel Core i5-6400)
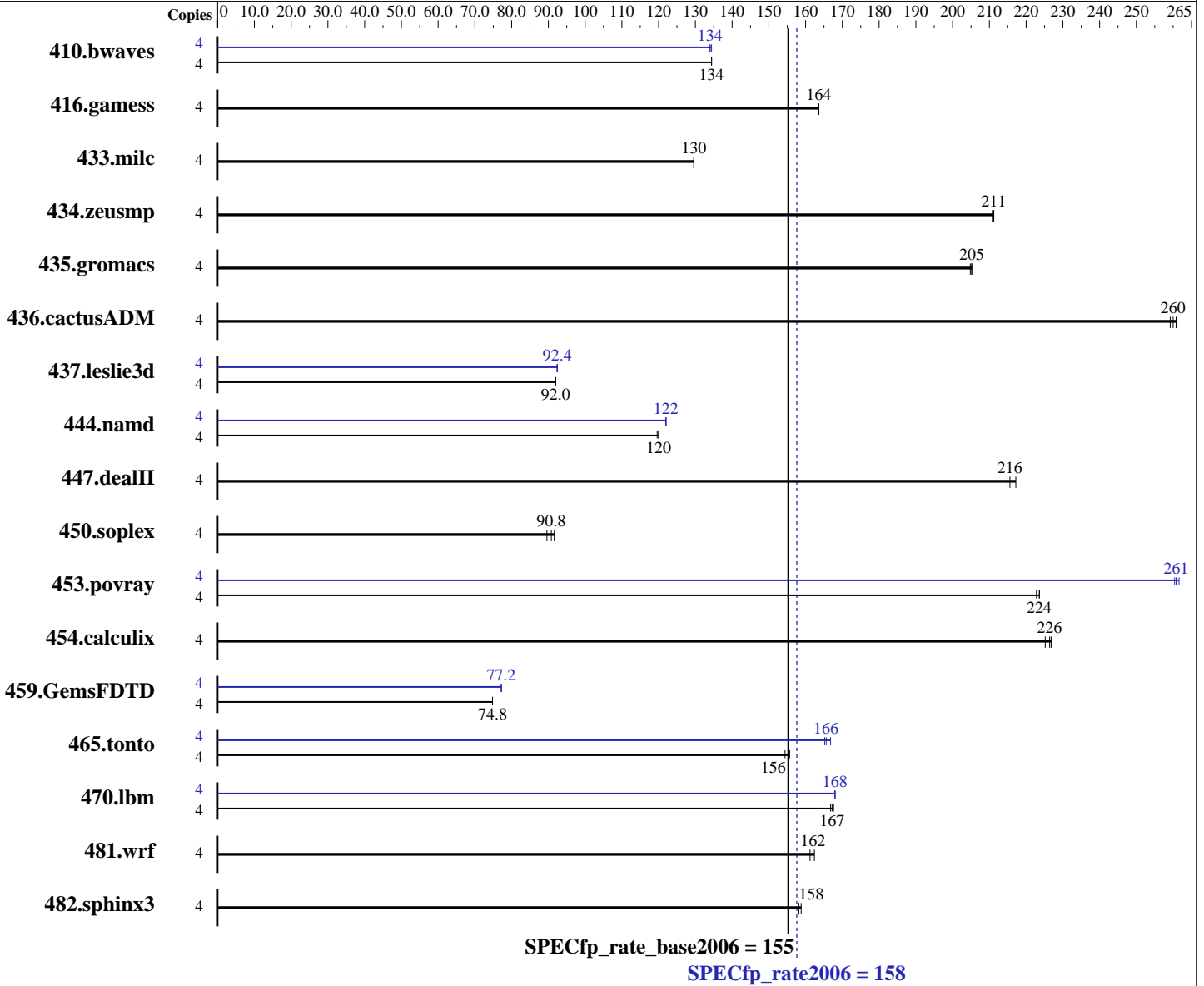
$SPECfp\_rate\_base2006 = 155$

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

Test date: Oct-2015
Hardware Availability: Sep-2015
Software Availability: Aug-2015

Benchmark	Copies	Result
410.bwaves	4	134
410.bwaves	4	134
416.gamess	4	164
433.milc	4	130
434.zeusmp	4	211
435.gromacs	4	205
436.cactusADM	4	260
437.leslie3d	4	92.4
437.leslie3d	4	92.0
444.namd	4	122
444.namd	4	120
447.dealII	4	216
450.soplex	4	90.8
453.povray	4	261
453.povray	4	224
454.calculix	4	226
459.GemsFDTD	4	77.2
459.GemsFDTD	4	74.8
465.tonto	4	166
465.tonto	4	156
470.lbm	4	168
470.lbm	4	167
481.wrf	4	162
482.sphinx3	4	158

SPECfp_rate_base2006 = 155
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Hardware
CPU Name: Intel Core i5-6400
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2700
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
Continued on next page

Software
Operating System: Microsoft Windows 10 Pro
10.0.10240 N/A Build 10240
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
Continued on next page

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L3 Cache:	6 MB I+D on chip per chip	File System:	NTFS
Other Cache:	None	System State:	Default
Memory:	8 GB (2 x 4 GB 2Rx4 PC4-2133P-U)	Base Pointers:	32/64-bit
Disk Subsystem:	1 TB Seagate SATA HDD, 7200 RPM	Peak Pointers:	32/64-bit
Other Hardware:	None	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	404	134	**405**	**134**	405	134	4	406	134	**405**	**134**	405	134
416.gamess	4	479	164	**479**	**164**	479	164	4	479	164	**479**	**164**	479	164
433.milc	4	284	130	**284**	**130**	284	130	4	284	130	**284**	**130**	284	130
434.zeusmp	4	172	211	173	211	**173**	**211**	4	172	211	173	211	**173**	**211**
435.gromacs	4	140	205	**139**	**205**	139	205	4	140	205	**139**	**205**	139	205
436.cactusADM	4	183	261	185	259	**184**	**260**	4	183	261	185	259	**184**	**260**
437.leslie3d	4	408	92.0	408	92.0	**408**	**92.0**	4	407	92.4	408	92.4	**407**	**92.4**
444.namd	4	268	120	268	120	**268**	**120**	4	263	122	263	122	**263**	**122**
447.dealII	4	211	217	213	215	**212**	**216**	4	211	217	213	215	**212**	**216**
450.soplex	4	373	89.6	365	91.6	**368**	**90.8**	4	373	89.6	365	91.6	**368**	**90.8**
453.povray	4	95.2	224	**95.2**	**224**	95.5	223	4	81.4	262	81.7	260	**81.6**	**261**
454.calculix	4	**146**	**226**	147	225	146	227	4	**146**	**226**	147	225	146	227
459.GemsFDTD	4	568	74.8	569	74.8	**569**	**74.8**	4	549	77.2	549	77.2	**549**	**77.2**
465.tonto	4	253	156	**253**	**156**	255	154	4	**238**	**166**	238	165	236	167
470.lbm	4	328	168	329	167	**329**	**167**	4	327	168	327	168	**327**	**168**
481.wrf	4	277	161	275	162	**276**	**162**	4	277	161	275	162	**276**	**162**
482.sphinx3	4	**493**	**158**	494	158	492	159	4	**493**	**158**	494	158	492	159

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 DESKTOP-C8BQEO8 Sat Oct 10 07:18:42 2015

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

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Platform Notes (Continued)

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

  Trying 'systeminfo'
  OS Name         : Microsoft Windows 10 Pro
  OS Version      : 10.0.10240 N/A Build 10240
  System Manufacturer: System manufacturer
  System Model    : System Product Name
  Processor(s)    : 1 Processor(s) Installed.
      [01]: Intel64 Family 6 Model 94 Stepping 3 GenuineIntel ~2701 Mhz
  BIOS Version    : American Megatrends Inc. 0408, 8/28/2015
  Total Physical Memory: 8,084 MB

  Trying 'wmic cpu get /value'
  DeviceID        : CPU0
  L2CacheSize     : 1024
  L3CacheSize     : 6144
  MaxClockSpeed   : 2701
  Name            : Intel(R) Core(TM) i5-6400 CPU @ 2.70GHz
  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
```

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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

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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

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

Tested with SPEC CPU2006 v1.2.
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