SPEC® CFP2006 Result
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NEC Corporation

$SPECfp^®\_rate2006 = 1050$

Express5800/T120g (Intel Xeon E5-2697 v4)

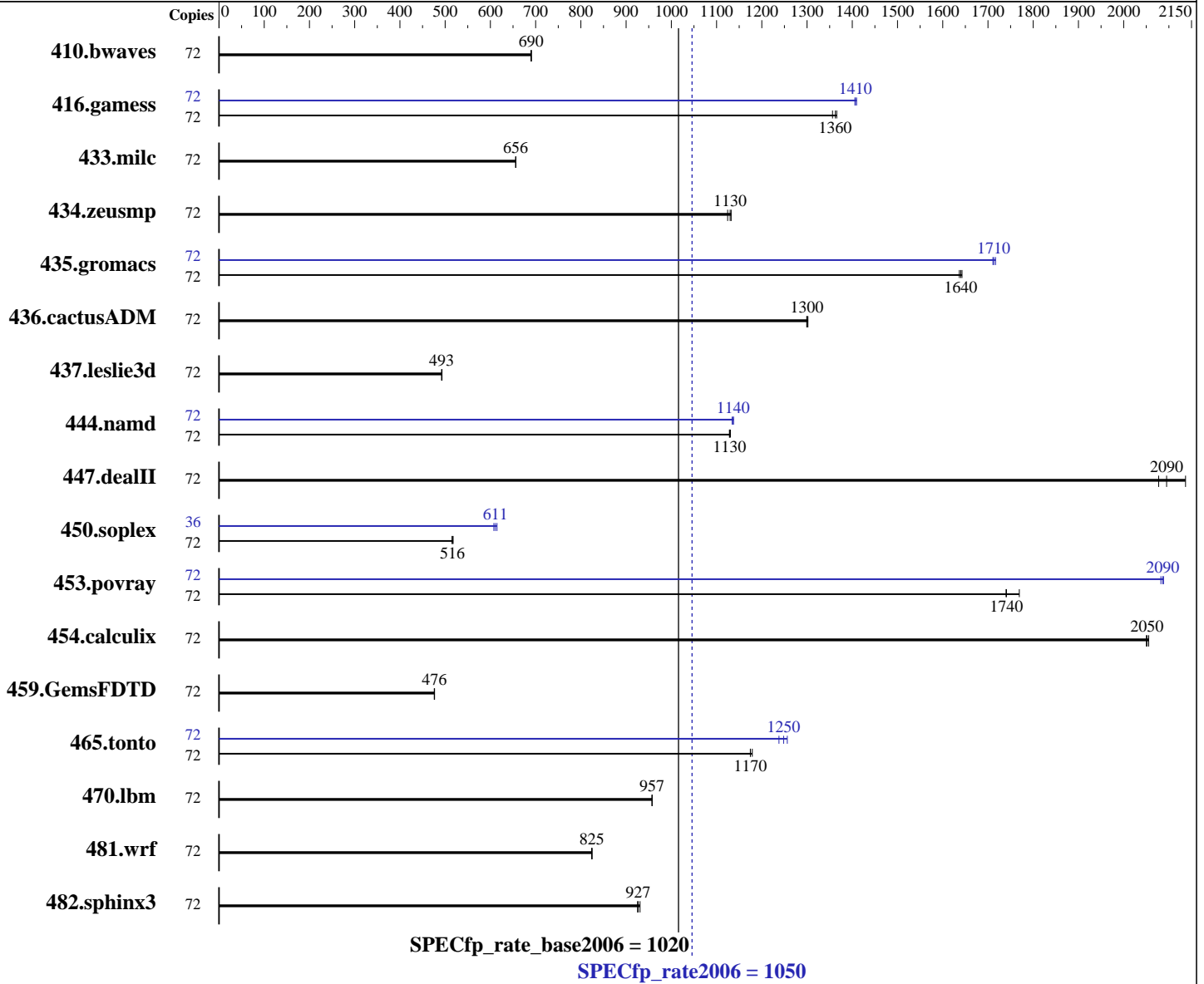$SPECfp\_rate\_base2006 = 1020$

CPU2006 license: 9006
Test sponsor: NEC Corporation
Tested by: NEC Corporation

Test date: Mar-2016
Hardware Availability: Apr-2016
Software Availability: Jan-2016

SPECfp_rate_base2006 = 1020

SPECfp_rate2006 = 1050

410.bwaves	72	690
416.gamess	72 / 72	1410 / 1360
433.milc	72	656
434.zeusmp	72	1130
435.gromacs	72 / 72	1710 / 1640
436.cactusADM	72	1300
437.leslie3d	72	493
444.namd	72 / 72	1140 / 1130
447.dealII	72	2090
450.soplex	36 / 72	611 / 516
453.povray	72 / 72	2090 / 1740
454.calculix	72	2050
459.GemsFDTD	72	476
465.tonto	72 / 72	1250 / 1170
470.lbm	72	957
481.wrf	72	825
482.sphinx3	72	927

Hardware

CPU Name: Intel Xeon E5-2697 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2300
FPU: Integrated
CPU(s) enabled: 36 cores, 2 chips, 18 cores/chip, 2 threads/core
CPU(s) orderable: 1,2 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: Red Hat Enterprise Linux Server release 7.2 (Maipo)
Kernel 3.10.0-327.4.5.el7.x86_64
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;
Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel: No
File System: ext4
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L3 Cache:	45 MB I+D on chip per chip	System State: Run level 3 (multi-user)
Other Cache:	None	Base Pointers: 32/64-bit
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)	Peak Pointers: 32/64-bit
Disk Subsystem:	1 x 1 TB SATA, 7200 RPM	Other Software: None
Other Hardware:	None	

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	72	1419	690	**1417**	**690**	1417	691	72	1419	690	**1417**	**690**	1417	691
416.gamess	72	1039	1360	1032	1370	**1035**	**1360**	72	1003	1410	1000	1410	**1002**	**1410**
433.milc	72	1008	656	1007	656	**1007**	**656**	72	1008	656	1007	656	**1007**	**656**
434.zeusmp	72	579	1130	583	1120	**580**	**1130**	72	579	1130	583	1120	**580**	**1130**
435.gromacs	72	314	1640	313	1640	**313**	**1640**	72	299	1720	300	1710	**300**	**1710**
436.cactusADM	72	661	1300	662	1300	**662**	**1300**	72	661	1300	662	1300	**662**	**1300**
437.leslie3d	72	**1374**	**493**	1375	492	1373	493	72	**1374**	**493**	1375	492	1373	493
444.namd	72	511	1130	**512**	**1130**	512	1130	72	**508**	**1140**	509	1130	508	1140
447.dealII	72	397	2080	**393**	**2090**	385	2140	72	397	2080	**393**	**2090**	385	2140
450.soplex	72	**1163**	**516**	1160	518	1166	515	36	**491**	**611**	488	615	494	608
453.povray	72	216	1770	**220**	**1740**	220	1740	72	**184**	**2090**	184	2080	183	2090
454.calculix	72	289	2060	**290**	**2050**	290	2050	72	289	2060	**290**	**2050**	290	2050
459.GemsFDTD	72	**1604**	**476**	1605	476	1603	477	72	**1604**	**476**	1605	476	1603	477
465.tonto	72	**603**	**1170**	603	1170	601	1180	72	564	1260	**568**	**1250**	572	1240
470.lbm	72	1033	957	**1033**	**957**	1033	958	72	1033	957	**1033**	**957**	1033	958
481.wrf	72	976	824	975	825	**975**	**825**	72	976	824	975	825	**975**	**825**
482.sphinx3	72	**1514**	**927**	1517	925	1508	931	72	**1514**	**927**	1517	925	1508	931

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"
```

Platform Notes

```
   BIOS Settings:
    Power Management Policy: Custom
    Energy Performance: Performance
```

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SPECfp_rate2006 =   1050

SPECfp_rate_base2006 = 1020

Platform Notes (Continued)

```
    Patrol Scrub: Disabled
    Cluster on Die: Enabled
```

General Notes

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

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 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
```

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
```

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CPU2006 license: 9006
Test sponsor: NEC Corporation
Tested by: NEC Corporation

Test date: Mar-2016
Hardware Availability: Apr-2016
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Base Portability Flags (Continued)

```
    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
```

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
```

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Peak Portability Flags (Continued)

```
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

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
```

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Peak Optimization Flags (Continued)

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/NEC-Platform-Settings-V1.2-120g-RevB.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/NEC-Platform-Settings-V1.2-120g-RevB.xml

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

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