SPEC® CINT2006 Result
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NEC Corporation

SPECint®_rate2006 = 3310

Express5800/A2040d (Intel Xeon E7-8880 v4)

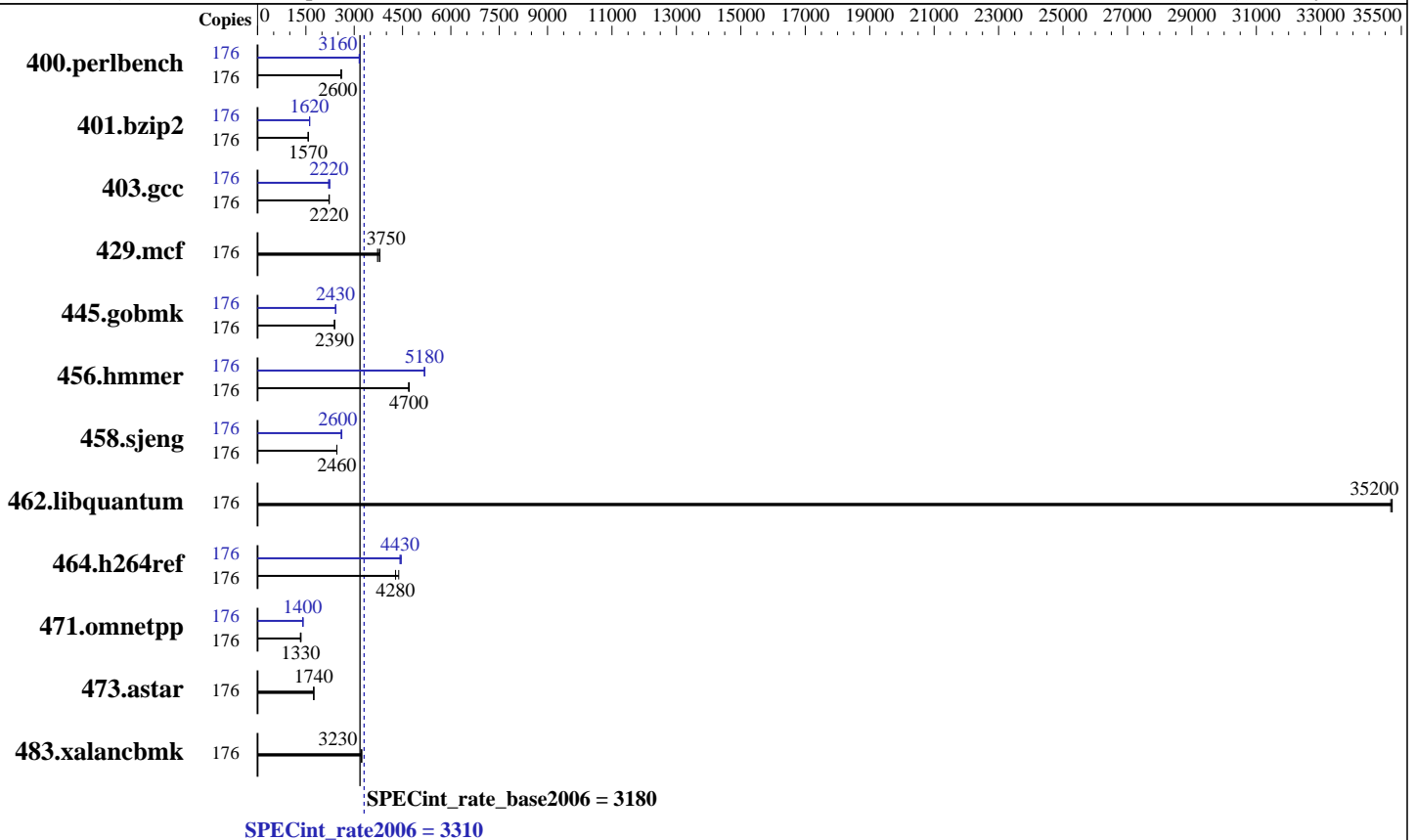SPECint_rate_base2006 = 3180

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

Test date: Sep-2016
Hardware Availability: Sep-2016
Software Availability: May-2016

Copies

Benchmark	Copies	Peak	Base
400.perlbench	176 / 176	3160	2600
401.bzip2	176 / 176	1620	1570
403.gcc	176 / 176	2220	2220
429.mcf	176	3750	
445.gobmk	176 / 176	2430	2390
456.hmmer	176 / 176	5180	4700
458.sjeng	176 / 176	2600	2460
462.libquantum	176	35200	
464.h264ref	176 / 176	4430	4280
471.omnetpp	176 / 176	1400	1330
473.astar	176	1740	
483.xalancbmk	176	3230	

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Hardware

CPU Name: Intel Xeon E7-8880 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 88 cores, 4 chips, 22 cores/chip, 2 threads/core
CPU(s) orderable: 2,3,4 chips
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 55 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (64 x 8 GB 1Rx4 PC4-2133P-R , running at 1600 MHz)
Disk Subsystem: 1 x 600 GB SAS, 15000 RPM, RAID 0
Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 6.8 (Santiago)
Kernel 2.6.32-642.el6.x86_64
Compiler: C/C++: Version 16.0.0.109 of Intel C++ Studio XE for Linux
Auto Parallel: No
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap Multi-Core V10.01

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	176	**661**	**2600**	665	2590	661	2600	176	**543**	**3160**	545	3150	543	3170
401.bzip2	176	1080	1570	1078	1580	**1079**	**1570**	176	**1051**	**1620**	1050	1620	1052	1610
403.gcc	176	**638**	**2220**	636	2230	639	2220	176	643	2200	631	2240	**637**	**2220**
429.mcf	176	423	3800	**428**	**3750**	431	3720	176	423	3800	**428**	**3750**	431	3720
445.gobmk	176	773	2390	**773**	**2390**	772	2390	176	**761**	**2430**	763	2420	760	2430
456.hmmer	176	**350**	**4700**	349	4710	350	4690	176	**317**	**5180**	317	5180	316	5190
458.sjeng	176	**865**	**2460**	865	2460	865	2460	176	**819**	**2600**	819	2600	814	2610
462.libquantum	176	**104**	**35200**	104	35200	104	35200	176	**104**	**35200**	104	35200	104	35200
464.h264ref	176	909	4280	889	4380	**909**	**4280**	176	880	4420	**879**	**4430**	873	4460
471.omnetpp	176	815	1350	**824**	**1330**	825	1330	176	**785**	**1400**	785	1400	775	1420
473.astar	176	708	1740	708	1750	**708**	**1740**	176	708	1740	708	1750	**708**	**1740**
483.xalancbmk	176	**376**	**3230**	375	3240	377	3220	176	**376**	**3230**	375	3240	377	3220

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:
     Memory RAS Mode: Independent mode
     VT-x : Disabled
     Processor C6 Report : Disabled
     OS Performance Tuning : Disabled
     Energy Performance : Performance
     Patrol Scrub : Disabled
     Demand Scrub : Disabled
     Memory P.E. Retry : Disabled

General Notes

   Environment variables set by runspec before the start of the run:
   LD_LIBRARY_PATH = "/opt/SmartHeap_10mc/lib:/opt/SmartHeap_10mc/lib64:/opt/intel/compilers_and_libraries_2016.0.109/linux/compiler/lib/ia32_lin:/opt/intel/compilers_and_libraries_2016.0.109/linux/compiler/lib/intel64_lin"

   Transparent Huge Pages enabled with:

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General Notes (Continued)

```
echo always > /sys/kernel/mm/redhat_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 -m32 -L/opt/intel/compilers_and_libraries_2016.0.109/linux/compiler/lib/ia32_lin
```

C++ benchmarks:
```
icpc -m32 -L/opt/intel/compilers_and_libraries_2016.0.109/linux/compiler/lib/ia32_lin
```

Base Portability Flags

```
 400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
     401.bzip2: -D_FILE_OFFSET_BITS=64
       403.gcc: -D_FILE_OFFSET_BITS=64
       429.mcf: -D_FILE_OFFSET_BITS=64
     445.gobmk: -D_FILE_OFFSET_BITS=64
     456.hmmer: -D_FILE_OFFSET_BITS=64
     458.sjeng: -D_FILE_OFFSET_BITS=64
 462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
    464.h264ref: -D_FILE_OFFSET_BITS=64
    471.omnetpp: -D_FILE_OFFSET_BITS=64
      473.astar: -D_FILE_OFFSET_BITS=64
  483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3 -Wl,-z,muldefs
-L/opt/SmartHeap_10mc/lib -lsmartheap
```

Base Other Flags

C benchmarks:

Continued on next page

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Base Other Flags (Continued)

403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):
    icc -m32 -L/opt/intel/compilers_and_libraries_2016.0.109/linux/compiler/lib/ia32_lin

    400.perlbench: icc -m64

    401.bzip2: icc -m64

    456.hmmer: icc -m64

    458.sjeng: icc -m64

C++ benchmarks:
    icpc -m32 -L/opt/intel/compilers_and_libraries_2016.0.109/linux/compiler/lib/ia32_lin

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
458.sjeng: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

    400.perlbench: -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) -auto-ilp32

    401.bzip2: -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) -opt-prefetch
                -auto-ilp32 -ansi-alias

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Peak Optimization Flags (Continued)

```
        403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div

        429.mcf: basepeak = yes

     445.gobmk: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                 -prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias
                 -opt-mem-layout-trans=3

     456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32

      458.sjeng: -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-ilp32

  462.libquantum: basepeak = yes

     464.h264ref: -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
                 -ansi-alias
```

C++ benchmarks:

```
     471.omnetpp: -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) -ansi-alias
                 -opt-ra-region-strategy=block -Wl,-z,muldefs
                 -L/opt/SmartHeap_10mc/lib -lsmartheap

       473.astar: basepeak = yes

   483.xalancbmk: basepeak = yes
```

Peak Other Flags

C benchmarks:

```
        403.gcc: -Dalloca=_alloca
```

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-A2040d-RevA.html

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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-A2040d-RevA.xml

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

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