# SPEC® CINT2006 Result

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## NEC Corporation

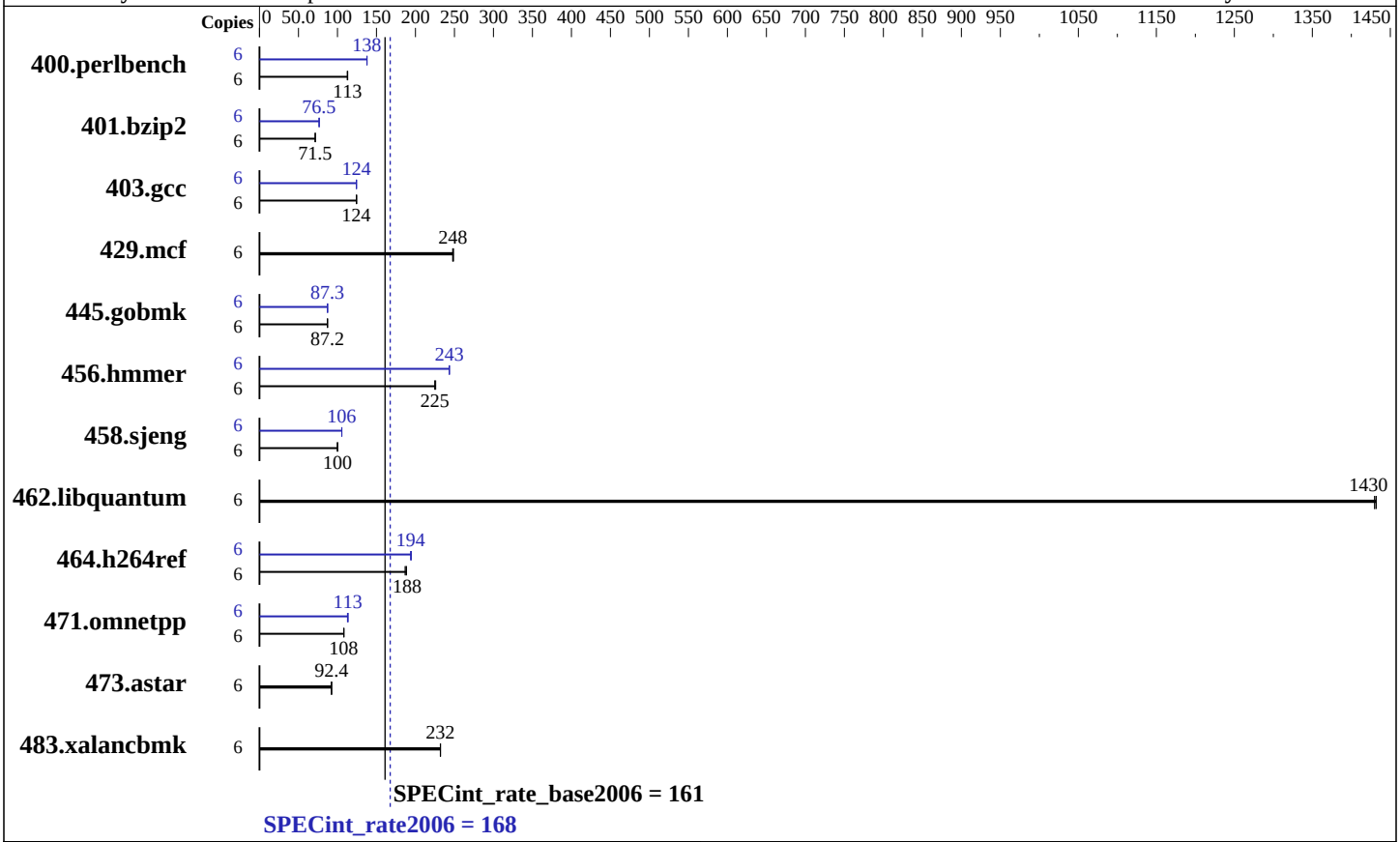
Express5800/R120g-2E (Intel Xeon E5-2603 v4)

SPECint®_rate2006 = 168

SPECint_rate_base2006 = 161

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

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




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2603 v4 |
| CPU Characteristics: | |
| CPU MHz: | 1700 |
| FPU: | Integrated |
| CPU(s) enabled: | 6 cores, 1 chip, 6 cores/chip |
| 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 |
| L3 Cache: | 15 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 128 GB (8 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz) |
| Disk Subsystem: | 1 x 1 TB SATA, 7200 RPM |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 7.2 (Maipo)<br>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 |
| 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 V10.2 |

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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 | 6 | 518 | 113 | 520 | 113 | **520** | **113** | 6 | 426 | 138 | 425 | 138 | **425** | **138** |
| 401.bzip2 | 6 | **810** | **71.5** | 809 | 71.6 | 811 | 71.4 | 6 | 758 | 76.4 | 756 | 76.6 | **757** | **76.5** |
| 403.gcc | 6 | 387 | 125 | 389 | 124 | **389** | **124** | 6 | 389 | 124 | **388** | **124** | 388 | 124 |
| 429.mcf | 6 | **221** | **248** | 221 | 248 | 220 | 249 | 6 | **221** | **248** | 221 | 248 | 220 | 249 |
| 445.gobmk | 6 | 721 | 87.2 | **722** | **87.2** | 722 | 87.1 | 6 | 721 | 87.3 | **721** | **87.3** | 721 | 87.3 |
| 456.hmmer | 6 | **249** | **225** | 249 | 225 | 248 | 226 | 6 | 230 | 243 | 230 | 243 | **230** | **243** |
| 458.sjeng | 6 | **726** | **100** | 726 | 100 | 726 | 100 | 6 | **688** | **106** | 687 | 106 | 688 | 106 |
| 462.libquantum | 6 | **86.9** | **1430** | 86.8 | 1430 | 86.9 | 1430 | 6 | **86.9** | **1430** | 86.8 | 1430 | 86.9 | 1430 |
| 464.h264ref | 6 | 711 | 187 | 704 | 189 | **707** | **188** | 6 | 682 | 195 | **684** | **194** | 685 | 194 |
| 471.omnetpp | 6 | **347** | **108** | 346 | 108 | 347 | 108 | 6 | 332 | 113 | 330 | 114 | **331** | **113** |
| 473.astar | 6 | 456 | 92.3 | **456** | **92.4** | 456 | 92.4 | 6 | 456 | 92.3 | **456** | **92.4** | 456 | 92.4 |
| 483.xalancbmk | 6 | 179 | 232 | 178 | 232 | **178** | **232** | 6 | 179 | 232 | 178 | 232 | **178** | **232** |

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

## Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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
 Patrol Scrub: Disabled
```

## 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
```

## Base Compiler Invocation

C benchmarks:
```
icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
```

C++ benchmarks:
```
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/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/sh -lsmartheap
```

## Base Other Flags

C benchmarks:

403.gcc: `-Dalloca=_alloca`

## Peak Compiler Invocation

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

Continued on next page

## Peak Compiler Invocation (Continued)

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/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

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

Continued on next page

## Peak Optimization Flags (Continued)

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/sh -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-V1.2-120g-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

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