



# SPEC<sup>®</sup> CINT2006 Result

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## NEC Corporation

SPECint<sup>®</sup>\_rate2006 = 795

Express5800/T120g (Intel Xeon E5-2697 v4)

SPECint\_rate\_base2006 = 766

CPU2006 license: 9006

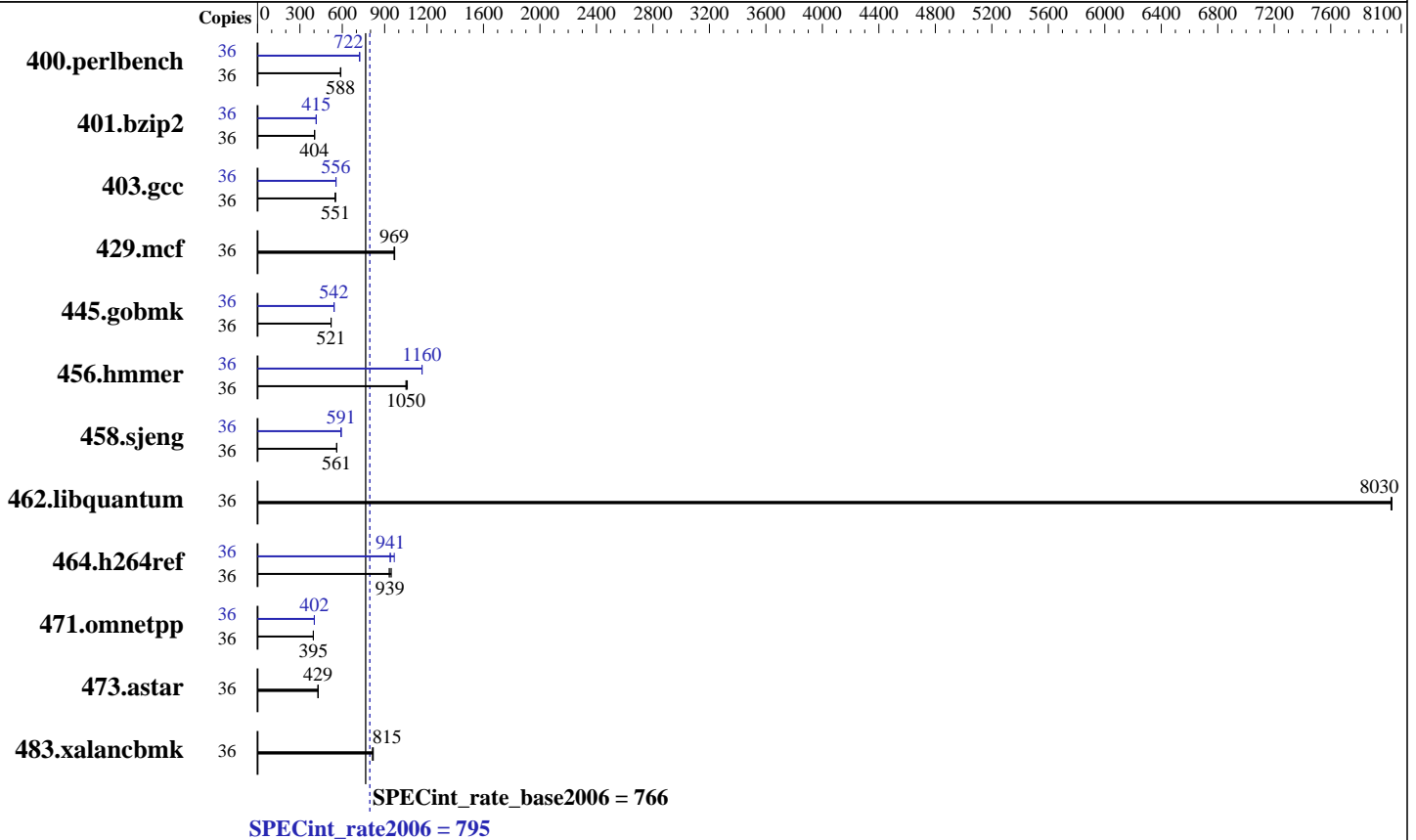
Test date: Mar-2016

Test sponsor: NEC Corporation

Hardware Availability: Apr-2016

Tested by: NEC Corporation

Software Availability: Jan-2016



### 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: 18 cores, 1 chip, 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  
 L3 Cache: 45 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (8 x 16 GB 2Rx4 PC4-2400T-R)  
 Disk Subsystem: 1 x 1 TB SATA, 7200 RPM  
 Other Hardware: None

### 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  
 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  | 36     | 596                | 590                | <b><u>598</u></b> | <b><u>588</u></b> | 599               | 588               | 36     | 488                | 721                | 486               | 724               | <b><u>487</u></b> | <b><u>722</u></b>  |
| 401.bzip2      | 36     | 861                | 403                | <b><u>861</u></b> | <b><u>404</u></b> | 859               | 404               | 36     | 836                | 416                | <b><u>836</u></b> | <b><u>415</u></b> | 836               | 415                |
| 403.gcc        | 36     | 528                | 549                | <b><u>526</u></b> | <b><u>551</u></b> | 525               | 552               | 36     | <b><u>522</u></b>  | <b><u>556</u></b>  | 521               | 556               | 522               | 555                |
| 429.mcf        | 36     | <b><u>339</u></b>  | <b><u>969</u></b>  | 339               | 967               | 338               | 971               | 36     | <b><u>339</u></b>  | <b><u>969</u></b>  | 339               | 967               | 338               | 971                |
| 445.gobmk      | 36     | <b><u>725</u></b>  | <b><u>521</u></b>  | 726               | 520               | 725               | 521               | 36     | 696                | 542                | <b><u>697</u></b> | <b><u>542</u></b> | 697               | 542                |
| 456.hammer     | 36     | <b><u>319</u></b>  | <b><u>1050</u></b> | 317               | 1060              | 319               | 1050              | 36     | 288                | 1160               | 288               | 1170              | <b><u>288</u></b> | <b><u>1160</u></b> |
| 458.sjeng      | 36     | 775                | 562                | <b><u>777</u></b> | <b><u>561</u></b> | 778               | 560               | 36     | 735                | 592                | 737               | 591               | <b><u>736</u></b> | <b><u>591</u></b>  |
| 462.libquantum | 36     | <b><u>92.9</u></b> | <b><u>8030</u></b> | 92.9              | 8030              | 92.9              | 8030              | 36     | <b><u>92.9</u></b> | <b><u>8030</u></b> | 92.9              | 8030              | 92.9              | 8030               |
| 464.h264ref    | 36     | 855                | 932                | 841               | 947               | <b><u>849</u></b> | <b><u>939</u></b> | 36     | 849                | 939                | 823               | 968               | <b><u>847</u></b> | <b><u>941</u></b>  |
| 471.omnetpp    | 36     | 570                | 395                | <b><u>569</u></b> | <b><u>395</u></b> | 569               | 395               | 36     | 559                | 402                | 560               | 402               | <b><u>560</u></b> | <b><u>402</u></b>  |
| 473.astar      | 36     | <b><u>590</u></b>  | <b><u>429</u></b>  | 589               | 429               | 590               | 428               | 36     | <b><u>590</u></b>  | <b><u>429</u></b>  | 589               | 429               | 590               | 428                |
| 483.xalancbmk  | 36     | 305                | 814                | <b><u>305</u></b> | <b><u>815</u></b> | 303               | 820               | 36     | 305                | 814                | <b><u>305</u></b> | <b><u>815</u></b> | 303               | 820                |

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



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## 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

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## 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

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## Peak Optimization Flags (Continued)

456.hmmcr: -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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