



# SPEC® CINT2006 Result

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## NEC Corporation

SPECint®\_rate2006 = 669

Express5800/T120g (Intel Xeon E5-2620 v4)

SPECint\_rate\_base2006 = 636

CPU2006 license: 9006

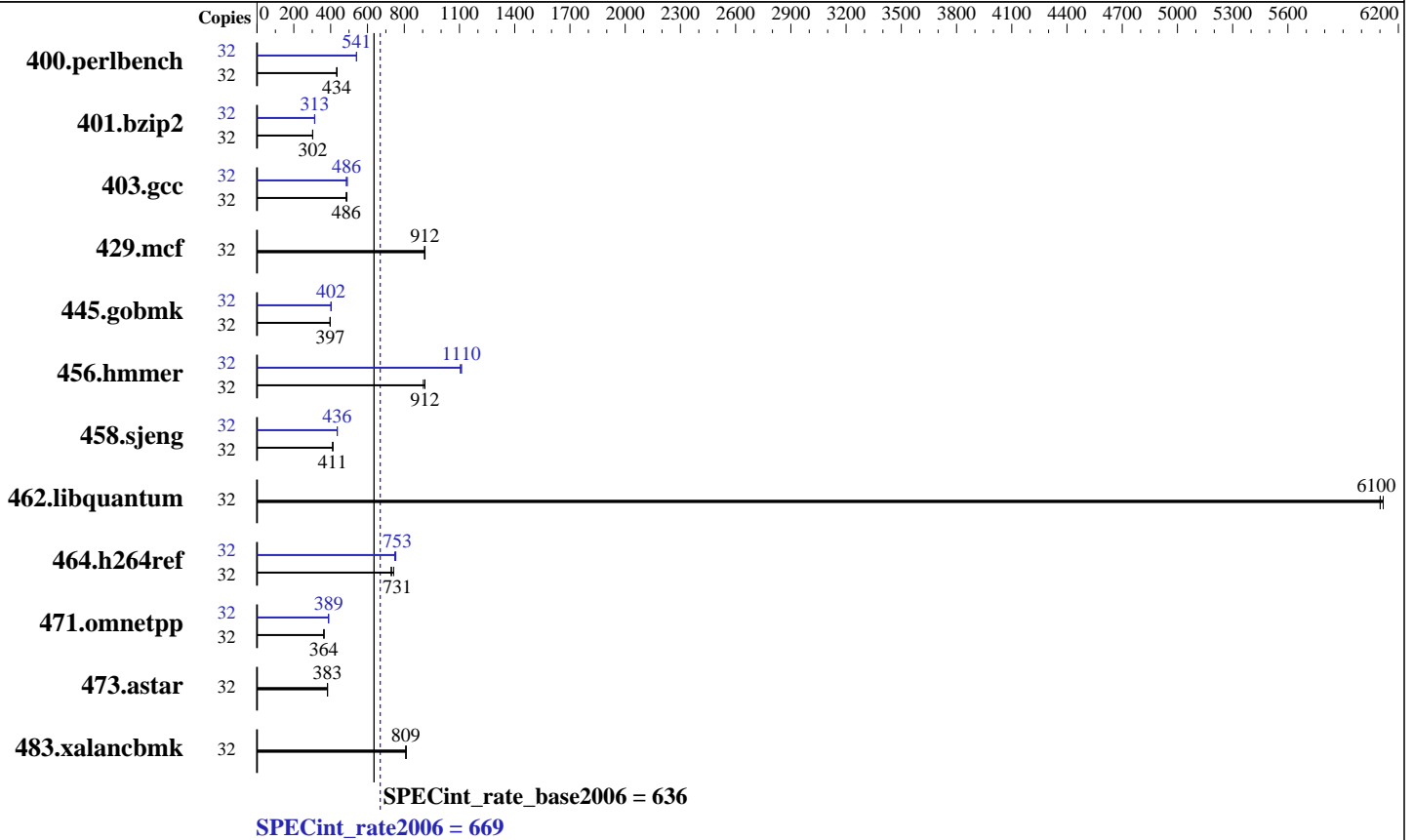
Test date: Mar-2016

Test sponsor: NEC Corporation

Hardware Availability: Apr-2016

Tested by: NEC Corporation

Software Availability: Jan-2016



### Hardware

CPU Name: Intel Xeon E5-2620 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 2 chips, 8 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: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 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)  
 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	32	721	434	721	434	<u>721</u>	<u>434</u>	32	578	541	579	540	<u>578</u>	<u>541</u>
401.bzip2	32	1019	303	<u>1021</u>	<u>302</u>	1022	302	32	988	313	<u>986</u>	<u>313</u>	984	314
403.gcc	32	531	485	<u>531</u>	<u>486</u>	527	489	32	530	486	525	491	<u>530</u>	<u>486</u>
429.mcf	32	<u>320</u>	<u>912</u>	320	913	321	909	32	<u>320</u>	<u>912</u>	320	913	321	909
445.gobmk	32	844	398	<u>845</u>	<u>397</u>	845	397	32	831	404	<u>835</u>	<u>402</u>	836	402
456.hammer	32	327	912	330	904	<u>327</u>	<u>912</u>	32	<u>269</u>	<u>1110</u>	269	1110	270	1100
458.sjeng	32	942	411	940	412	<u>941</u>	<u>411</u>	32	<u>888</u>	<u>436</u>	889	436	888	436
462.libquantum	32	<u>109</u>	<u>6100</u>	108	6120	109	6100	32	<u>109</u>	<u>6100</u>	108	6120	109	6100
464.h264ref	32	954	742	<u>969</u>	<u>731</u>	972	728	32	939	754	<u>940</u>	<u>753</u>	946	748
471.omnetpp	32	<u>550</u>	<u>364</u>	550	364	550	364	32	<u>515</u>	<u>389</u>	515	388	514	389
473.astar	32	<u>587</u>	<u>383</u>	587	382	586	383	32	<u>587</u>	<u>383</u>	587	382	586	383
483.xalancbmk	32	273	808	<u>273</u>	<u>809</u>	272	811	32	273	808	<u>273</u>	<u>809</u>	272	811

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  
Patrol Scrub: Disabled  
Snoop Mode: Home Snoop with Directory

## 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:

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## General Notes (Continued)

```
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/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
```



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## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/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/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

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## Peak Optimization Flags (Continued)

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.hmmr: -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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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