# SPEC® CINT2006 Result

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## SGI

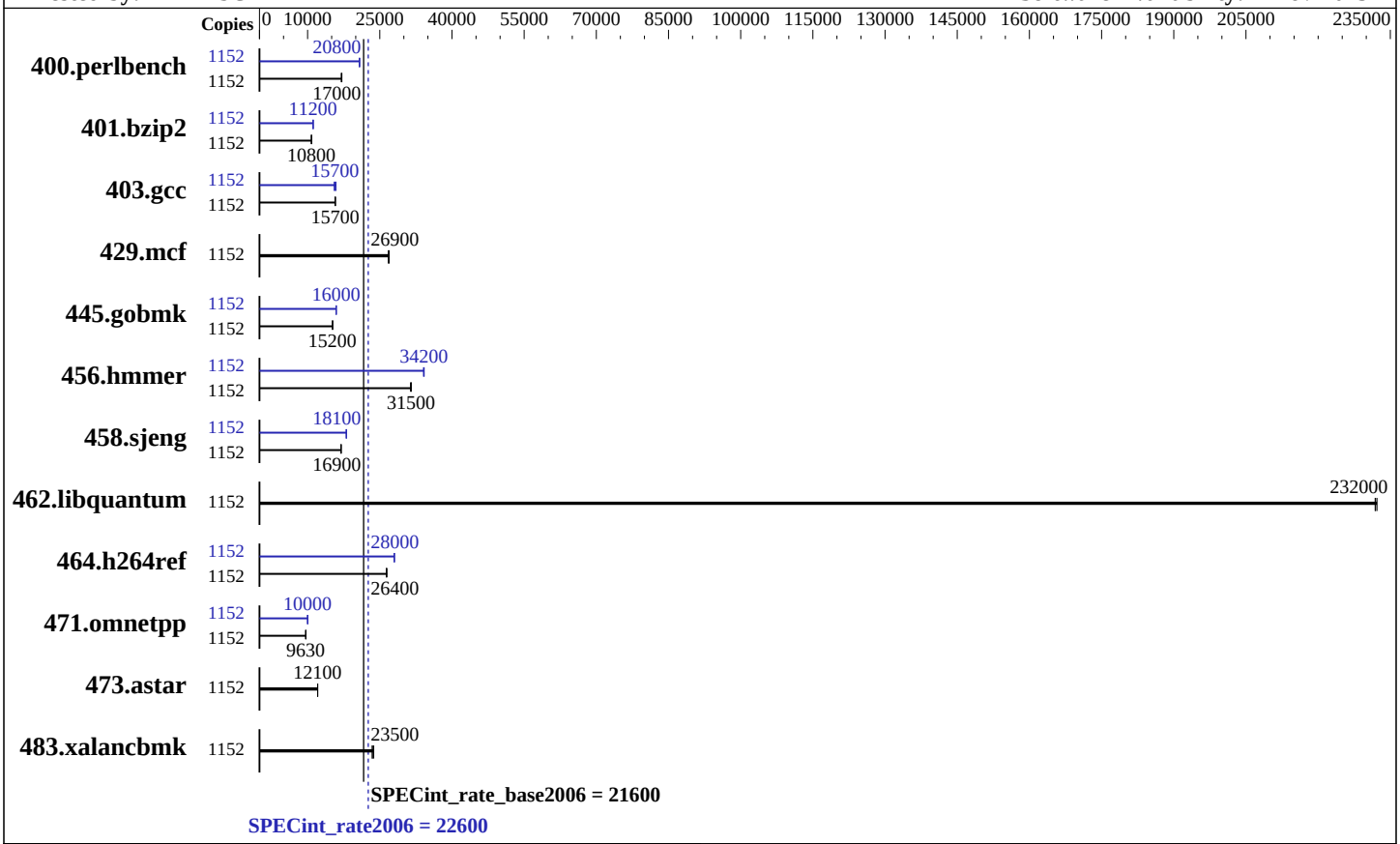
## SGI UV 300 (Intel Xeon E7-8890 v3, 2.5 GHz)

**SPECint®_rate2006 = 22600**

**SPECint_rate_base2006 = 21600**

**CPU2006 license:** 4
**Test sponsor:** SGI
**Tested by:** SGI

**Test date:** Dec-2015
**Hardware Availability:** Sep-2015
**Software Availability:** Nov-2015




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E7-8890 v3 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.30 GHz |
| CPU MHz: | 2500 |
| FPU: | Integrated |
| CPU(s) enabled: | 576 cores, 32 chips, 18 cores/chip, 2 threads/core |
| CPU(s) orderable: | 4-64 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: | 16 TB (512 x 32 GB 2Rx4 PC4-2133P-R, running at 1600 MHz) |
| Disk Subsystem: | 16 TB tmpfs |
| Other Hardware: | None |

## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 11 (x86_64) SP4, Kernel 3.0.101-65.1.9552.0.PTF-default |
| Compiler: | C/C++: Version 16.0.0.109 of Intel C++ Studio XE for Linux |
| Auto Parallel: | No |
| File System: | tmpfs |
| 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 | 1152 | 662 | 17000 | 657 | 17100 | **660** | **17000** | 1152 | 540 | 20800 | 543 | 20700 | **541** | **20800** |
| 401.bzip2 | 1152 | **1029** | **10800** | 1031 | 10800 | 1028 | 10800 | 1152 | **997** | **11200** | 996 | 11200 | 998 | 11100 |
| 403.gcc | 1152 | **589** | **15700** | 591 | 15700 | 587 | 15800 | 1152 | **590** | **15700** | 583 | 15900 | 598 | 15500 |
| 429.mcf | 1152 | **391** | **26900** | 392 | 26800 | 390 | 26900 | 1152 | **391** | **26900** | 392 | 26800 | 390 | 26900 |
| 445.gobmk | 1152 | 795 | 15200 | 796 | 15200 | **796** | **15200** | 1152 | 759 | 15900 | 757 | 16000 | **758** | **16000** |
| 456.hmmer | 1152 | **341** | **31500** | 341 | 31500 | 342 | 31400 | 1152 | **314** | **34200** | 314 | 34200 | 315 | 34100 |
| 458.sjeng | 1152 | 820 | 17000 | **823** | **16900** | 823 | 16900 | 1152 | 773 | 18000 | 772 | 18100 | **772** | **18100** |
| 462.libquantum | 1152 | 103 | 232000 | **103** | **232000** | 103 | 232000 | 1152 | 103 | 232000 | **103** | **232000** | 103 | 232000 |
| 464.h264ref | 1152 | 967 | 26400 | 962 | 26500 | **967** | **26400** | 1152 | **910** | **28000** | 909 | 28100 | 911 | 28000 |
| 471.omnetpp | 1152 | **748** | **9630** | 748 | 9630 | 750 | 9600 | 1152 | **719** | **10000** | 720 | 10000 | 719 | 10000 |
| 473.astar | 1152 | 668 | 12100 | **669** | **12100** | 669 | 12100 | 1152 | 668 | 12100 | **669** | **12100** | 669 | 12100 |
| 483.xalancbmk | 1152 | **339** | **23500** | 335 | 23700 | 339 | 23400 | 1152 | **339** | **23500** | 335 | 23700 | 339 | 23400 |

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"

Tmpfs filesystem set up with:
  mkdir -p /mnt/shm/cpu2006-ic16
  mount -t tmpfs -o size=16384G,rw tmpfs /mnt/shm/cpu2006-ic16

Turbo mode activated with:
  modprobe acpi_cpufreq
  cpupower frequency-set -u 3300MHz -d 3300MHz -g performance
```

## Platform Notes

```
BT Mode set to Auto-select
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/mnt/shm/cpu2006-ic16/libs/32:/mnt/shm/cpu2006-ic16/libs/64:/mnt/shm/cpu2006-ic16/sh"

Transparent Huge Pages enabled with:
```

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## General Notes (Continued)

```
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 -m32 -L/sw/sdev/intel/parallel_studio_xe_2016/compilers_and_libraries/linux/lib/ia32_lin
```

C++ benchmarks:

```
icpc -m32 -L/sw/sdev/intel/parallel_studio_xe_2016/compilers_and_libraries/linux/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/root/cpu2006-ic16/sh -lsmartheap
```

## Base Other Flags

C benchmarks:

Continued on next page

## Base Other Flags (Continued)

403.gcc: `-Dalloca=_alloca`

## Peak Compiler Invocation

C benchmarks (except as noted below):
`icc -m32 -L/sw/sdev/intel/parallel_studio_xe_2016/compilers_and_libraries/linux/lib/ia32_lin`

400.perlbench: `icc -m64`

401.bzip2: `icc -m64`

456.hmmer: `icc -m64`

458.sjeng: `icc -m64`

C++ benchmarks:
`icpc -m32 -L/sw/sdev/intel/parallel_studio_xe_2016/compilers_and_libraries/linux/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/root/cpu2006-ic16/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/SGI-UV300-Platform-Flags.20160112.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/SGI-UV300-Platform-Flags.20160112.xml


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