# SPEC® CINT2006 Result

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## HITACHI

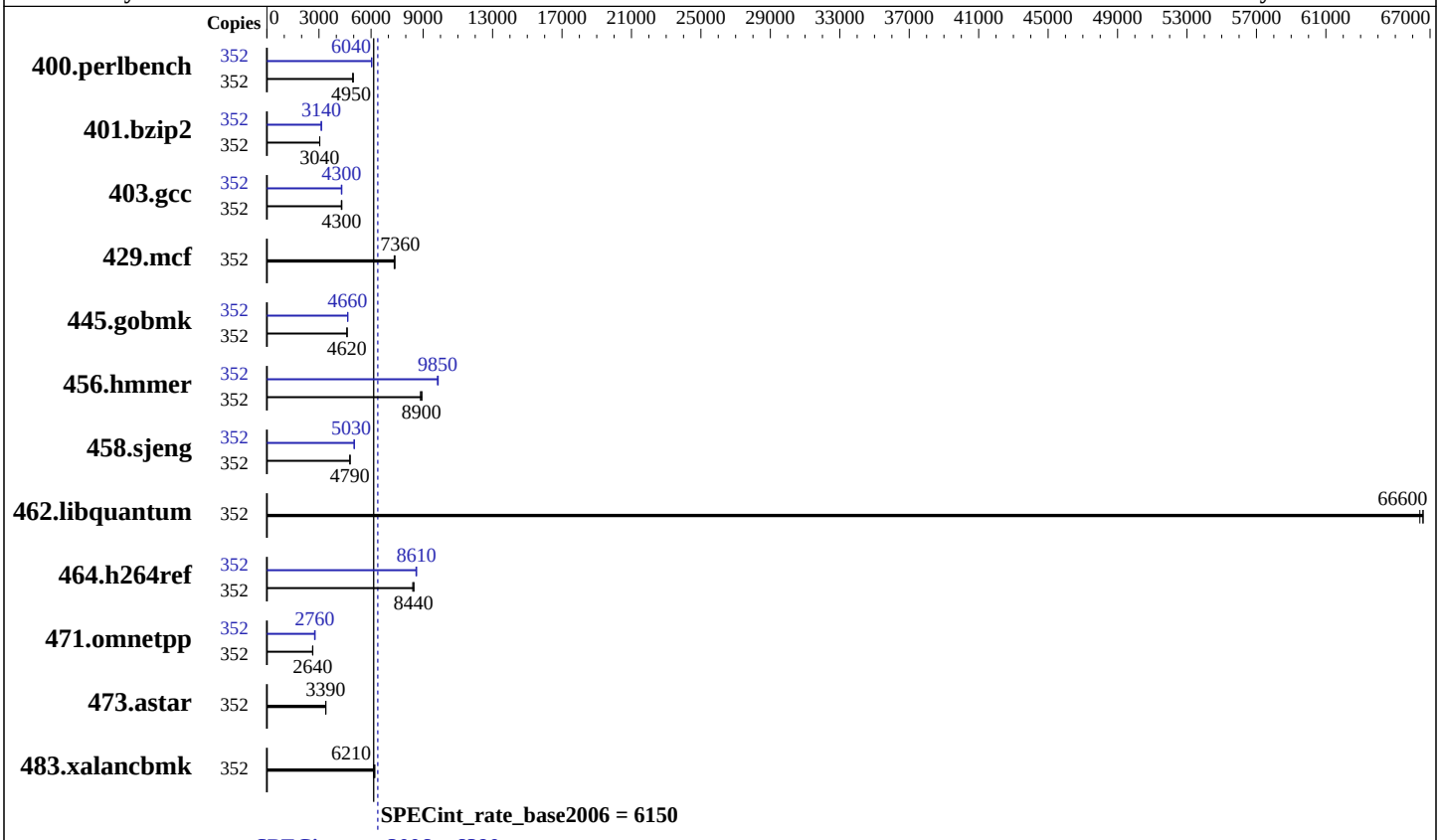
BladeSymphony BS2500 (Intel Xeon E7-8880 v4)

SPECint®_rate2006 = 6390

SPECint_rate_base2006 = 6150

**CPU2006 license:** 35
**Test sponsor:** HITACHI
**Tested by:** HITACHI

**Test date:** Oct-2016
**Hardware Availability:** Sep-2016
**Software Availability:** Mar-2016




### 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: | 176 cores, 8 chips, 22 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1,2,3,4,8 chip |
| 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: | 2 TB (128 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz) |
| Disk Subsystem: | 2 x 600 GB SAS, 15000 RPM, RAID1 |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 7.2 (Maipo)<br>3.10.0-327.el7.x86_64 |
| Compiler: | C/C++: Version 16.0.2.181 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 |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 400.perlbench | 352 | 691 | 4980 | 695 | 4950 | **694** | **4950** | 352 | **570** | **6040** | 570 | 6040 | 571 | 6020 |
| 401.bzip2 | 352 | 1117 | 3040 | 1115 | 3050 | **1116** | **3040** | 352 | 1082 | 3140 | **1083** | **3140** | 1083 | 3140 |
| 403.gcc | 352 | 656 | 4320 | **659** | **4300** | 660 | 4290 | 352 | 660 | 4290 | **659** | **4300** | 656 | 4320 |
| 429.mcf | 352 | 438 | 7330 | 435 | 7370 | **436** | **7360** | 352 | 438 | 7330 | 435 | 7370 | **436** | **7360** |
| 445.gobmk | 352 | **800** | **4620** | 800 | 4610 | 800 | 4620 | 352 | **793** | **4660** | 794 | 4650 | 792 | 4660 |
| 456.hmmer | 352 | 368 | 8930 | 371 | 8840 | **369** | **8900** | 352 | 333 | 9870 | 334 | 9830 | **334** | **9850** |
| 458.sjeng | 352 | 890 | 4790 | 890 | 4780 | **890** | **4790** | 352 | **846** | **5030** | 846 | 5040 | 847 | 5030 |
| 462.libquantum | 352 | 110 | 66600 | **110** | **66600** | 110 | 66400 | 352 | 110 | 66600 | **110** | **66600** | 110 | 66400 |
| 464.h264ref | 352 | 920 | 8470 | 927 | 8400 | **922** | **8440** | 352 | 907 | 8590 | **905** | **8610** | 904 | 8620 |
| 471.omnetpp | 352 | 831 | 2650 | **833** | **2640** | 836 | 2630 | 352 | 801 | 2750 | 793 | 2780 | **796** | **2760** |
| 473.astar | 352 | 728 | 3390 | **728** | **3390** | 729 | 3390 | 352 | 728 | 3390 | **728** | **3390** | 729 | 3390 |
| 483.xalancbmk | 352 | **391** | **6210** | 394 | 6160 | 391 | 6210 | 352 | **391** | **6210** | 394 | 6160 | 391 | 6210 |

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 configuration:
 Memory Power Management = Automatic
 Active Energy Manager = "Capping Disabled"
 Power/Performance Bias="OS Controlled"
 C1 Enhanced Mode = Disable
 C-States =  Legacy
 Processor Performance States = Disable
 Sysinfo program /home/shm/cpu2006/config/sysinfo.rev6914
 $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
 running on rhel7264 Mon Oct  3 18:59:07 2016

 This section contains SUT (System Under Test) info as seen by
 some common utilities.  To remove or add to this section, see:
   http://www.spec.org/cpu2006/Docs/config.html#sysinfo

 From /proc/cpuinfo
    model name : Intel(R) Xeon(R) CPU E7-8880 v4 @ 2.20GHz
```

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## Platform Notes (Continued)

```
        8 "physical id"s (chips)
        352 "processors"
     cores, siblings (Caution: counting these is hw and system dependent.  The
     following excerpts from /proc/cpuinfo might not be reliable.  Use with
     caution.)
        cpu cores : 22
        siblings  : 44
        physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
        physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
        physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
        physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
        physical 4: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
        physical 5: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
        physical 6: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
        physical 7: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
        28
     cache size : 56320 KB

  From /proc/meminfo
     MemTotal:       2112861176 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.2 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VERSION_ID="7.2"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"
        ANSI_COLOR="0;31"
        CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
     redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
     system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

  uname -a:
     Linux rhel7264 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015
     x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Oct 3 18:48

  SPEC is set to: /home/shm/cpu2006
     Filesystem     Type   Size  Used Avail Use% Mounted on
```

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## Platform Notes (Continued)

```
    tmpfs           tmpfs 1000G  8.0G  993G   1% /home/shm
 Additional information from dmidecode:

    Warning: Use caution when you interpret this section. The 'dmidecode' program
    reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to
    hardware, firmware, and the "DMTF SMBIOS" standard.

   BIOS HITACHI 11-04 08/29/2016
   Memory:
    52x 0x0000 M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    6x 0x0003 M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    2x 0x0004 M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    2x 0x0201 M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    2x 0x5C00 M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz
    64x NO DIMM Unknown
    64x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz, configured at 1600 MHz

 (End of data from sysinfo program)
```

## General Notes

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

 Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB
 memory using RedHat EL 7.2 glibc 2.17
 Transparent Huge Pages enabled with:
 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>
 Hitachi Compute Blade 520X and BladeSymphony BS2500 are electronically equivalent.
 The results have been measured on a Hitachi Compute Blade 520X.
```

# 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`

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

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

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## Peak Optimization Flags (Continued)

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/PlatformHitachi-V1.7.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/PlatformHitachi-V1.7.xml`


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