# SPEC® CINT2006 Result

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## Dell Inc.

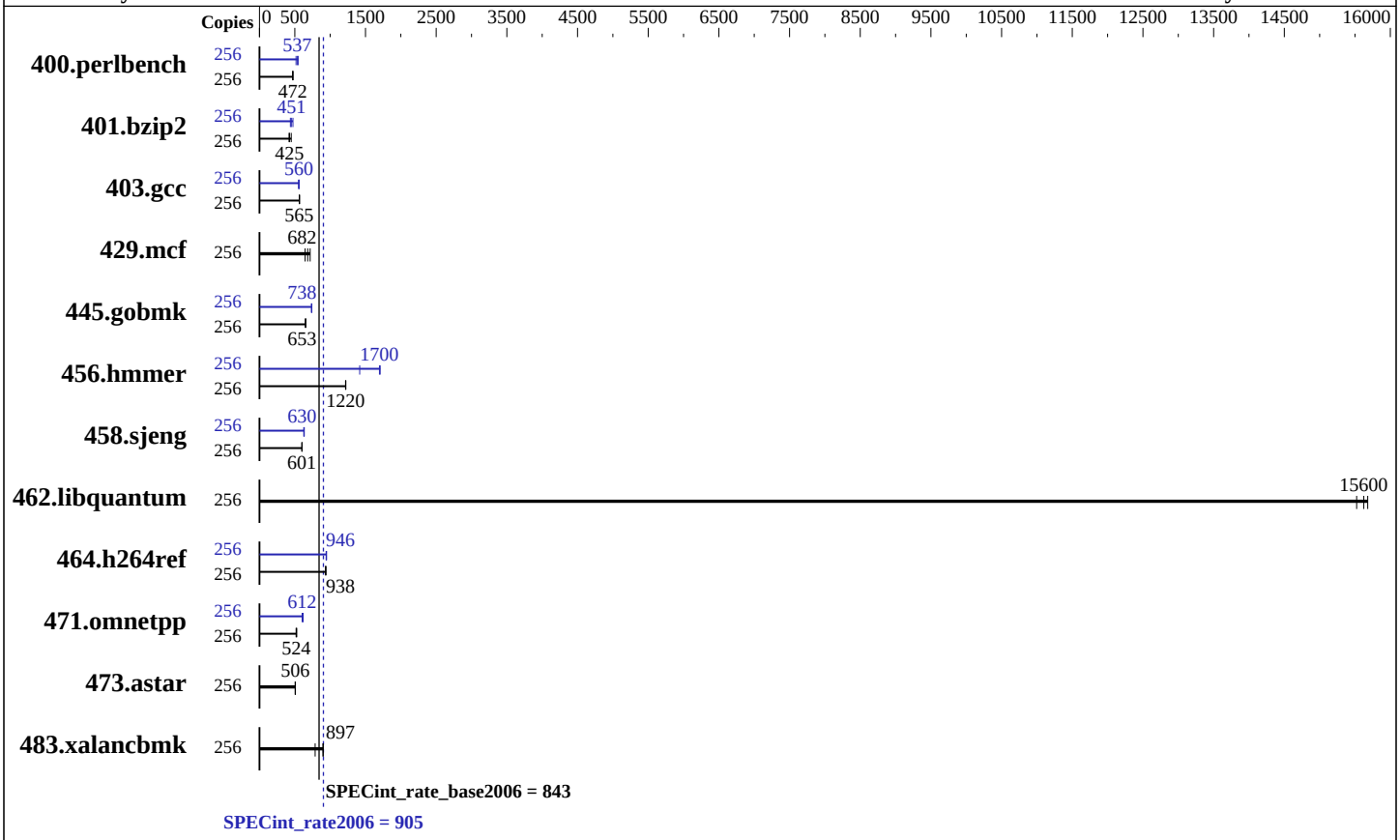
PowerEdge C6320P (Intel Xeon Phi 7210F 1.30 GHz)

SPECint®_rate2006 = 905

SPECint_rate_base2006 = 843

**CPU2006 license:** 55
**Test sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test date:** Mar-2017
**Hardware Availability:** Mar-2017
**Software Availability:** Jan-2017




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Phi 7210F |
| CPU Characteristics: | Intel Turbo Boost Technology up to 1.50 GHz |
| CPU MHz: | 1300 |
| FPU: | Integrated |
| CPU(s) enabled: | 64 cores, 1 chip, 64 cores/chip, 4 threads/core |
| CPU(s) orderable: | 1 chip |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 1 MB I+D on chip per two cores |
| L3 Cache: | None |
| Other Cache: | None |
| Memory: | 400 GB (6 x 64 GB 2Rx8 PC4-2400T-R, running at 2133 MHz + 8 x 2 GB 6400 MHz MCDRAM) |
| Disk Subsystem: | 1 x 1 TB 7.2K RPM SATA |
| Other Hardware: | None |

## Software

| | |
|---|---|
| Operating System: | CentOS Linux release 7.3.1611 (Core) 3.10.0-514.2.2.el7.x86_64 |
| Compiler: | C/C++: Version 16.0.2.181 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 |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 400.perlbench | 256 | 5323 | 470 | **5302** | **472** | 5279 | 474 | 256 | 4836 | 517 | **4658** | **537** | 4575 | 547 |
| 401.bzip2 | 256 | **5811** | **425** | 5903 | 419 | 5500 | 449 | 256 | **5476** | **451** | 5650 | 437 | 5216 | 474 |
| 403.gcc | 256 | 3636 | 567 | **3650** | **565** | 3657 | 564 | 256 | 3678 | 560 | 3731 | 552 | **3682** | **560** |
| 429.mcf | 256 | 3619 | 645 | **3424** | **682** | 3256 | 717 | 256 | 3619 | 645 | **3424** | **682** | 3256 | 717 |
| 445.gobmk | 256 | 4105 | 654 | 4136 | 649 | **4114** | **653** | 256 | **3638** | **738** | 3653 | 735 | 3624 | 741 |
| 456.hmmer | 256 | 1962 | 1220 | **1958** | **1220** | 1956 | 1220 | 256 | **1407** | **1700** | 1685 | 1420 | 1399 | 1710 |
| 458.sjeng | 256 | 5160 | 600 | **5154** | **601** | 5142 | 602 | 256 | **4914** | **630** | 4888 | 634 | 4939 | 627 |
| 462.libquantum | 256 | 342 | 15500 | **339** | **15600** | 338 | 15700 | 256 | 342 | 15500 | **339** | **15600** | 338 | 15700 |
| 464.h264ref | 256 | **6037** | **938** | 6075 | 933 | 6025 | 940 | 256 | 5969 | 949 | **5988** | **946** | 6010 | 943 |
| 471.omnetpp | 256 | 3088 | 518 | **3056** | **524** | 3040 | 526 | 256 | 2590 | 618 | 2653 | 603 | **2614** | **612** |
| 473.astar | 256 | **3549** | **506** | 3552 | 506 | 3542 | 507 | 256 | **3549** | **506** | 3552 | 506 | 3542 | 507 |
| 483.xalancbmk | 256 | 2243 | 787 | 1956 | 903 | **1969** | **897** | 256 | 2243 | 787 | 1956 | 903 | **1969** | **897** |

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

```
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Tue Mar 28 06:17:58 2017

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) Genuine Intel(R) CPU 0000 @ 1.30GHz
      1 "physical id"s (chips)
      256 "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 : 64
      siblings  : 256
```

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## Platform Notes (Continued)

```
        physical 0: cores 0 1 10 11 12 13 14 15 18 19 20 21 22 23 24 25 26 27 28
        29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
        56 57 58 59 60 61 62 63 64 65 68 69 70 71 72 73
     cache size : 1024 KB

  From /proc/meminfo
     MemTotal:       395950388 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     centos-release: CentOS Linux release 7.3.1611 (Core)
     centos-release-upstream: Derived from Red Hat Enterprise Linux 7.3 (Source)
     os-release:
        NAME="CentOS Linux"
        VERSION="7 (Core)"
        ID="centos"
        ID_LIKE="rhel fedora"
        VERSION_ID="7"
        PRETTY_NAME="CentOS Linux 7 (Core)"
        ANSI_COLOR="0;31"
        CPE_NAME="cpe:/o:centos:centos:7"
     redhat-release: CentOS Linux release 7.3.1611 (Core)
     system-release: CentOS Linux release 7.3.1611 (Core)
     system-release-cpe: cpe:/o:centos:centos:7

  uname -a:
     Linux localhost.localdomain 3.10.0-514.2.2.el7.x86_64 #1 SMP Tue Dec 6
     23:06:41 UTC 2016 x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Mar 28 06:14 last=5

  SPEC is set to: /root/cpu2006-1.2
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sdc1      ext4  847G  525G  280G  66% /
  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 Dell Inc. 1.1.9 03/22/2017
    Memory:
     8x INTEL N/A 2 GB 6400 MHz
     6x Samsung M386A8K40BMB-CRC 64 GB 4 rank 2400 MHz, configured at 2133 MHz

  (End of data from sysinfo program)
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"

 Binaries compiled on a system with
 Intel 2nd Generation Xeon Phi CPU
 + 96GB DDR4 RAM memory using RedHat EL 7.2
 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/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:

```
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch
```

C++ benchmarks:

```
-xMIC-AVX512 -ipo -O3 -no-prec-div -opt-prefetch -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: `-xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen`(pass 1)
`-prof-use`(pass 2) `-par-num-threads=1`(pass 1) `-auto-ilp32`

401.bzip2: `-xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen`(pass 1)
`-prof-use`(pass 2) `-par-num-threads=1`(pass 1) `-opt-prefetch`
`-auto-ilp32 -ansi-alias`

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## Peak Optimization Flags (Continued)

403.gcc: -xMIC-AVX512 -ipo -O3 -no-prec-div

429.mcf: basepeak = yes

445.gobmk: -xMIC-AVX512(pass 2) -prof-gen(pass 1) -par-num-threads=1(pass 1) -prof-use(pass 2) -ansi-alias

456.hmmer: -xMIC-AVX512 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32

458.sjeng: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1) -prof-use(pass 2) -par-num-threads=1(pass 1) -unroll4 -auto-ilp32

462.libquantum: basepeak = yes

464.h264ref: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1) -prof-use(pass 2) -par-num-threads=1(pass 1) -unroll2 -ansi-alias

C++ benchmarks:

471.omnetpp: -xMIC-AVX512 -ipo -O3 -no-prec-div -prof-gen(pass 1) -prof-use(pass 2) -par-num-threads=1(pass 1) -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-revB.html
http://www.spec.org/cpu2006/flags/Default-Platform-Flags.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-revB.xml
http://www.spec.org/cpu2006/flags/Default-Platform-Flags.xml

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