SPEC® CINT2006 Result

Dell Inc.

PowerEdge C6320P (Intel Xeon Phi 7230F 1.30 GHz)

$SPECint^{®}\_rate2006 =$ 994

$SPECint\_rate\_base2006 =$ 926
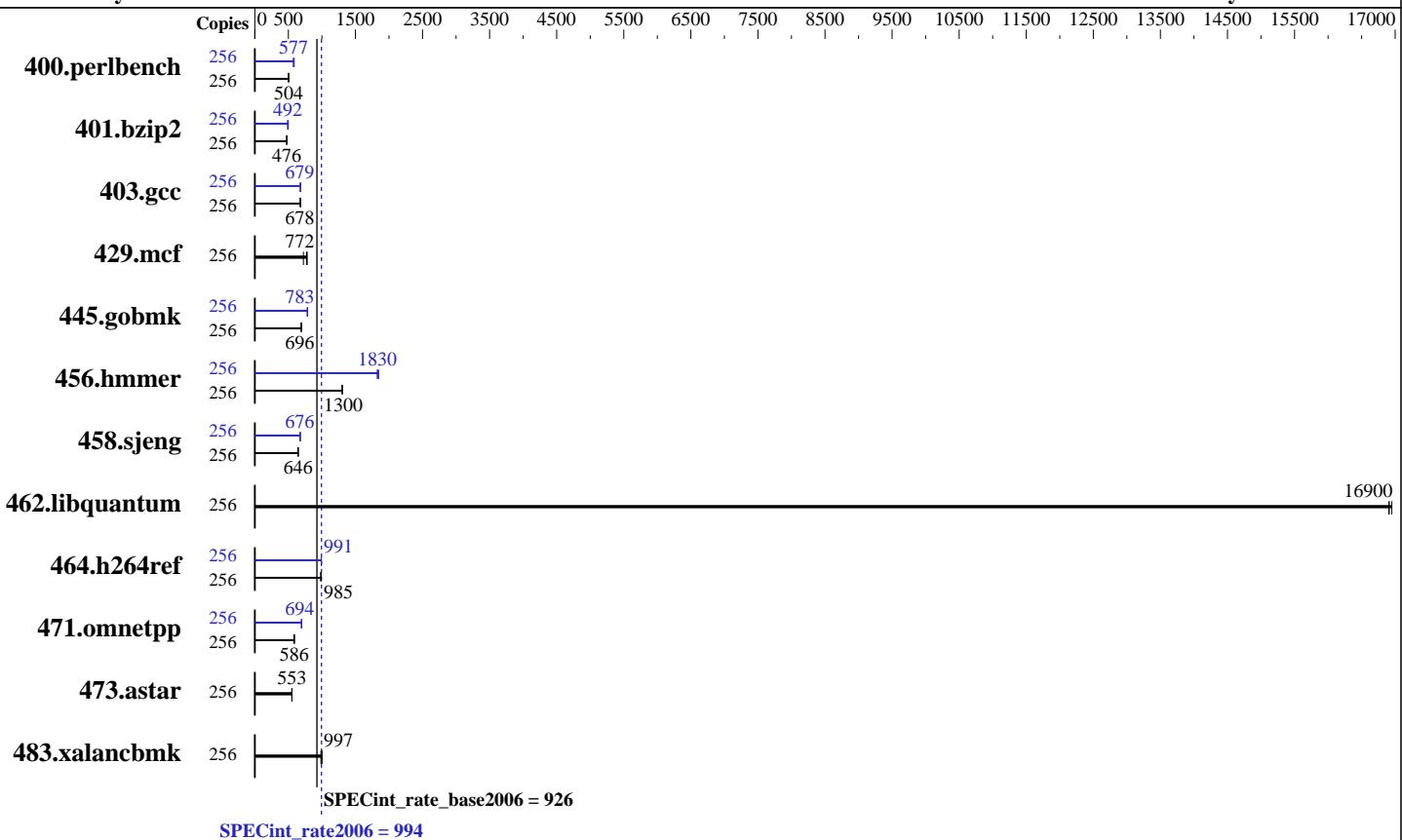
CPU2006 license: 13
Test sponsor: Dell Inc.
Tested by: Dell Inc.

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

Benchmark results chart (Copies = 256 for all benchmarks):

- 400.perlbench: 577 (peak), 504 (base)
- 401.bzip2: 492 (peak), 476 (base)
- 403.gcc: 679 (peak), 678 (base)
- 429.mcf: 772
- 445.gobmk: 783 (peak), 696 (base)
- 456.hmmer: 1830 (peak), 1300 (base)
- 458.sjeng: 676 (peak), 646 (base)
- 462.libquantum: 16900
- 464.h264ref: 991 (peak), 985 (base)
- 471.omnetpp: 694 (peak), 586 (base)
- 473.astar: 553
- 483.xalancbmk: 997

SPECint_rate_base2006 = 926
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Hardware

CPU Name:	Intel Xeon Phi 7230F
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 + 8 x 2 GB 6400 MHz MCDRAM)
Disk Subsystem:	1 x 1 TB 7.2K RPM SATA
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 12 (x86_64) SP2 4.4.16-56-default
Compiler:	C/C++: Version 16.0.2.181 of Intel C++ Studio XE for Linux
Auto Parallel:	No
File System:	btrfs
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	256	4949	505	**4961**	**504**	4993	501	256	4343	576	**4333**	**577**	4260	587
401.bzip2	256	5193	476	**5193**	**476**	5188	476	256	**5017**	**492**	5052	489	4949	499
403.gcc	256	3054	675	**3038**	**678**	3014	684	256	**3033**	**679**	3040	678	3030	680
429.mcf	256	3225	724	**3025**	**772**	2991	781	256	3225	724	**3025**	**772**	2991	781
445.gobmk	256	3905	688	**3861**	**696**	3858	696	256	3420	785	3432	782	**3430**	**783**
456.hmmer	256	1838	1300	1829	1310	**1831**	**1300**	256	1309	1830	**1305**	**1830**	1294	1850
458.sjeng	256	4788	647	4807	644	**4797**	**646**	256	4586	675	**4581**	**676**	4574	677
462.libquantum	256	314	16900	**314**	**16900**	313	17000	256	314	16900	**314**	**16900**	313	17000
464.h264ref	256	5739	987	5755	984	**5752**	**985**	256	5715	991	**5717**	**991**	5718	991
471.omnetpp	256	2704	592	**2732**	**586**	2739	584	256	2287	699	2307	694	**2304**	**694**
473.astar	256	3256	552	**3250**	**553**	3245	554	256	3256	552	**3250**	**553**	3245	554
483.xalancbmk	256	1793	985	1764	1000	**1772**	**997**	256	1793	985	1764	1000	**1772**	**997**

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 linux-z6tq Fri Mar 31 22:07:48 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) Xeon Phi(TM) CPU 7230F @ 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 66 67 68 69 70 71 72 73
    cache size : 1024 KB

  From /proc/meminfo
    MemTotal:       396136268 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
    SuSE-release:
        SUSE Linux Enterprise Server 12 (x86_64)
        VERSION = 12
        PATCHLEVEL = 2
        # This file is deprecated and will be removed in a future service pack or
        release.
        # Please check /etc/os-release for details about this release.
    os-release:
        NAME="SLES"
        VERSION="12-SP2"
        VERSION_ID="12.2"
        PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
    Linux linux-z6tq 4.4.16-56-default #1 SMP Mon Aug 8 14:24:26 UTC 2016
    (5b281a8) x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Mar 31 22:06

  SPEC is set to: /root/cpu2006-1.2
    Filesystem      Type   Size  Used Avail Use% Mounted on
    /dev/sdb2       btrfs  930G  533G  394G  58% /
  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. 1.1.7 003/003/2017
    Memory:
    6x Hynix HMAA8GL7MMR4N-UH 64 GB 4 rank 2400 MHz
    8x INTEL N/A 2 GB 7200 MHz

  (End of data from sysinfo program)
```

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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
```

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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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