SPEC® CINT2006 Result

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Dell Inc.

PowerEdge C6320P (Intel Xeon Phi 7290 1.50 GHz)

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

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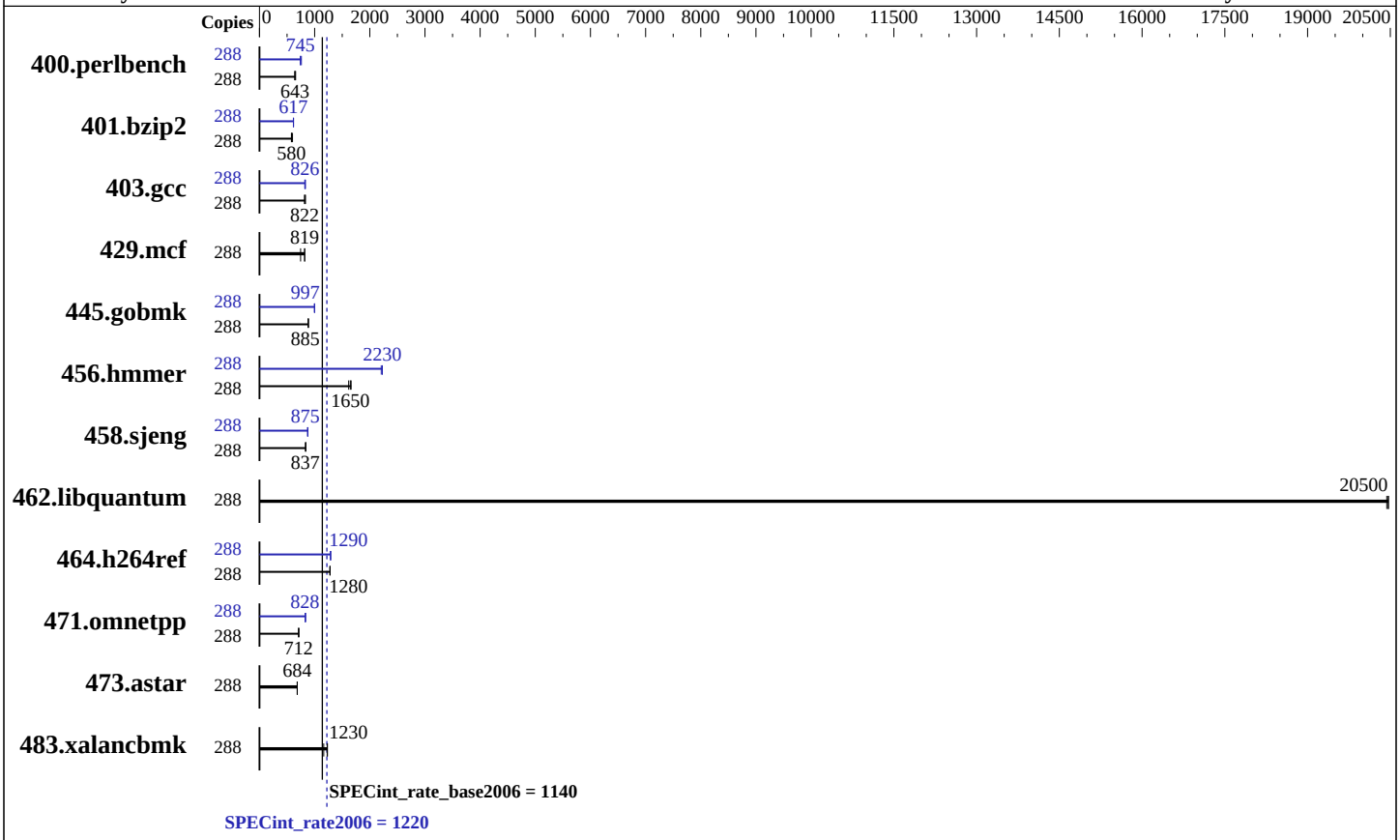
Hardware Availability: Jan-2017
Software Availability: Jan-2017



Hardware

CPU Name:	Intel Xeon Phi 7290
CPU Characteristics:	Intel Turbo Boost Technology up to 1.70 GHz
CPU MHz:	1500
FPU:	Integrated
CPU(s) enabled:	72 cores, 1 chip, 72 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 7200 MHz MCDRAM)
Disk Subsystem:	1 x 1 TB 7.2K SATA
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 12 SP2 (x86_64) 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:	xfs
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	288	4294	655	4396	640	**4376**	**643**	288	3807	739	**3777**	**745**	3702	760
401.bzip2	288	**4790**	**580**	4800	579	4640	599	288	4505	617	4519	615	**4505**	**617**
403.gcc	288	2840	816	**2820**	**822**	2780	834	288	**2806**	**826**	2822	822	2781	834
429.mcf	288	3524	745	3208	819	**3208**	**819**	288	3524	745	3208	819	**3208**	**819**
445.gobmk	288	3407	887	3419	884	**3415**	**885**	288	**3029**	**997**	3029	997	3021	1000
456.hmmer	288	1617	1660	1662	1620	**1631**	**1650**	288	**1207**	**2230**	1217	2210	1206	2230
458.sjeng	288	4166	837	**4165**	**837**	4162	837	288	**3985**	**875**	3988	874	3978	876
462.libquantum	288	292	20400	292	20500	**292**	**20500**	288	292	20400	292	20500	**292**	**20500**
464.h264ref	288	**4985**	**1280**	4982	1280	4986	1280	288	4941	1290	4954	1290	**4944**	**1290**
471.omnetpp	288	2528	712	2541	708	**2529**	**712**	288	**2174**	**828**	2176	827	2148	838
473.astar	288	2950	685	2954	684	**2954**	**684**	288	2950	685	2954	684	**2954**	**684**
483.xalancbmk	288	**1620**	**1230**	1706	1160	1612	1230	288	**1620**	**1230**	1706	1160	1612	1230

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 Thu Feb  2 21:35:38 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 7290 @ 1.50GHz
      1 "physical id"s (chips)
      288 "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 : 72
      siblings  : 288
```

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Platform Notes (Continued)

```
        physical 0: cores 0 1 8 9 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 54 55 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:       396132132 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 Feb 2 21:12

  SPEC is set to: /root/cpu2006-1.2
     Filesystem     Type   Size  Used Avail Use% Mounted on
     /dev/sdb2      btrfs  930G   15G  907G   2% /
  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. 1.1.3 12/001/2016
    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)
```

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
 2x Intel 2nd Generation Xeon Phi CPU
 + 96GB DDR4 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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