SPEC® CINT2006 Result

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Dell Inc.

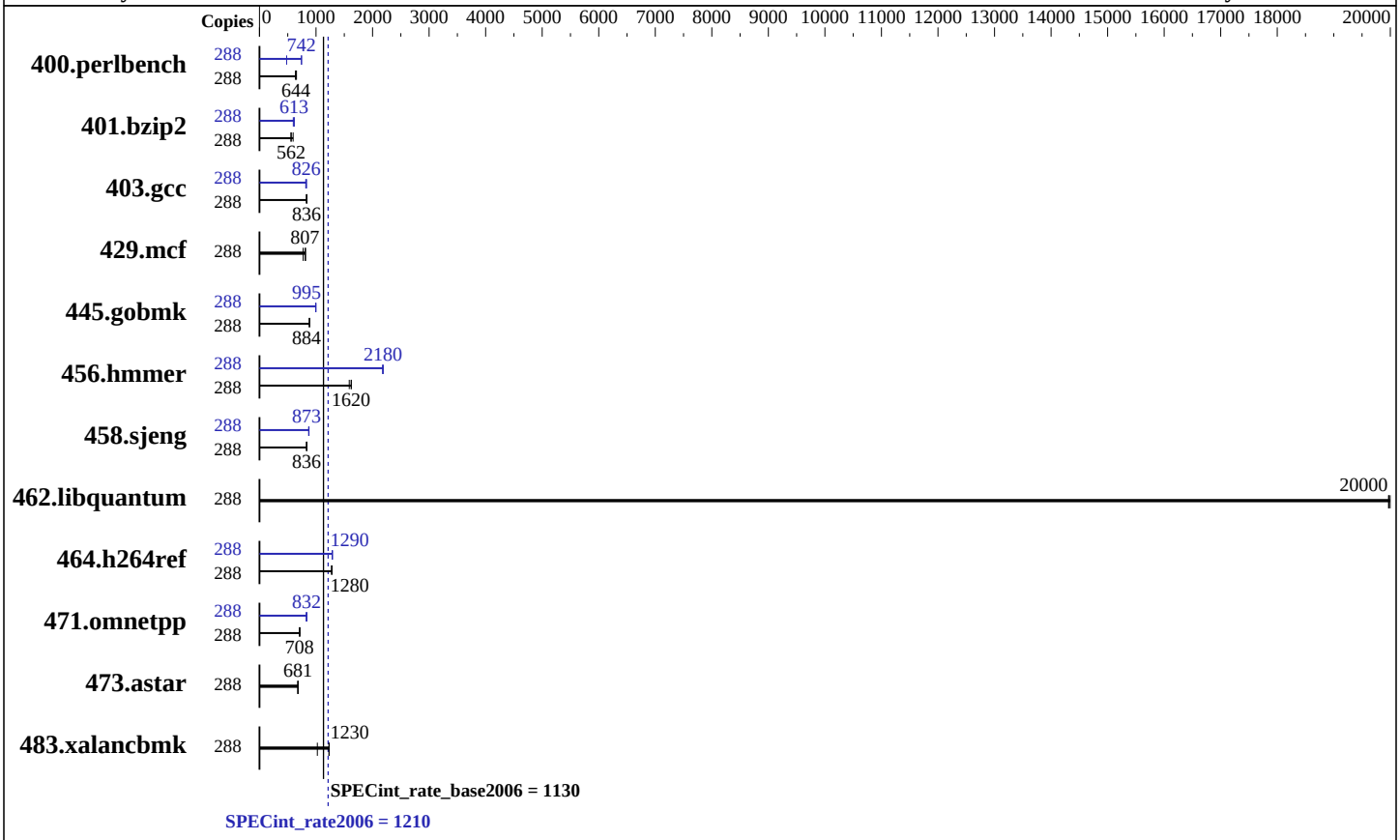
PowerEdge C6320P (Intel Xeon Phi 7290F, 1.50 GHz)

SPECint®_rate2006 = 1210

SPECint_rate_base2006 = 1130

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

Test date: Feb-2017
Hardware Availability: Jan-2017
Software Availability: Jan-2016



Hardware

CPU Name:	Intel Xeon Phi 7290F
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:	btrfs
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	4299	654	4419	637	**4366**	**644**	288	**3792**	**742**	3780	744	5855	481
401.bzip2	288	5001	556	**4943**	**562**	4671	595	288	4528	614	**4535**	**613**	4649	598
403.gcc	288	**2772**	**836**	2764	839	2800	828	288	2831	819	**2808**	**826**	2787	832
429.mcf	288	3402	772	3219	816	**3254**	**807**	288	3402	772	3219	816	**3254**	**807**
445.gobmk	288	**3419**	**884**	3423	883	3416	884	288	3041	993	**3037**	**995**	3022	1000
456.hmmer	288	1656	1620	1693	1590	**1656**	**1620**	288	**1231**	**2180**	1228	2190	1233	2180
458.sjeng	288	**4170**	**836**	4158	838	4200	830	288	**3990**	**873**	4005	870	3979	876
462.libquantum	288	299	20000	298	20000	**299**	**20000**	288	299	20000	298	20000	**299**	**20000**
464.h264ref	288	4982	1280	4990	1280	**4989**	**1280**	288	4941	1290	4953	1290	**4951**	**1290**
471.omnetpp	288	**2541**	**708**	2546	707	2513	716	288	2150	837	2177	827	**2163**	**832**
473.astar	288	**2969**	**681**	2964	682	2983	678	288	**2969**	**681**	2964	682	2983	678
483.xalancbmk	288	1615	1230	1942	1020	**1616**	**1230**	288	1615	1230	1942	1020	**1616**	**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

```
BIOS settings:
Virtualization Technology disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-z6tq Mon Feb 13 18:18:38 2017

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

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Platform Notes (Continued)

```
  http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Genuine Intel(R) CPU 0000 @ 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
      physical 0: cores 0 1 2 3 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 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 74 75
   cache size : 1024 KB

From /proc/meminfo
   MemTotal:       396132044 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 13 15:41

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
```

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Platform Notes (Continued)

```
     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
 Intel 2nd Generation Xeon Phi CPU
 with 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`

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/Dell-Platform-Flags-PowerEdge14G-revC.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/Dell-Platform-Flags-PowerEdge14G-revC.xml

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