SPEC® CINT2006 Result
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Lenovo Global Technology

$SPECint^{®}_rate2006 = $ 4670

ThinkSystem SN850
(2.10 GHz, Intel Xeon Platinum 8170)

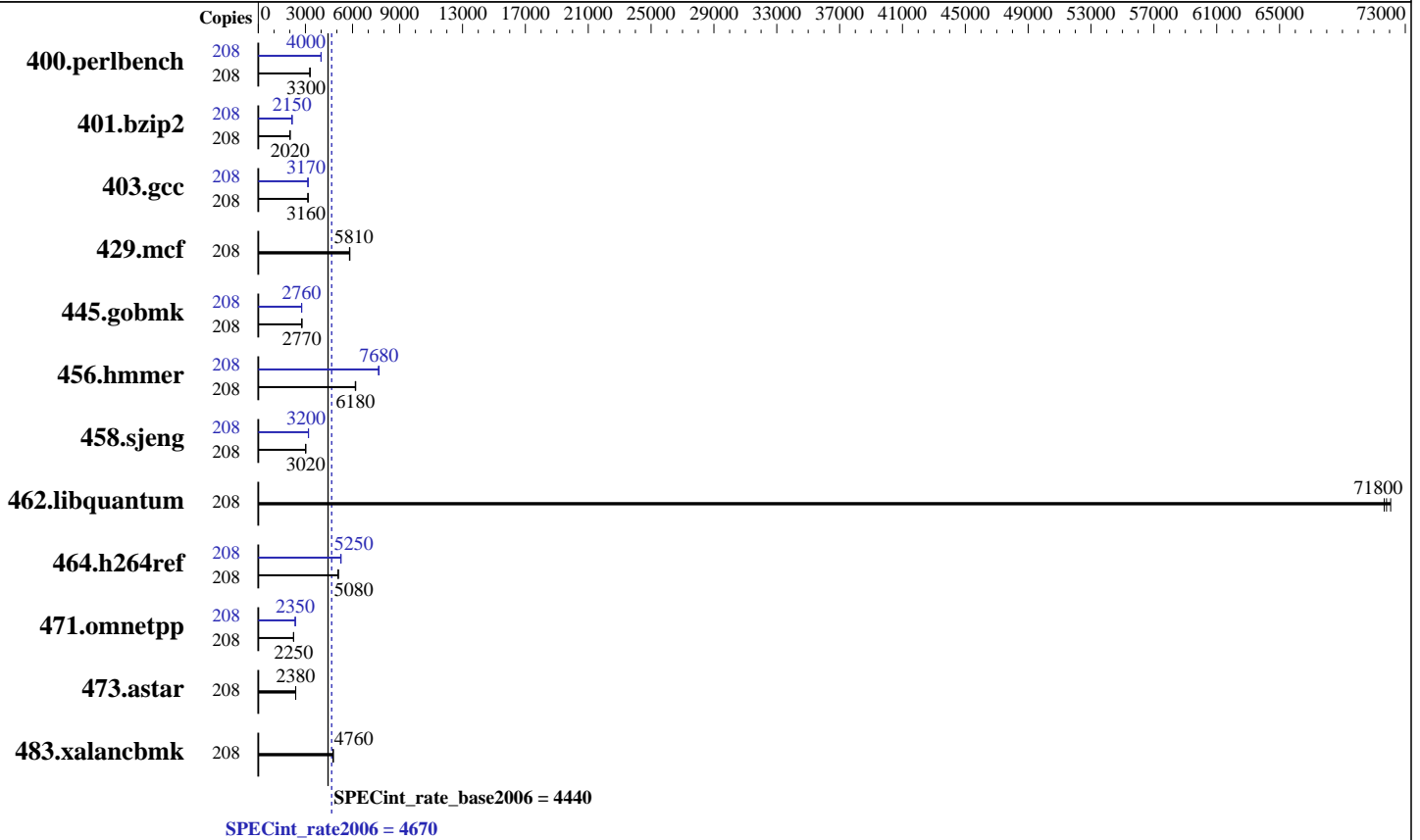$SPECint_rate_base2006 = $ 4440

CPU2006 license: 9017

Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Aug-2017

Hardware Availability: Aug-2017

Software Availability: Nov-2016

Copies | 0 3000 6000 9000 13000 17000 21000 25000 29000 33000 37000 41000 45000 49000 53000 57000 61000 65000 73000

400.perlbench — 208 / 4000, 208 / 3300
401.bzip2 — 208 / 2150, 208 / 2020
403.gcc — 208 / 3170, 208 / 3160
429.mcf — 208 / 5810
445.gobmk — 208 / 2760, 208 / 2770
456.hmmer — 208 / 7680, 208 / 6180
458.sjeng — 208 / 3200, 208 / 3020
462.libquantum — 208 / 71800
464.h264ref — 208 / 5250, 208 / 5080
471.omnetpp — 208 / 2350, 208 / 2250
473.astar — 208 / 2380
483.xalancbmk — 208 / 4760

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Hardware

CPU Name:	Intel Xeon Platinum 8170
CPU Characteristics:	Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	104 cores, 4 chips, 26 cores/chip, 2 threads/core
CPU(s) orderable:	2,4 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core
L3 Cache:	35.75 MB I+D on chip per chip
Other Cache:	None
Memory:	1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)
Disk Subsystem:	1 x 960 GB SATA SSD
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 12 SP2 (x86_64) Kernel 4.4.21-69-default
Compiler:	C/C++: Version 17.0.1.132 of Intel C/C++ Compiler 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

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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	208	**617**	**3300**	616	3300	619	3280	208	**509**	**4000**	508	4000	509	3990
401.bzip2	208	996	2020	991	2020	**993**	**2020**	208	932	2150	939	2140	**933**	**2150**
403.gcc	208	530	3160	528	3170	**530**	**3160**	208	531	3150	**529**	**3170**	528	3170
429.mcf	208	325	5830	327	5800	**326**	**5810**	208	325	5830	327	5800	**326**	**5810**
445.gobmk	208	788	2770	**787**	**2770**	787	2770	208	790	2760	791	2760	**791**	**2760**
456.hmmer	208	**314**	**6180**	314	6180	313	6200	208	254	7650	**253**	**7680**	252	7690
458.sjeng	208	836	3010	833	3020	**834**	**3020**	208	**787**	**3200**	789	3190	787	3200
462.libquantum	208	60.1	71700	59.8	72100	**60.0**	**71800**	208	60.1	71700	59.8	72100	**60.0**	**71800**
464.h264ref	208	**906**	**5080**	907	5080	903	5100	208	873	5270	877	5250	**877**	**5250**
471.omnetpp	208	579	2250	577	2250	**579**	**2250**	208	553	2350	**552**	**2350**	552	2360
473.astar	208	**614**	**2380**	613	2380	614	2380	208	**614**	**2380**	613	2380	614	2380
483.xalancbmk	208	**301**	**4760**	302	4760	300	4780	208	**301**	**4760**	302	4760	300	4780

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"
    Tmpfs filesystem can be set with:
     mount -t tmpfs -o size=800g tmpfs /home

Platform Notes

    BIOS configuration:
     Choose Operating Mode set to Maximum Performance
     DCU Streamer Prefetcher set to Disable
     SNC set to Enable
     Per Core P-state set to Disable
     UPI Prefetcher set to Disable
     Stale AtoS set to Enable
     LLC dead line alloc set to Disable
    Sysinfo program /home/cpu2006-1.2-ic17.0u1/config/sysinfo.rev6993
    Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
    running on SN850-01 Wed Aug 23 17:50:58 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

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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : Intel(R) Xeon(R) Platinum 8170 CPU @ 2.10GHz
      4 "physical id"s (chips)
      208 "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 : 26
      siblings  : 52
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
      physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
      physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
      26 27 28 29
   cache size : 36608 KB

From /proc/meminfo
   MemTotal:       1584965048 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 SN850-01 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
   (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Aug 23 17:46

SPEC is set to: /home/cpu2006-1.2-ic17.0u1
   Filesystem      Type   Size  Used Avail Use% Mounted on
   tmpfs           tmpfs  800G  6.9G  794G   1% /home
Additional information from dmidecode:
```
Continued on next page

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Platform Notes (Continued)

```
    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 Lenovo -[IVE109A-1.00]- 04/27/2017
    Memory:
    48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz

  (End of data from sysinfo program)
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic17.0u1/lib/ia32:/home/cpu2006-1.2-ic17.0u1/lib/intel64:/home/cpu2006-1.2-ic17.0u1/sh10.2"


 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.2
 Transparent Huge Pages enabled by default
 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_2017/linux/lib/ia32
```

C++ benchmarks:
```
    icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
```

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
```

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Base Portability Flags (Continued)

483.xalancbmk: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX`

Base Optimization Flags

C benchmarks:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
`-qopt-mem-layout-trans=3`

C++ benchmarks:
`-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
`-qopt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh10.2 -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_2017/linux/lib/ia32`

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_2017/linux/lib/ia32`

Peak Portability Flags

400.perlbench: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64`
401.bzip2: `-DSPEC_CPU_LP64`
403.gcc: `-D_FILE_OFFSET_BITS=64`
429.mcf: `-D_FILE_OFFSET_BITS=64`
445.gobmk: `-D_FILE_OFFSET_BITS=64`

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Peak Portability Flags (Continued)

```
     456.hmmer: -DSPEC_CPU_LP64
     458.sjeng: -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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
               -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -auto-ilp32 -qopt-mem-layout-trans=3

      401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
               -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -qopt-prefetch -auto-ilp32
               -qopt-mem-layout-trans=3

        403.gcc: -xCORE-AVX512 -ipo -O3 -no-prec-div
               -qopt-mem-layout-trans=3

        429.mcf: basepeak = yes

      445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
               -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -qopt-mem-layout-trans=3

     456.hmmer: -xCORE-AVX512 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
               -qopt-mem-layout-trans=3

      458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
               -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -unroll4 -auto-ilp32
               -qopt-mem-layout-trans=3

  462.libquantum: basepeak = yes

    464.h264ref: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
               -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -unroll2 -qopt-mem-layout-trans=3
```

C++ benchmarks:

```
    471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
               -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2)
```

Continued on next page

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Peak Optimization Flags (Continued)

471.omnetpp (continued):
```
-qopt-ra-region-strategy=block
-qopt-mem-layout-trans=3 -Wl,-z,muldefs
-L/sh10.2 -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-ic17.0-official-linux64-revD.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revD.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.xml

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