SPEC® CINT2006 Result
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Lenovo Group Limited

SPECint®_rate2006 =   1240

Lenovo Flex System x440
(Intel Xeon E5-4627 v2, 3.30 GHz)

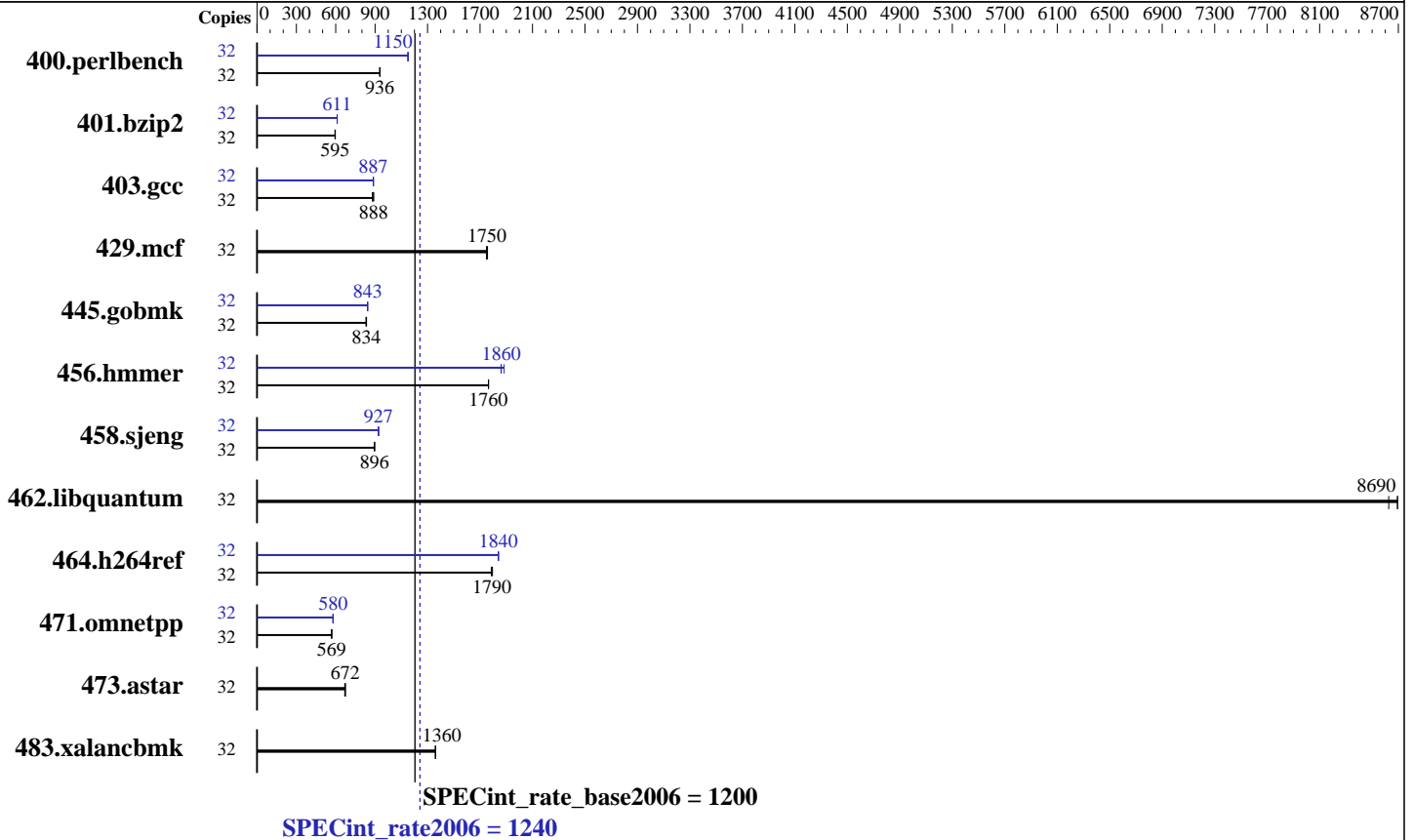SPECint_rate_base2006 = 1200

CPU2006 license: 9017

Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Jun-2016

Hardware Availability: Dec-2014

Software Availability: Nov-2013

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Hardware

CPU Name: Intel Xeon E5-4627 v2

CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz

CPU MHz: 3300

FPU: Integrated

CPU(s) enabled: 32 cores, 4 chips, 8 cores/chip

CPU(s) orderable: 4 chips

Primary Cache: 32 KB I + 32 KB D on chip per core

Secondary Cache: 256 KB I+D on chip per core

L3 Cache: 16 MB I+D on chip per chip

Other Cache: None

Memory: 512 GB (32 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1600 MHz)

Disk Subsystem: 1 x 240 GB SATA, SSD

Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 6.5 (Santiago)
2.6.32-431.el6.x86_64

Compiler: C/C++: Version 14.0.0.080 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 V10.0

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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	32	334	936	**334**	**936**	334	937	32	**271**	**1150**	271	1150	272	1150
401.bzip2	32	517	597	**519**	**595**	519	595	32	505	611	**505**	**611**	506	611
403.gcc	32	290	889	**290**	**888**	293	879	32	290	888	**291**	**887**	291	886
429.mcf	32	167	1750	166	1760	**166**	**1750**	32	167	1750	166	1760	**166**	**1750**
445.gobmk	32	404	830	402	835	**403**	**834**	32	399	842	398	844	**398**	**843**
456.hmmer	32	169	1760	169	1760	**169**	**1760**	32	**160**	**1860**	160	1860	159	1880
458.sjeng	32	**432**	**896**	432	896	432	895	32	418	927	418	926	**418**	**927**
462.libquantum	32	76.9	8630	**76.3**	**8690**	76.3	8690	32	76.9	8630	**76.3**	**8690**	76.3	8690
464.h264ref	32	397	1790	**395**	**1790**	395	1790	32	**385**	**1840**	385	1840	385	1840
471.omnetpp	32	352	569	**351**	**569**	351	570	32	**345**	**580**	345	580	345	579
473.astar	32	333	674	336	669	**334**	**672**	32	333	674	336	669	**334**	**672**
483.xalancbmk	32	162	1360	162	1360	**162**	**1360**	32	162	1360	162	1360	**162**	**1360**

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

   Operating Mode set to Maximum Perfomance in BIOS
   Sysinfo program /cpu2006-1.2/config/sysinfo.rev6818
   $Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
   running on localhost.localdomain Wed Jun 8 11:45:50 2016

   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(R) CPU E5-4627 v2 @ 3.30GHz
         4 "physical id"s (chips)
         32 "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 : 8

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Platform Notes (Continued)

```
      siblings  : 8
      physical 0: cores 0 1 2 3 4 5 6 7
      physical 1: cores 0 1 2 3 4 5 6 7
      physical 2: cores 0 1 2 3 4 5 6 7
      physical 3: cores 0 1 2 3 4 5 6 7
   cache size : 16384 KB

 From /proc/meminfo
    MemTotal:       529410520 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
    Red Hat Enterprise Linux Server release 6.5 (Santiago)

 From /etc/*release* /etc/*version*
    redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
    system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

 uname -a:
    Linux localhost.localdomain 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54
    EST 2013 x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Jun 8 11:41 last=5

 SPEC is set to: /cpu2006-1.2
    Filesystem               Type  Size  Used Avail Use% Mounted on
    /dev/mapper/VolGroup-lv_root ext4  210G  7.9G  192G   4% /

 Additional information from dmidecode:
   BIOS IBM -[CGE103GUS-1.10]- 03/06/2015
   Memory:
    30x Micron 36JSF2G72PZ-1G9E1 16 GB 1600 MHz 2 rank
    16x Not Specified Not Specified
    2x Samsung M393B2G70BH0-CMA 16 GB 1600 MHz 2 rank

 (End of data from sysinfo program)
```

General Notes

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

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RedHat EL 6.4
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
 Filesystem page cache cleared with:
 echo 1>       /proc/sys/vm/drop_caches
 runspec command invoked through numactl i.e.:
```

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General Notes (Continued)

```
numactl --interleave=all runspec <etc>
```

Base Compiler Invocation

C benchmarks:
```
icc  -m32
```

C++ benchmarks:
```
icpc -m32
```

Base Portability Flags

```
    400.perlbench: -DSPEC_CPU_LINUX_IA32
    462.libquantum: -DSPEC_CPU_LINUX
    483.xalancbmk: -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
    -xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -opt-mem-layout-trans=3
```

C++ benchmarks:
```
    -xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -opt-mem-layout-trans=3
    -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
```

```
    400.perlbench: icc -m64
```

```
    401.bzip2: icc -m64
```

```
    456.hmmer: icc -m64
```

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Peak Compiler Invocation (Continued)

458.sjeng: `icc -m64`

C++ benchmarks:
`icpc -m32`

Peak Portability Flags

400.perlbench: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64`
401.bzip2: `-DSPEC_CPU_LP64`
456.hmmer: `-DSPEC_CPU_LP64`
458.sjeng: `-DSPEC_CPU_LP64`
462.libquantum: `-DSPEC_CPU_LINUX`
483.xalancbmk: `-DSPEC_CPU_LINUX`

Peak Optimization Flags

C benchmarks:

400.perlbench: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
`-auto-ilp32`

401.bzip2: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
`-opt-prefetch -auto-ilp32 -ansi-alias`

403.gcc: `-xSSE4.2 -ipo -O3 -no-prec-div`

429.mcf: `basepeak = yes`

445.gobmk: `-xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)`
`-ansi-alias -opt-mem-layout-trans=3`

456.hmmer: `-xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32`

458.sjeng: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
`-unroll4 -auto-ilp32`

462.libquantum: `basepeak = yes`

464.h264ref: `-xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)`
`-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)`
`-unroll2 -ansi-alias`

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Peak Optimization Flags (Continued)

C++ benchmarks:

> 471.omnetpp: `-xSSE4.2(pass 2)` `-prof-gen(pass 1)` `-ipo(pass 2)`
> `-O3(pass 2)` `-no-prec-div(pass 2)` `-prof-use(pass 2)`
> `-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-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-C.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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