SPEC® CINT2006 Result

Lenovo Group Limited

SPECint®_rate2006 =　　1880

Lenovo System x3550 M5
(2.40 GHz, Intel Xeon E5-2699A v4)

SPECint_rate_base2006 =　1810
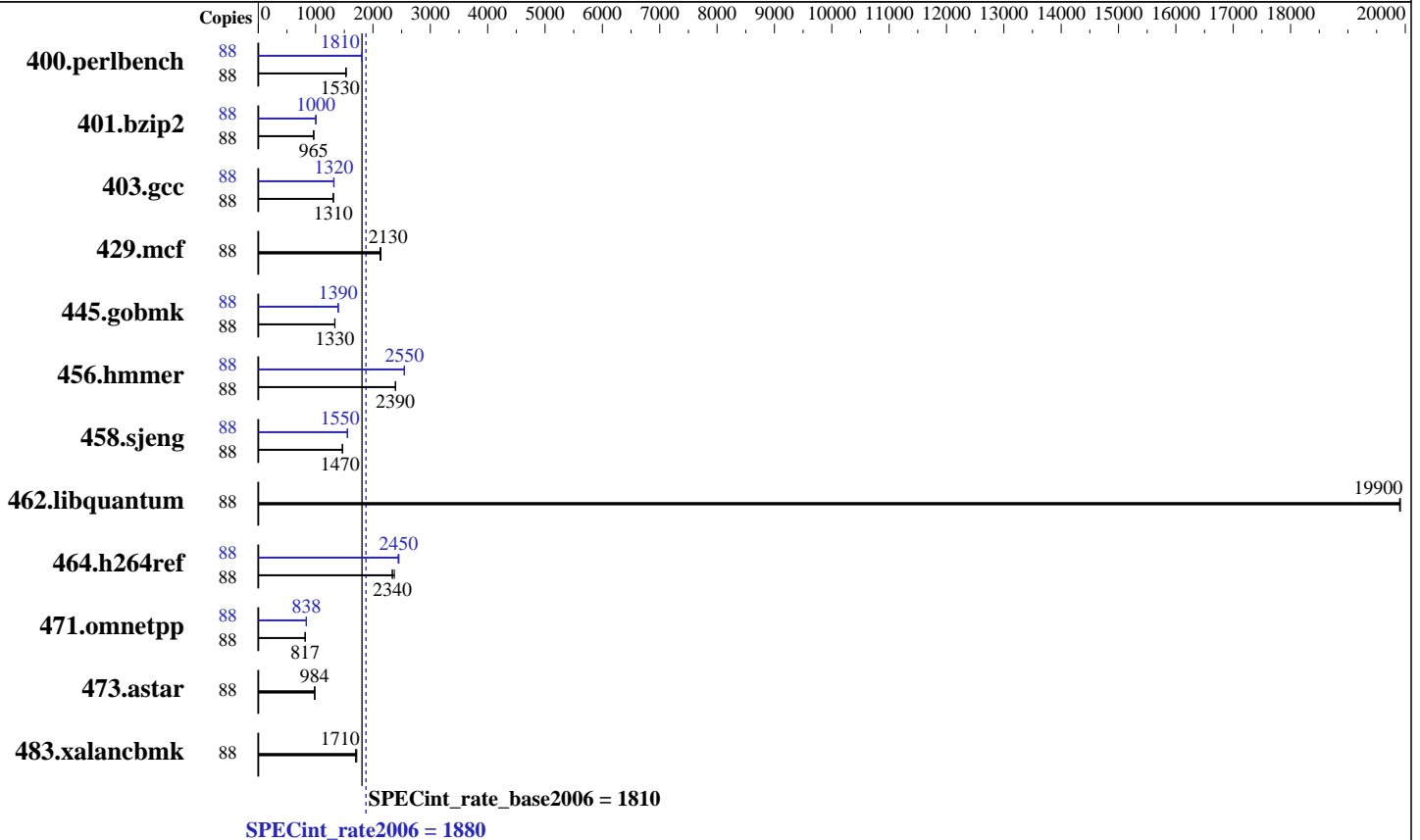
CPU2006 license: 9017

Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Nov-2016

Hardware Availability: Mar-2016

Software Availability: Sep-2016

SPECint_rate_base2006 = 1810

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Hardware

CPU Name:	Intel Xeon E5-2699A v4
CPU Characteristics:	Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	44 cores, 2 chips, 22 cores/chip, 2 threads/core
CPU(s) orderable:	1,2 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:	55 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem:	1 x 800 GB SATA SSD
Other Hardware:	None

Software

Operating System:	SUSE Linux Enterprise Server 12 SP1 (x86_64) Kernel 3.12.49-11-default
Compiler:	C/C++: Version 17.0.0.098 of Intel C/C++ Compiler 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

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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	88	564	1530	560	1540	**563**	**1530**	88	**475**	**1810**	476	1810	474	1810
401.bzip2	88	880	965	**880**	**965**	877	968	88	845	1010	**846**	**1000**	848	1000
403.gcc	88	540	1310	**541**	**1310**	543	1300	88	536	1320	**538**	**1320**	538	1320
429.mcf	88	375	2140	**377**	**2130**	378	2120	88	375	2140	**377**	**2130**	378	2120
445.gobmk	88	692	1330	690	1340	**692**	**1330**	88	663	1390	**662**	**1390**	662	1390
456.hmmer	88	343	2400	344	2390	**343**	**2390**	88	**322**	**2550**	322	2550	323	2540
458.sjeng	88	726	1470	**726**	**1470**	726	1470	88	685	1550	685	1550	**685**	**1550**
462.libquantum	88	91.6	19900	**91.6**	**19900**	91.6	19900	88	91.6	19900	**91.6**	**19900**	91.6	19900
464.h264ref	88	821	2370	**833**	**2340**	833	2340	88	**795**	**2450**	799	2440	794	2450
471.omnetpp	88	**673**	**817**	674	816	670	821	88	656	838	657	837	**656**	**838**
473.astar	88	629	983	**628**	**984**	627	985	88	629	983	**628**	**984**	627	985
483.xalancbmk	88	358	1700	353	1720	**356**	**1710**	88	358	1700	353	1720	**356**	**1710**

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"
Transparent Huge Pages enabled with:
  echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:
  echo 1 > /proc/sys/vm/drop_caches
```

Platform Notes

```
   BIOS Configuration:
  Operating Mode set to Maximum Performance
  COD Preference set to Enable
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on 123123 Fri Nov 18 09:01:44 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 E5-2699A v4 @ 2.40GHz
```

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Platform Notes (Continued)

```
      2 "physical id"s (chips)
     88 "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 : 22
      siblings  : 44
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
      28
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
      28
   cache size : 28160 KB

From /proc/meminfo
   MemTotal:       263821292 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 1
      # 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-SP1"
      VERSION_ID="12.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
   Linux 123123 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015 (8d714a0)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 18 08:58

SPEC is set to: /home/cpu2006-1.2-ic16.0
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda4       xfs   689G   52G  638G   8% /home
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 LENOVO -[TBE123H-2.10]- 03/25/2016
```

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Platform Notes (Continued)

```
     Memory:
       16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
       8x NO DIMM Unknown

     (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-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh10.2"

  Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
  memory using Redhat Enterprise Linux 7.2
  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
      483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
     -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
     -qopt-mem-layout-trans=3
```

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Base Optimization Flags (Continued)

C++ benchmarks:
```
-xCORE-AVX2 -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`
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`

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Peak Optimization Flags

C benchmarks:

    400.perlbench: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(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-AVX2(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-AVX2 -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-AVX2(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-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32`
        `-qopt-mem-layout-trans=3`

    458.sjeng: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(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-AVX2(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-AVX2(pass 2)`
        `-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)`
        `-no-prec-div(pass 2)`
        `-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

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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.html`
`http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.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.xml`
`http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.xml`

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