SPEC® CINT2006 Result

Lenovo Global Technology

ThinkSystem SD530
(2.40 GHz, Intel Xeon Gold 5115)

$SPECint®\_rate2006 = 1010$

$SPECint\_rate\_base2006 = 964$

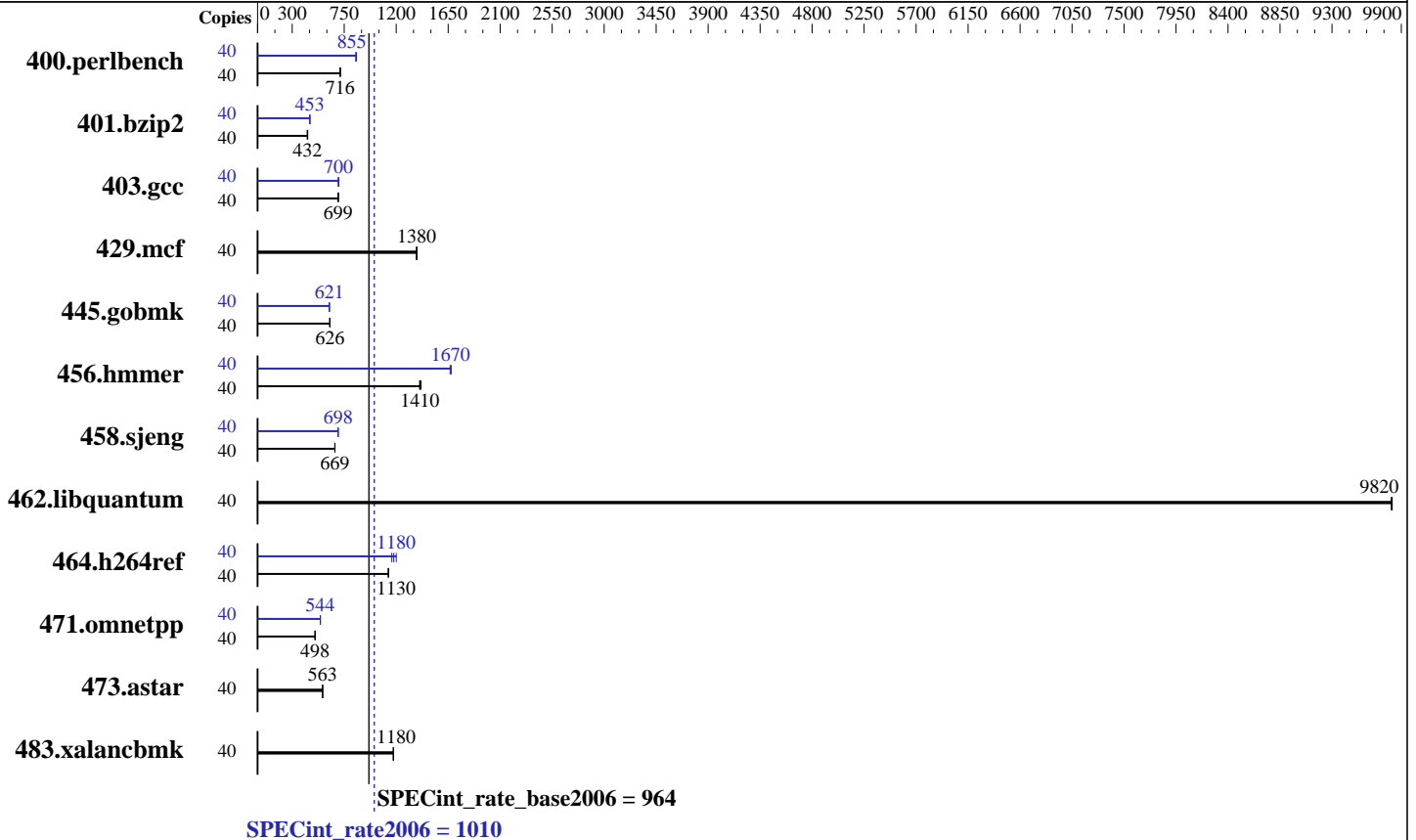| **CPU2006 license:** 9017	**Test date:** Sep-2017
Test sponsor: Lenovo Global Technology	**Hardware Availability:** Aug-2017
Tested by: Lenovo Global Technology	**Software Availability:** Apr-2017

Copies 0 300 750 1200 1650 2100 2550 3000 3450 3900 4350 4800 5250 5700 6150 6600 7050 7500 7950 8400 8850 9300 9900

- 400.perlbench: 40 / 855 ; 40 / 716
- 401.bzip2: 40 / 453 ; 40 / 432
- 403.gcc: 40 / 700 ; 40 / 699
- 429.mcf: 40 / 1380
- 445.gobmk: 40 / 621 ; 40 / 626
- 456.hmmer: 40 / 1670 ; 40 / 1410
- 458.sjeng: 40 / 698 ; 40 / 669
- 462.libquantum: 40 / 9820
- 464.h264ref: 40 / 1180 ; 40 / 1130
- 471.omnetpp: 40 / 544 ; 40 / 498
- 473.astar: 40 / 563
- 483.xalancbmk: 40 / 1180

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Hardware

CPU Name:	Intel Xeon Gold 5115
CPU Characteristics:	Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 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:	1 MB I+D on chip per core
L3 Cache:	13.75 MB I+D on chip per chip
Other Cache:	None
Memory:	384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400 MHz)
Disk Subsystem:	1 x 800 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 17.0.3.191 of Intel C/C++ Compiler for Linux
Auto Parallel:	Yes
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	40	545	717	**546**	**716**	547	714	40	460	850	457	855	**457**	**855**
401.bzip2	40	898	430	**894**	**432**	889	434	40	**852**	**453**	855	452	852	453
403.gcc	40	462	696	460	700	**461**	**699**	40	**460**	**700**	461	698	458	703
429.mcf	40	265	1380	**265**	**1380**	264	1380	40	265	1380	**265**	**1380**	264	1380
445.gobmk	40	670	626	672	625	**670**	**626**	40	675	622	675	621	**675**	**621**
456.hmmer	40	266	1400	**265**	**1410**	264	1420	40	224	1670	**223**	**1670**	223	1680
458.sjeng	40	722	670	724	669	**723**	**669**	40	**694**	**698**	695	697	694	698
462.libquantum	40	**84.4**	**9820**	84.5	9810	84.4	9820	40	**84.4**	**9820**	84.5	9810	84.4	9820
464.h264ref	40	781	1130	**782**	**1130**	782	1130	40	737	1200	**751**	**1180**	762	1160
471.omnetpp	40	502	498	**502**	**498**	501	499	40	460	543	**460**	**544**	460	544
473.astar	40	**498**	**563**	499	563	498	563	40	**498**	**563**	499	563	498	563
483.xalancbmk	40	**235**	**1180**	235	1170	235	1180	40	**235**	**1180**	235	1170	235	1180

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 Configuration:
     Choose Operating Mode set to Maximum Performance
     SNC set to Enable
     Execute Disable Bit set to Disable
     DCU Streamer Prefetcher set to Disable
     Uncore Frequency Scaling set to Disable
     Stale AtoS set to Enable
     LLC dead line alloc set to Disable
     Sysinfo program /home/cpu2006-1.2-ic17.0u3-QYC/config/sysinfo.rev6993
     Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
     running on stark-02-03 Wed Sep 13 16:55:50 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

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Platform Notes (Continued)

```
    model name : Intel(R) Xeon(R) Gold 5115 CPU @ 2.40GHz
       2 "physical id"s (chips)
       40 "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 : 10
       siblings  : 20
       physical 0: cores 0 1 2 3 4 8 9 10 11 12
       physical 1: cores 0 1 2 3 4 8 9 10 11 12
    cache size : 14080 KB

From /proc/meminfo
    MemTotal:       395893572 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 stark-02-03 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 Sep 13 16:53

SPEC is set to: /home/cpu2006-1.2-ic17.0u3-QYC
    Filesystem     Type   Size   Used Avail Use% Mounted on
    /dev/sda4      xfs    689G    98G  592G  15% /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 -[TEE113J-1.00]- 06/03/2017
    Memory:
```

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Platform Notes (Continued)

```
     4x NO DIMM NO DIMM
     12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz, configured at 2400 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-ic17.0u3-QYC/lib/ia32:/home/cpu2006-1.2-ic17.0u3-QYC/lib/intel64:/home/cpu2006-1.2-ic17.0u3-QYC/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:
 shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
 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-revF.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.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-revF.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.xml

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Tested with SPEC CPU2006 v1.2.
Report generated on Wed Oct 4 12:40:41 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 3 October 2017.