SPEC® CINT2006 Result

Lenovo Global Technology

SPECint®_rate2006 =   2250

ThinkSystem SR630
(2.10 GHz, Intel Xeon Platinum 8160)

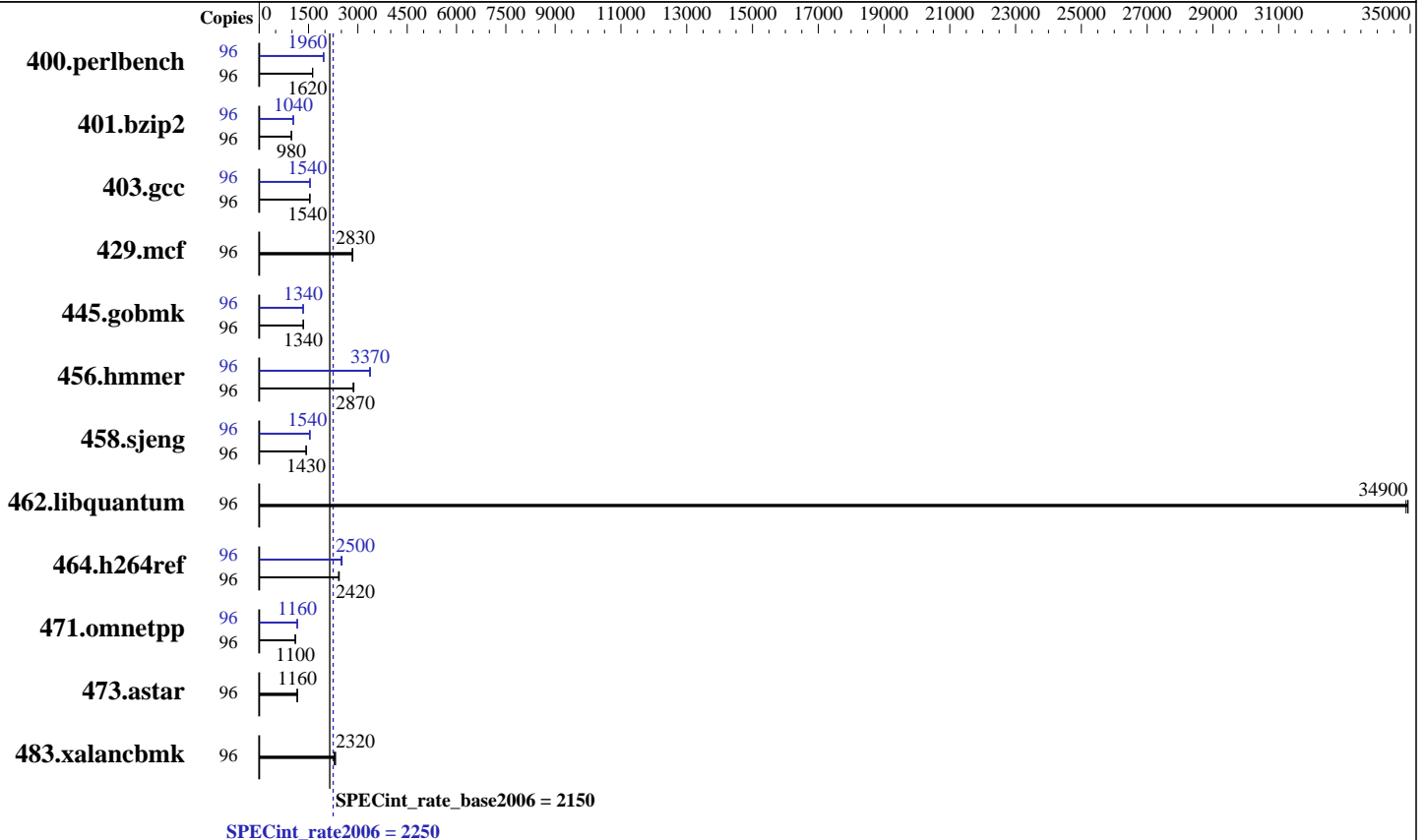SPECint_rate_base2006 = 2150

CPU2006 license: 9017

Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Jul-2017

Hardware Availability: Aug-2017

Software Availability: Apr-2017

Copies — scale 0 1500 3000 4500 6000 7500 9000 11000 13000 15000 17000 19000 21000 23000 25000 27000 29000 31000 35000

- 400.perlbench: 96 — 1960; 96 — 1620
- 401.bzip2: 96 — 1040; 96 — 980
- 403.gcc: 96 — 1540; 96 — 1540
- 429.mcf: 96 — 2830
- 445.gobmk: 96 — 1340; 96 — 1340
- 456.hmmer: 96 — 3370; 96 — 2870
- 458.sjeng: 96 — 1540; 96 — 1430
- 462.libquantum: 96 — 34900
- 464.h264ref: 96 — 2500; 96 — 2420
- 471.omnetpp: 96 — 1160; 96 — 1100
- 473.astar: 96 — 1160
- 483.xalancbmk: 96 — 2320

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Hardware

CPU Name: Intel Xeon Platinum 8160

CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz

CPU MHz: 2100

FPU: Integrated

CPU(s) enabled: 48 cores, 2 chips, 24 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: 33 MB I+D on chip per chip

Other Cache: None

Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)

Disk Subsystem: 1 x 800 GB SAS 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: btrfs

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	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	96	**578**	**1620**	578	1620	577	1620	96	480	1950	**479**	**1960**	477	1970
401.bzip2	96	946	980	**945**	**980**	943	982	96	896	1030	893	1040	**894**	**1040**
403.gcc	96	504	1530	**501**	**1540**	501	1540	96	500	1550	**500**	**1540**	501	1540
429.mcf	96	**309**	**2830**	309	2830	308	2850	96	**309**	**2830**	309	2830	308	2850
445.gobmk	96	750	1340	751	1340	**751**	**1340**	96	754	1340	753	1340	**753**	**1340**
456.hmmer	96	311	2880	**312**	**2870**	314	2860	96	**266**	**3370**	266	3360	265	3380
458.sjeng	96	813	1430	812	1430	**812**	**1430**	96	754	1540	754	1540	**754**	**1540**
462.libquantum	96	57.0	34900	**57.0**	**34900**	56.9	34900	96	57.0	34900	**57.0**	**34900**	56.9	34900
464.h264ref	96	879	2420	873	2430	**878**	**2420**	96	**848**	**2500**	843	2520	853	2490
471.omnetpp	96	547	1100	545	1100	**546**	**1100**	96	519	1160	**518**	**1160**	518	1160
473.astar	96	582	1160	**582**	**1160**	582	1160	96	582	1160	**582**	**1160**	582	1160
483.xalancbmk	96	291	2280	**286**	**2320**	286	2320	96	291	2280	**286**	**2320**	286	2320

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
    DCU Streamer Prefetcher set to Disable
    Stale AtoS set to Enable
    LLC dead line alloc set to Disable
     Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
     Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
     running on Cable-SPECcpu2017-SUSE12SP2 Sat Jul 8 23:44:56 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
        model name : Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
           2 "physical id"s (chips)

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Platform Notes (Continued)

```
     96 "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 : 24
      siblings  : 48
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26
      27 28 29
   cache size : 33792 KB

From /proc/meminfo
   MemTotal:       395891856 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 Cable-SPECcpu2017-SUSE12SP2 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 Jul 8 23:44

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
   Filesystem      Type    Size   Used Avail Use% Mounted on
   /dev/sda2       btrfs   744G    35G  706G   5% /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 -[IVE109Q-1.00]- 06/28/2017
   Memory:
```

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Platform Notes (Continued)

```
    24x Samsung M393A2K43BB1-CTD 16 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-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/lib/intel64:/home/cpu2006-1.2-ic17.0u3/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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
     -qopt-mem-layout-trans=3
```

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Base Optimization Flags (Continued)

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`
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-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)
                  -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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