SPEC® CINT2006 Result

Lenovo Global Technology

ThinkSystem SR950
(3.40 GHz, Intel Xeon Gold 6128)

SPECint®2006 = 76.4

SPECint_base2006 = 72.8

CPU2006 license: 9017
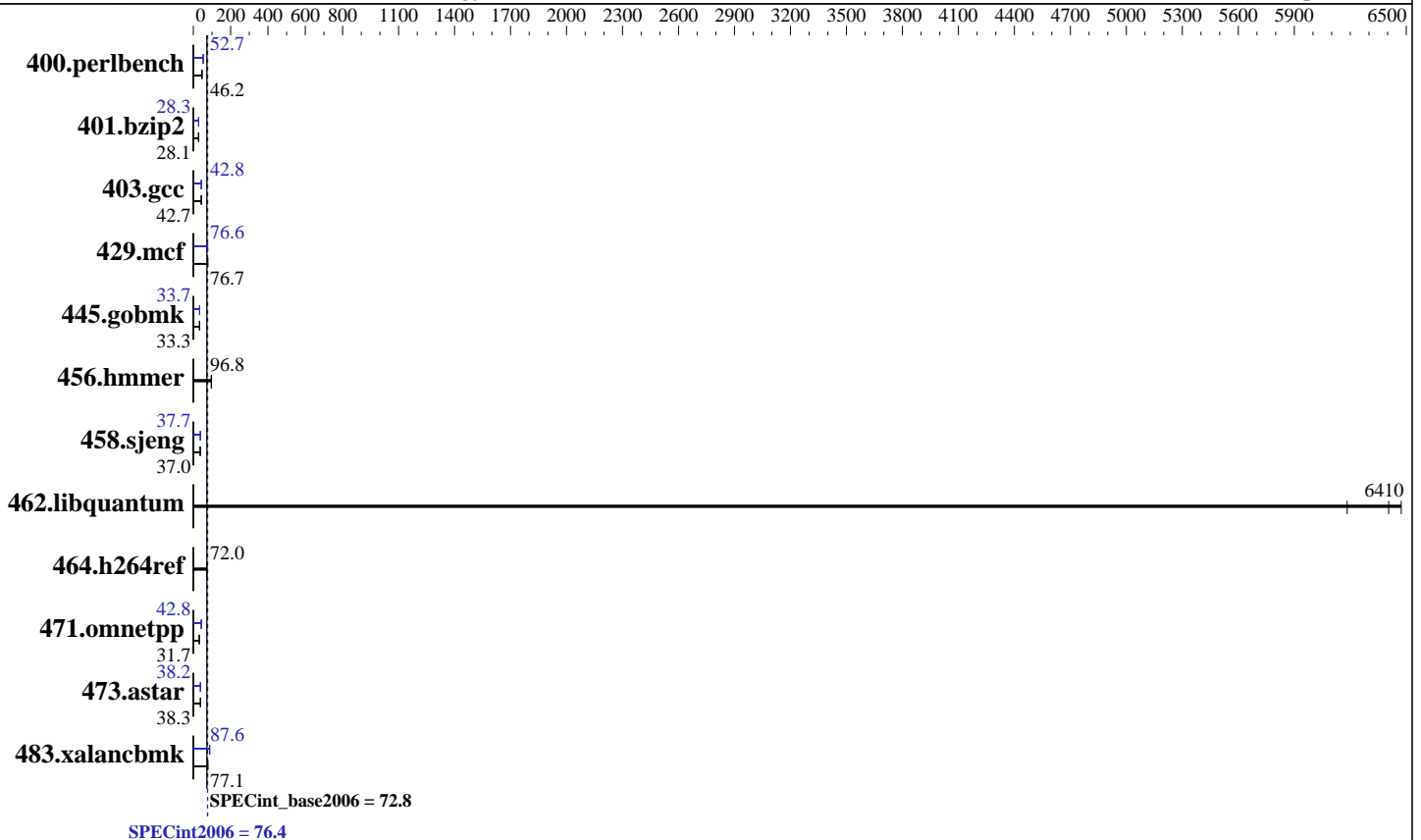**Test sponsor:** Lenovo Global Technology
Tested by: Lenovo Global Technology

Test date: Nov-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2017


```
400.perlbench    52.7
                 46.2
401.bzip2        28.3
                 28.1
403.gcc          42.8
                 42.7
429.mcf          76.6
                 76.7
445.gobmk        33.7
                 33.3
456.hmmer        96.8
458.sjeng        37.7
                 37.0
462.libquantum   6410
464.h264ref      72.0
471.omnetpp      42.8
                 31.7
473.astar        38.2
                 38.3
483.xalancbmk    87.6
                 77.1
```

SPECint_base2006 = 72.8

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Hardware

CPU Name: Intel Xeon Gold 6128
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 3400
FPU: Integrated
CPU(s) enabled: 24 cores, 4 chips, 6 cores/chip
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: 19.25 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 800 GB SAS SSD
Other Hardware: None

Software

Operating System: Red Hat Enterprise Linux Server release 7.3 (Maipo)
Kernel 3.10.0-514.el7.x86_64
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: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	211	46.4	**211**	**46.2**	211	46.2	185	52.7	**185**	**52.7**	185	52.7
401.bzip2	342	28.2	**343**	**28.1**	343	28.1	**341**	**28.3**	341	28.3	341	28.3
403.gcc	188	42.8	**189**	**42.7**	189	42.6	188	42.9	188	42.7	**188**	**42.8**
429.mcf	118	77.6	**119**	**76.7**	119	76.6	120	75.9	119	76.7	**119**	**76.6**
445.gobmk	315	33.3	**315**	**33.3**	315	33.3	**311**	**33.7**	311	33.7	311	33.7
456.hmmer	**96.4**	**96.8**	96.3	96.8	96.5	96.7	**96.4**	**96.8**	96.3	96.8	96.5	96.7
458.sjeng	**327**	**37.0**	327	37.0	327	37.0	**321**	**37.7**	321	37.7	321	37.7
462.libquantum	3.35	6180	3.20	6470	**3.23**	**6410**	3.35	6180	3.20	6470	**3.23**	**6410**
464.h264ref	309	71.6	307	72.1	**307**	**72.0**	309	71.6	307	72.1	**307**	**72.0**
471.omnetpp	197	31.7	194	32.1	**197**	**31.7**	148	42.4	**146**	**42.8**	146	42.9
473.astar	183	38.3	183	38.3	**183**	**38.3**	184	38.2	**184**	**38.2**	184	38.1
483.xalancbmk	89.4	77.1	**89.4**	**77.1**	89.3	77.3	78.7	87.7	**78.7**	**87.6**	79.0	87.3

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The config file option 'submit' was used.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

```
    BIOS configuration:
    Choose Operating Mode set to Maximum Performance
    Hyper-Threading 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 localhost.localdomain Thu Nov  2 22:52:32 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) Gold 6128 CPU @ 3.40GHz
           4 "physical id"s (chips)
           24 "processors"
        cores, siblings (Caution: counting these is hw and system dependent.  The
        following excerpts from /proc/cpuinfo might not be reliable.  Use with
```
Continued on next page

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Platform Notes (Continued)

```
    caution.)
       cpu cores : 6
       siblings  : 6
       physical 0: cores 0 6 9 10 11 13
       physical 1: cores 0 6 9 10 11 13
       physical 2: cores 0 6 9 10 11 13
       physical 3: cores 2 3 4 5 10 11
    cache size : 19712 KB

  From /proc/meminfo
     MemTotal:      1584772088 kB
     HugePages_Total:        0
     Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.3 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VERSION_ID="7.3"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
        ANSI_COLOR="0;31"
        CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
     redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
     system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

  uname -a:
     Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13
     EDT 2016 x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Nov 2 22:51

  SPEC is set to: /home/cpu2006-1.2-ic17.0u3
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sdb3       xfs   743G  6.4G  737G   1% /
  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 -[PSE103K-1.00]- 06/19/2017
   Memory:
    48x NO DIMM NO DIMM
    48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz

  (End of data from sysinfo program)
```

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General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,0,3"
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"
OMP_NUM_THREADS = "24"

 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
```

Base Compiler Invocation

C benchmarks:
```
icc -m64
```

C++ benchmarks:
```
icpc -m64
```

Base Portability Flags

```
400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
  401.bzip2: -DSPEC_CPU_LP64
    403.gcc: -DSPEC_CPU_LP64
    429.mcf: -DSPEC_CPU_LP64
 445.gobmk: -DSPEC_CPU_LP64
 456.hmmer: -DSPEC_CPU_LP64
  458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
 464.h264ref: -DSPEC_CPU_LP64
 471.omnetpp: -DSPEC_CPU_LP64
   473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch
-auto-p32
```

C++ benchmarks:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh10.2 -lsmartheap64
```

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Base Other Flags

C benchmarks:

      403.gcc: `-Dalloca=_alloca`

Peak Compiler Invocation

C benchmarks (except as noted below):
    `icc -m64`

    400.perlbench: `icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

      445.gobmk: `icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

C++ benchmarks (except as noted below):
    `icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

      473.astar: `icpc -m64`

Peak Portability Flags

    400.perlbench: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32`
      401.bzip2: `-DSPEC_CPU_LP64`
      403.gcc: `-DSPEC_CPU_LP64`
      429.mcf: `-DSPEC_CPU_LP64`
    445.gobmk: `-D_FILE_OFFSET_BITS=64`
    456.hmmer: `-DSPEC_CPU_LP64`
    458.sjeng: `-DSPEC_CPU_LP64`
  462.libquantum: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`
    464.h264ref: `-DSPEC_CPU_LP64`
    471.omnetpp: `-D_FILE_OFFSET_BITS=64`
      473.astar: `-DSPEC_CPU_LP64`
  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-AVX2(pass 2)`
             `-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)`
             `-no-prec-div(pass 2) -qopt-prefetch`

      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 -auto-ilp32 -qopt-prefetch`

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Peak Optimization Flags (Continued)

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
-qopt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
-qopt-prefetch -auto-p32

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)

456.hmmer: basepeak = yes

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

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

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
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

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-E.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-E.xml

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

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