SPEC® CINT2006 Result
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Lenovo Global Technology

SPECint®2006 =   78.5

ThinkSystem SR850
(2.00 GHz, Intel Xeon Gold 6138)
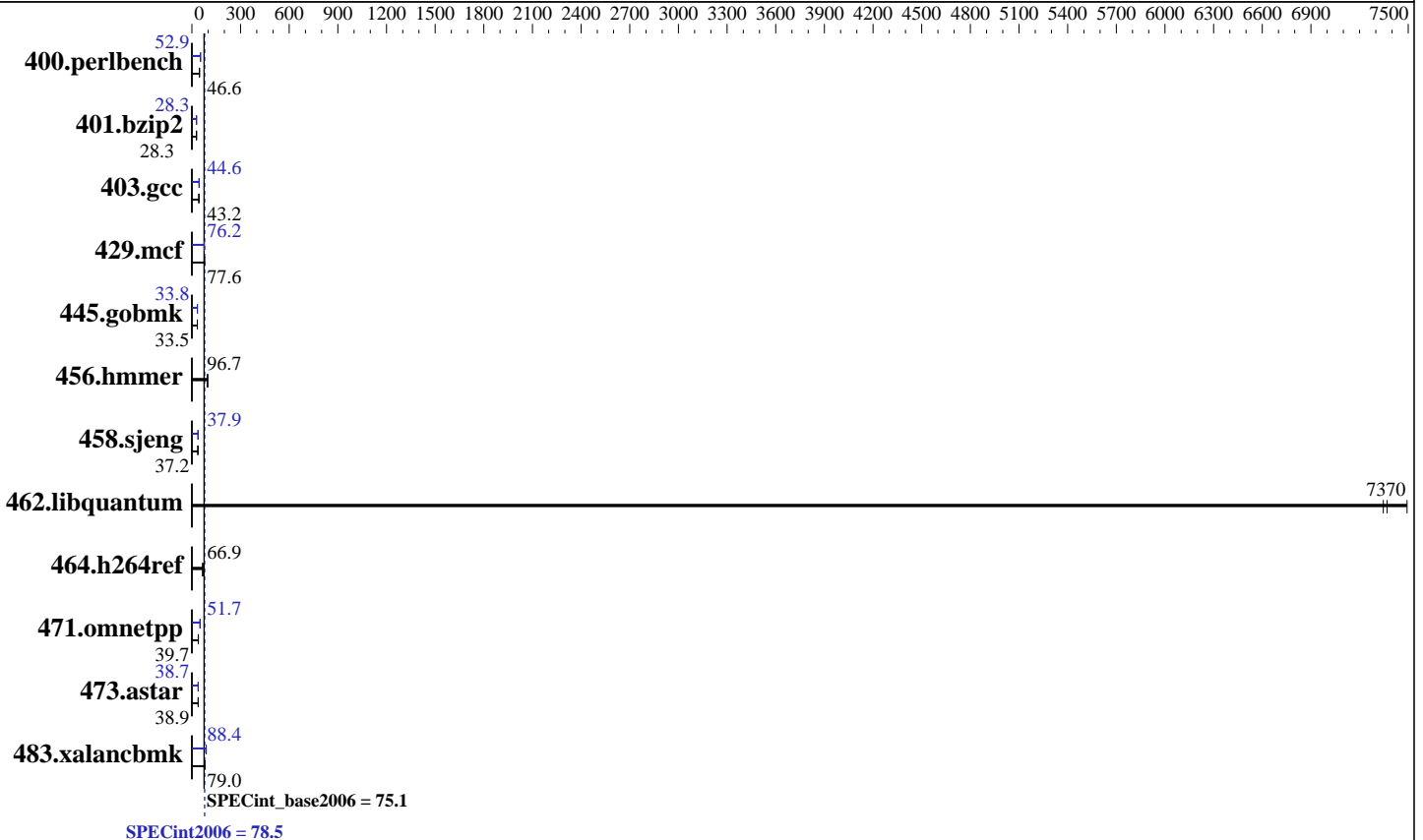
SPECint_base2006 =   75.1

CPU2006 license: 9017

Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Aug-2017

Hardware Availability: Aug-2017

Software Availability: Apr-2017

400.perlbench	52.9 / 46.6
401.bzip2	28.3 / 28.3
403.gcc	44.6 / 43.2
429.mcf	76.2 / 77.6
445.gobmk	33.8 / 33.5
456.hmmer	96.7
458.sjeng	37.9 / 37.2
462.libquantum	7370
464.h264ref	66.9
471.omnetpp	51.7 / 39.7
473.astar	38.7 / 38.9
483.xalancbmk	88.4 / 79.0

SPECint_base2006 = 75.1

SPECint2006 = 78.5

Hardware

CPU Name: Intel Xeon Gold 6138

CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz

CPU MHz: 2000

FPU: Integrated

CPU(s) enabled: 80 cores, 4 chips, 20 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: 27.5 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 SATA 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	**210**	**46.6**	210	46.6	210	46.4	185	52.9	**185**	**52.9**	185	52.8
401.bzip2	**341**	**28.3**	341	28.3	342	28.2	340	28.4	340	28.3	**340**	**28.3**
403.gcc	186	43.2	**187**	**43.2**	187	43.1	181	44.5	**181**	**44.6**	181	44.6
429.mcf	118	77.0	**118**	**77.6**	117	77.7	118	77.0	120	76.1	**120**	**76.2**
445.gobmk	313	33.5	312	33.6	**313**	**33.5**	310	33.8	**310**	**33.8**	311	33.8
456.hmmer	96.5	96.7	96.5	96.7	**96.5**	**96.7**	96.5	96.7	96.5	96.7	**96.5**	**96.7**
458.sjeng	326	37.1	**325**	**37.2**	325	37.2	**319**	**37.9**	320	37.9	319	37.9
462.libquantum	**2.81**	**7370**	2.77	7490	2.82	7350	**2.81**	**7370**	2.77	7490	2.82	7350
464.h264ref	330	67.1	**331**	**66.9**	331	66.8	330	67.1	**331**	**66.9**	331	66.8
471.omnetpp	**158**	**39.7**	156	40.0	160	39.0	120	51.9	**121**	**51.7**	128	48.6
473.astar	180	39.0	**180**	**38.9**	182	38.6	**182**	**38.7**	182	38.6	181	38.9
483.xalancbmk	87.2	79.1	**87.3**	**79.0**	87.3	79.0	78.3	88.1	77.8	88.7	**78.1**	**88.4**

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
     LLC dead line alloc set to Disable
     Hyper-Threading set to Disable
     Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
     Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
     running on electron-rhel7.3 Thu Aug 17 18:49:19 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 6138 CPU @ 2.00GHz
           4 "physical id"s (chips)
           80 "processors"
        cores, siblings (Caution: counting these is hw and system dependent.  The
        following excerpts from /proc/cpuinfo might not be reliable.  Use with
        caution.)
```

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Platform Notes (Continued)

```
      cpu cores : 20
      siblings  : 20
      physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
      physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
      physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
      physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
   cache size : 28160 KB

From /proc/meminfo
   MemTotal:     1584977776 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 electron-rhel7.3 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 Aug 17 18:48

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
   Filesystem       Type   Size   Used Avail Use% Mounted on
   /dev/sda4        xfs    688G   5.1G  683G   1% /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:
   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"
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 = "80"

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

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