SPEC® CINT2006 Result
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Lenovo Global Technology

SPECint®2006 = 78.8

ThinkSystem SN550
(2.00 GHz, Intel Xeon Gold 6138)

SPECint_base2006 = 75.6

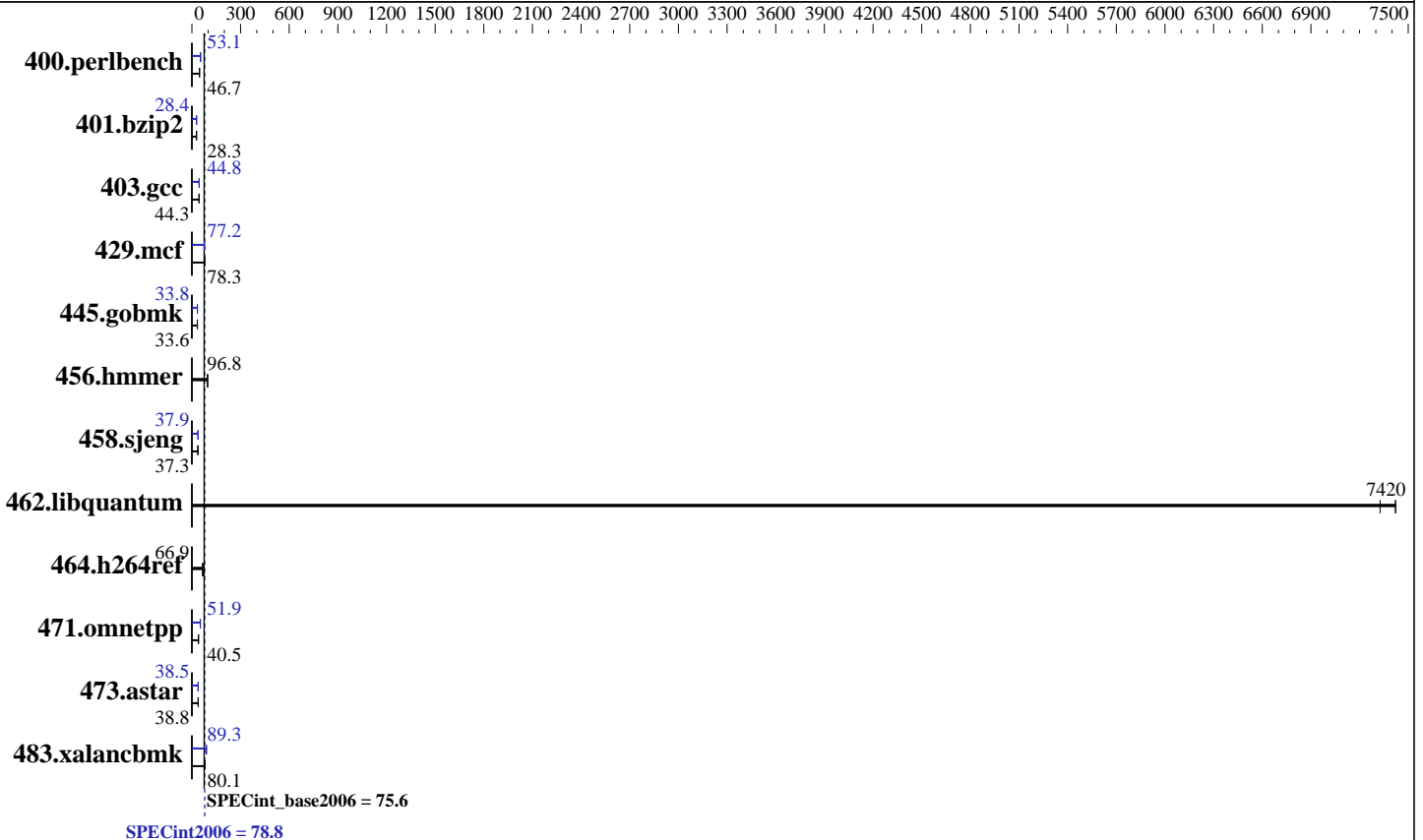| Benchmark	Result
400.perlbench	53.1 / 46.7
401.bzip2	28.4 / 28.3
403.gcc	44.8 / 44.3
429.mcf	77.2 / 78.3
445.gobmk	33.8 / 33.6
456.hmmer	96.8
458.sjeng	37.9 / 37.3
462.libquantum	7420
464.h264ref	66.9
471.omnetpp	51.9 / 40.5
473.astar	38.5 / 38.8
483.xalancbmk	89.3 / 80.1

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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:	40 cores, 2 chips, 20 cores/chip
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:	27.5 MB I+D on chip per chip
Other Cache:	None
Memory:	768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
Disk Subsystem:	1 x 480 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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Test date: Jul-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	209	46.7	209	46.7	**209**	**46.7**	**184**	**53.1**	184	53.1	184	53.1
401.bzip2	340	28.3	341	28.3	**341**	**28.3**	339	28.4	340	28.4	**340**	**28.4**
403.gcc	181	44.4	182	44.3	**182**	**44.3**	**180**	**44.8**	180	44.8	180	44.7
429.mcf	117	77.9	**116**	**78.3**	116	78.8	120	76.0	**118**	**77.2**	118	77.3
445.gobmk	**312**	**33.6**	312	33.6	312	33.6	**310**	**33.8**	310	33.8	311	33.8
456.hmmer	96.7	96.4	96.4	96.8	**96.4**	**96.8**	96.7	96.4	96.4	96.8	**96.4**	**96.8**
458.sjeng	325	37.2	**325**	**37.3**	324	37.3	319	37.9	**319**	**37.9**	319	37.9
462.libquantum	2.83	7330	2.79	7420	**2.79**	**7420**	2.83	7330	2.79	7420	**2.79**	**7420**
464.h264ref	**331**	**66.9**	331	66.9	332	66.8	**331**	**66.9**	331	66.9	332	66.8
471.omnetpp	**154**	**40.5**	153	40.7	155	40.2	**120**	**51.9**	119	52.5	122	51.3
473.astar	**181**	**38.8**	181	38.8	181	38.7	**182**	**38.5**	183	38.4	181	38.7
483.xalancbmk	86.1	80.1	**86.2**	**80.1**	86.2	80.0	77.6	88.9	**77.3**	**89.3**	77.1	89.5

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
     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 SN550 Fri Jul 21 17:15:50 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
       model name : Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz
          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.)
```

Continued on next page

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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
  cache size : 28160 KB

From /proc/meminfo
   MemTotal:       792247492 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 SN550 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 Jul 21 17:07

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   389G  5.5G  384G   2% /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 -[IVE109A-1.00]- 04/27/2017
  Memory:
  24x 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 = "40"

 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.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.xml

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