SPEC® CINT2006 Result
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Lenovo Global Technology

SPECint®_rate2006 =   931

ThinkSystem SR550
(2.20 GHz, Intel Xeon Silver 4114)
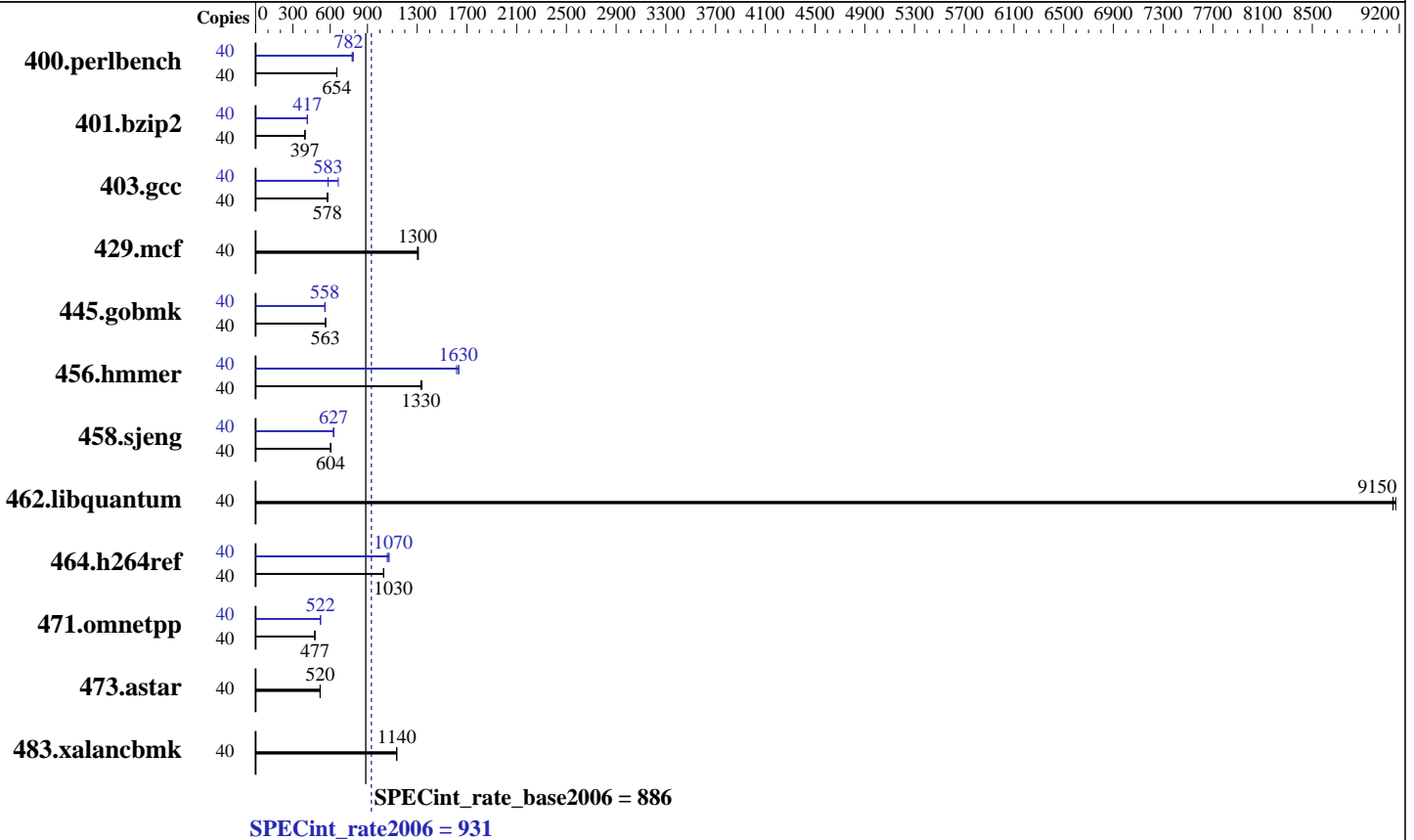
SPECint_rate_base2006 = 886

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

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Hardware

CPU Name:	Intel Xeon Silver 4114
CPU Characteristics:	Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz:	2200
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:	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	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	40	597	654	598	653	**598**	**654**	40	**500**	**782**	503	777	498	785
401.bzip2	40	**973**	**397**	968	399	976	395	40	925	417	928	416	**925**	**417**
403.gcc	40	558	577	**557**	**578**	555	580	40	484	665	**552**	**583**	553	583
429.mcf	40	280	1300	**280**	**1300**	279	1310	40	280	1300	**280**	**1300**	279	1310
445.gobmk	40	746	562	**746**	**563**	745	563	40	751	558	752	558	**752**	**558**
456.hmmer	40	279	1340	**280**	**1330**	281	1330	40	**229**	**1630**	228	1630	231	1620
458.sjeng	40	802	604	801	604	**801**	**604**	40	770	629	772	627	**772**	**627**
462.libquantum	40	90.4	9170	**90.6**	**9150**	90.6	9150	40	90.4	9170	**90.6**	**9150**	90.6	9150
464.h264ref	40	**859**	**1030**	860	1030	859	1030	40	**830**	**1070**	824	1070	836	1060
471.omnetpp	40	524	477	**524**	**477**	525	476	40	480	521	479	522	**479**	**522**
473.astar	40	**540**	**520**	540	520	542	519	40	**540**	**520**	540	520	542	519
483.xalancbmk	40	**243**	**1140**	243	1130	243	1140	40	**243**	**1140**	243	1130	243	1140

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:
    Operating Mode set to Maximum Performance
    DCU Streamer Prefetcher set to Disable
    Adjacent Cache Prefetch set to Disable
    UPI 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 linux-g50d Sat Jul 29 09:40:50 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) Silver 4114 CPU @ 2.20GHz
                            Continued on next page

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Platform Notes (Continued)

```
     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:       395882580 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 linux-g50d 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 28 22:20

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
   Filesystem      Type    Size   Used Avail Use% Mounted on
   /dev/sda2       btrfs   744G   111G  632G  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 -[TEE105Z-1.00]- 04/27/2017
   Memory:
   12x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666 MHz, configured at 2400 MHz
```

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Platform Notes (Continued)

```
(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-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.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

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

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