SPEC® CINT2006 Result
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Lenovo Global Technology

ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8176M)

$SPECint®2006 =$ 80.1
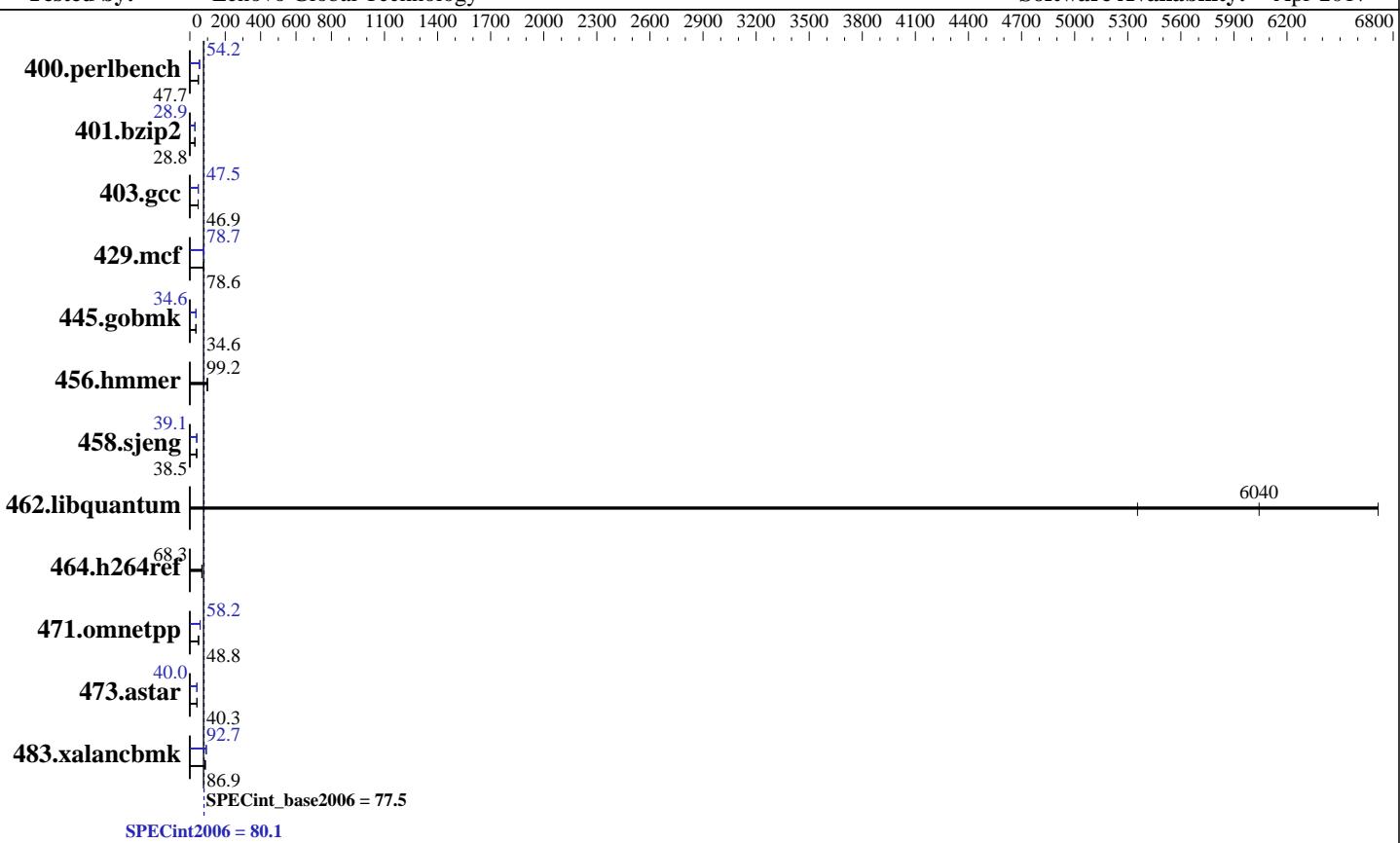
$SPECint\_base2006 =$ 77.5

CPU2006 license: 9017

Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Dec-2017

Hardware Availability: Sep-2017

Software Availability: Apr-2017

Benchmark results (bars, base below / peak above):

- **400.perlbench** — 54.2 / 47.7
- **401.bzip2** — 28.9 / 28.8
- **403.gcc** — 47.5 / 46.9
- **429.mcf** — 78.7 / 78.6
- **445.gobmk** — 34.6 / 34.6
- **456.hmmer** — 99.2
- **458.sjeng** — 39.1 / 38.5
- **462.libquantum** — 6040
- **464.h264ref** — 68.3
- **471.omnetpp** — 58.2 / 48.8
- **473.astar** — 40.0 / 40.3
- **483.xalancbmk** — 92.7 / 86.9

SPECint_base2006 = 77.5

SPECint2006 = 80.1

Hardware

CPU Name: Intel Xeon Platinum 8176M

CPU Characteristics: Intel Turbo Boost Technology up to 3.80 GHz

CPU MHz: 2100

FPU: Integrated

CPU(s) enabled: 224 cores, 8 chips, 28 cores/chip

CPU(s) orderable: 2,4,8 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: 38.5 MB I+D on chip per chip

Other Cache: None

Memory: 3 TB (96 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	204	47.9	205	47.7	**205**	**47.7**	180	54.2	**180**	**54.2**	179	54.7
401.bzip2	335	28.8	335	28.8	**335**	**28.8**	**333**	**28.9**	333	28.9	334	28.9
403.gcc	172	46.9	**172**	**46.9**	172	46.8	169	47.5	170	47.5	**169**	**47.5**
429.mcf	**116**	**78.6**	117	78.2	114	79.7	116	78.5	115	79.3	**116**	**78.7**
445.gobmk	303	34.6	303	34.6	**303**	**34.6**	303	34.6	303	34.6	**303**	**34.6**
456.hmmer	94.2	99.1	94.1	99.2	**94.1**	**99.2**	94.2	99.1	94.1	99.2	**94.1**	**99.2**
458.sjeng	**315**	**38.5**	315	38.5	315	38.5	309	39.1	**309**	**39.1**	309	39.2
462.libquantum	3.87	5360	**3.43**	**6040**	3.09	6720	3.87	5360	**3.43**	**6040**	3.09	6720
464.h264ref	324	68.4	325	68.2	**324**	**68.3**	324	68.4	325	68.2	**324**	**68.3**
471.omnetpp	**128**	**48.8**	128	49.0	128	48.7	107	58.2	108	58.1	**107**	**58.2**
473.astar	174	40.4	**174**	**40.3**	174	40.3	175	40.1	**175**	**40.0**	176	40.0
483.xalancbmk	79.2	87.1	79.6	86.7	**79.4**	**86.9**	74.4	92.8	**74.5**	**92.7**	74.8	92.2

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 Fri Dec  1 11:06:08 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 8176M CPU @ 2.10GHz
           8 "physical id"s (chips)
           224 "processors"
        cores, siblings (Caution: counting these is hw and system dependent.  The
        following excerpts from /proc/cpuinfo might not be reliable.  Use with
```

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

Platform Notes (Continued)

```
     caution.)
        cpu cores : 28
        siblings  : 28
        physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
        physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
        physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
        physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
        physical 4: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
        physical 5: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
        physical 6: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
        physical 7: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
        25 26 27 28 29 30
     cache size : 39424 KB

  From /proc/meminfo
     MemTotal:       3170214820 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 Dec 1 11:05

  SPEC is set to: /home/cpu2006-1.2-ic17.0u3
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda3       xfs   743G  6.9G  736G   1% /
  Additional information from dmidecode:

     Warning: Use caution when you interpret this section. The 'dmidecode' program
```

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Platform Notes (Continued)

```
   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 -[PSE105X-1.00]- 08/17/2017
   Memory:
     96x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz

 (End of data from sysinfo program)
```

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 = "224"

 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
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
No: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
No: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
This benchmark result is intended to provide perspective on
past performance using the historical hardware and/or
software described on this result page.
The system as described on this result page was formerly
generally available.  At the time of this publication, it may
not be shipping, and/or may not be supported, and/or may fail
to meet other tests of General Availability described in the
SPEC OSG Policy document, http://www.spec.org/osg/policy.html
This measured result may not be representative of the result
that would be measured were this benchmark run with hardware
and software available as of the publication date.
```

Base Compiler Invocation

C benchmarks:
     icc -m64

C++ benchmarks:
     icpc -m64

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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
```

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
```

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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

            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:

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Peak Optimization Flags (Continued)

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

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

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