SPEC® CINT2006 Result

Lenovo Group Limited

Lenovo System x3500 M5
(Intel Xeon E5-2628L v3, 2.00 GHz)

$SPECint^®\_rate2006 = 754$

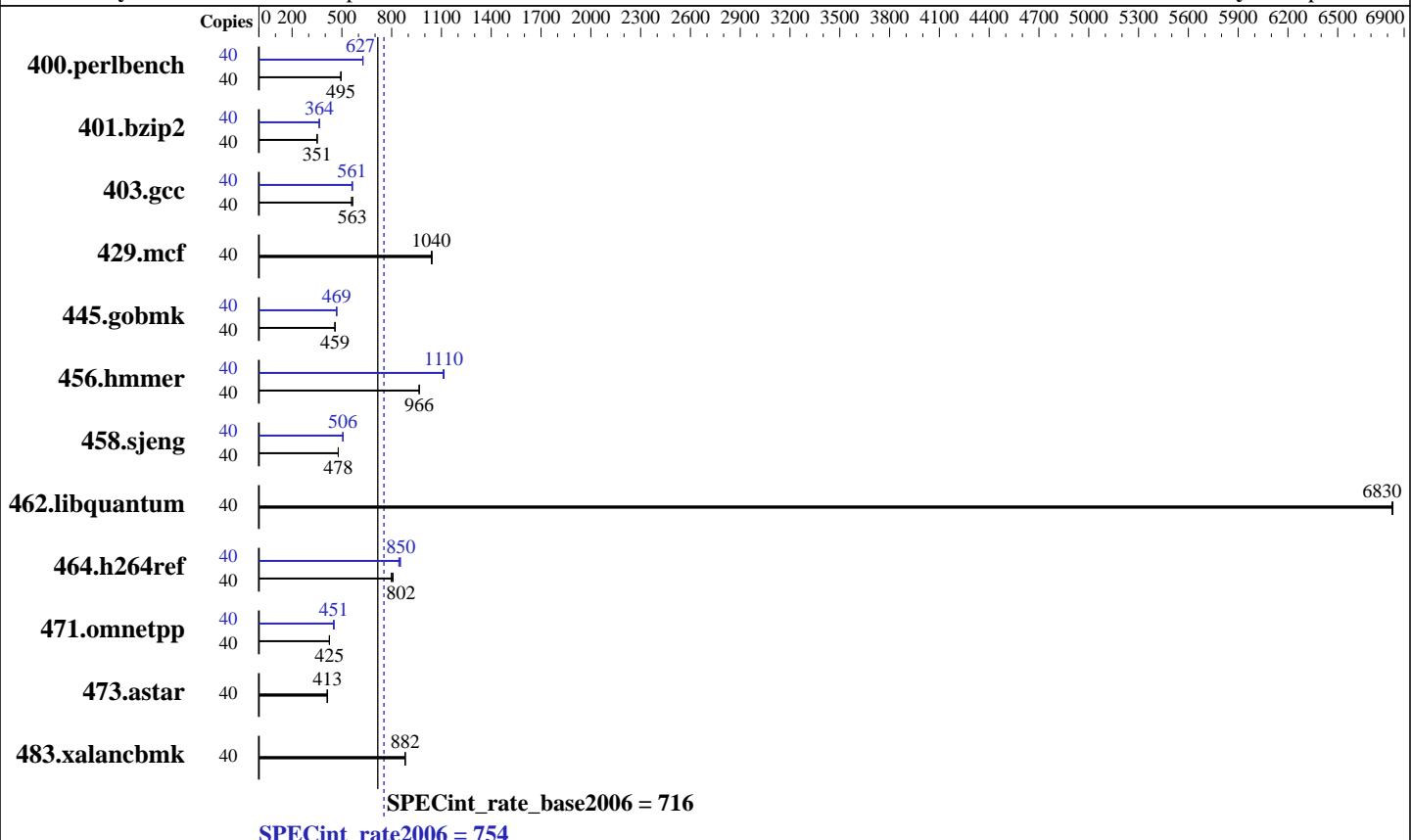$SPECint\_rate\_base2006 = 716$

CPU2006 license: 9017

Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Oct-2015

Hardware Availability: Jan-2015

Software Availability: Sep-2014

Copies 0 200 500 800 1100 1400 1700 2000 2300 2600 2900 3200 3500 3800 4100 4400 4700 5000 5300 5600 5900 6200 6500 6900

Benchmark	Copies	Peak	Base
400.perlbench	40 / 40	627	495
401.bzip2	40 / 40	364	351
403.gcc	40 / 40	561	563
429.mcf	40		1040
445.gobmk	40 / 40	469	459
456.hmmer	40 / 40	1110	966
458.sjeng	40 / 40	506	478
462.libquantum	40		6830
464.h264ref	40 / 40	850	802
471.omnetpp	40 / 40	451	425
473.astar	40		413
483.xalancbmk	40		882

SPECint_rate_base2006 = 716

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Hardware

CPU Name:	Intel Xeon E5-2628L v3
CPU Characteristics:	Intel Turbo Boost Technology up to 2.50 GHz
CPU MHz:	2000
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:	256 KB I+D on chip per core
L3 Cache:	25 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)
Disk Subsystem:	1 x 960 GB SATA SSD
Other Hardware:	None

Software

Operating System:	Red Hat Enterprise Linux Server release 7.0 (Maipo) 3.10.0-123.el7.x86_64
Compiler:	C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel:	No
File System:	xfs
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	792	494	**790**	**495**	790	495	40	624	626	623	627	**624**	**627**
401.bzip2	40	1101	350	1098	351	**1099**	**351**	40	**1061**	**364**	1061	364	1060	364
403.gcc	40	569	566	578	558	**572**	**563**	40	**574**	**561**	574	561	570	565
429.mcf	40	349	1040	351	1040	**351**	**1040**	40	349	1040	351	1040	**351**	**1040**
445.gobmk	40	**915**	**459**	917	458	914	459	40	895	469	896	468	**896**	**469**
456.hmmer	40	386	966	**386**	**966**	386	967	40	334	1120	**335**	**1110**	336	1110
458.sjeng	40	1011	479	**1012**	**478**	1012	478	40	956	506	**956**	**506**	956	506
462.libquantum	40	121	6830	**121**	**6830**	121	6830	40	121	6830	**121**	**6830**	121	6830
464.h264ref	40	1110	798	**1104**	**802**	1095	809	40	**1042**	**850**	1037	853	1050	843
471.omnetpp	40	588	425	**588**	**425**	590	424	40	**554**	**451**	555	451	552	453
473.astar	40	678	414	684	411	**680**	**413**	40	678	414	684	411	**680**	**413**
483.xalancbmk	40	**313**	**882**	313	881	313	882	40	**313**	**882**	313	881	313	882

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 setting:
    Operating Mode set to "Efficiency-Favor Performance"
    Hyper-threading set to "Enable"
    Snoop mode set to "Cluster On Die"
    Sysinfo program /home/SPEC_ic16/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on x3500M5 Fri Oct 9 03:00:48 2015

    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) CPU E5-2628L v3 @ 2.00GHz
          2 "physical id"s (chips)
          40 "processors"
       cores, siblings (Caution: counting these is hw and system dependent. The

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Platform Notes (Continued)

```
    following excerpts from /proc/cpuinfo might not be reliable.  Use with
    caution.)
       cpu cores : 5
       siblings  : 10
       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 : 12800 KB

 From /proc/meminfo
    MemTotal:       263454396 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux Server"
       VERSION="7.0 (Maipo)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="7.0"
       PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
       ANSI_COLOR="0;31"
       CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
    redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
    system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

 uname -a:
    Linux x3500M5 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64
    x86_64 x86_64 GNU/Linux


 SPEC is set to: /home/SPEC_ic16
    Filesystem            Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-root xfs   927G  147G  780G  16% /
 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 IBM -[TAE105J-1.10]- 04/20/2015
   Memory:
   6x Hynix HMA42GR7MFR4N-TF 16 GB 2 rank 2133 MHz, configured at 1866 MHz
   10x Hynix HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz, configured at 1866 MHz
   8x NO DIMM Unknown

 (End of data from sysinfo program)
```

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General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/SPEC_ic16/libs/32:/home/SPEC_ic16/libs/64:/home/SPEC_ic16/sh"

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
 Filesystem page cache cleared with:
 echo 1>        /proc/sys/vm/drop_caches
 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_2016/linux/compiler/lib/ia32_lin
```

C++ benchmarks:
```
    icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
```

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 -opt-prefetch
    -opt-mem-layout-trans=3
```

C++ benchmarks:
```
    -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
    -opt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh -lsmartheap
```

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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_2016/linux/compiler/lib/ia32_lin`

>   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_2016/linux/compiler/lib/ia32_lin`

Peak Portability Flags

>   400.perlbench: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64`
>   401.bzip2: `-D_FILE_OFFSET_BITS=64 -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: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64`
>   458.sjeng: `-D_FILE_OFFSET_BITS=64 -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`

Peak Optimization Flags

C benchmarks:

>   400.perlbench: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
>   `-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
>   `-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32`

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Peak Optimization Flags (Continued)

401.bzip2: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
`-par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch`
`-auto-ilp32 -ansi-alias`

403.gcc: `-xCORE-AVX2 -ipo -O3 -no-prec-div`

429.mcf: basepeak = yes

445.gobmk: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias`
`-opt-mem-layout-trans=3`

456.hmmer: `-xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32`

458.sjeng: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
`-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4`
`-auto-ilp32`

462.libquantum: basepeak = yes

464.h264ref: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
`-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2`
`-ansi-alias`

C++ benchmarks:

471.omnetpp: `-xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)`
`-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)`
`-par-num-threads=1(pass 1) -prof-use(pass 2) -ansi-alias`
`-opt-ra-region-strategy=block -Wl,-z,muldefs`
`-L/sh -lsmartheap`

473.astar: basepeak = yes

483.xalancbmk: basepeak = yes

Peak Other Flags

C benchmarks:

403.gcc: `-Dalloca=_alloca`

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SPECint_rate_base2006 =   716

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The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-D.20150923.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-D.20150923.xml

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Nov 17 19:13:43 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 17 November 2015.