Lenovo Group Limited

Lenovo NeXtScale nx360 M5
(2.20 GHz, Intel Xeon E5-2699R v4)

**SPECint®2006 = 75.1**

**SPECint_base2006 = 73.0**

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tr>
<td>perlbench</td>
<td>400</td>
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<tr>
<td>bzip2</td>
<td>401</td>
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<tr>
<td>gcc</td>
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<tr>
<td>mcf</td>
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<td>31.6</td>
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<tr>
<td>gobmk</td>
<td>445</td>
<td>31.0</td>
</tr>
<tr>
<td>hmmer</td>
<td>456</td>
<td>36.5</td>
</tr>
<tr>
<td>sjeng</td>
<td>458</td>
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<tr>
<td>libquantum</td>
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<td>58.8</td>
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<td>h264ref</td>
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<tr>
<td>omnetpp</td>
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<td>50.6</td>
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<tr>
<td>astar</td>
<td>473</td>
<td>36.5</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>483</td>
<td>35.9</td>
</tr>
</tbody>
</table>

**Hardware**

**CPU Name:** Intel Xeon E5-2699R v4  
**CPU Characteristics:** Intel Turbo Boost Technology up to 3.60 GHz  
**CPU MHz:** 2200  
**FPU:** Integrated  
**CPU(s) enabled:** 44 cores, 2 chips, 22 cores/chip  
**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:** 55 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)  
**Disk Subsystem:** 1 x 800 GB SATA SSD  
**Other Hardware:** None

**Software**

**Operating System:** SUSE Linux Enterprise Server 12 SP1 (x86_64)  
**Kernel:** 3.12.49-11-default  
**Compiler:** C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux  
**Auto Parallel:** Yes  
**File System:** btrfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 32/64-bit  
**Peak Pointers:** 32/64-bit  
**Other Software:** Microquill SmartHeap V10.2
Lenovo Group Limited

Lenovo NeXtScale nx360 M5
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SPECint_base2006 = 73.0

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Dec-2016
Hardware Availability: Jan-2017
Software Availability: Sep-2016

Results Table

<table>
<thead>
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<th>Ratio</th>
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<th>Ratio</th>
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<td>80.2</td>
<td>80.3</td>
<td>85.9</td>
<td>80.4</td>
</tr>
</tbody>
</table>

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"
Transparent Huge Pages enabled with:
   echo always > /sys/kernel/mm/transparent_hugepage/enabled

Platform Notes

BIOS configuration:
Operating Mode set to Maximum Performance
Hyper-Threading set to Disabled
Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on nx360 Wed Dec 14 02:10:21 2016

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 E5-2699R v4 @ 2.20GHz
   2 "physical id"s (chips)
   44 "processors"
   cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with Continued on next page
Lenovo Group Limited
Lenovo NeXtScale nx360 M5
(2.20 GHz, Intel Xeon E5-2699R v4)

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Platform Notes (Continued)

caution.)
cpu cores : 22
siblings : 22
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
cache size : 56320 KB

From /proc/meminfo
MemTotal: 263963528 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 1
# 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-SP1"
    VERSION_ID="12.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
    Linux nx360 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015 (8d714a0)
x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Dec 14 02:09

SPEC is set to: /home/cpu2006-1.2-ic17.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 746G 31G 714G 5% /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 -[THE126N-2.20]- 09/07/2016
Memory:
    16x Samsung M393A2G40DB1-CRC 16 GB 2 rank 2400 MHz

(End of data from sysinfo program)
Lenovo Group Limited

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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-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/sh10.2"
OMP_NUM_THREADS = "44"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2

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
Lenovo Group Limited
Lenovo NeXtScale nx360 M5 (2.20 GHz, Intel Xeon E5-2699R v4)

SPEC CINT2006 Result

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CPU2006 license: 9017
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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

Continued on next page
Lenovo Group Limited

Lenovo NeXtScale nx360 M5
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SPECint2006 = 75.1
SPECint_base2006 = 73.0

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 -lsmartheap64

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.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-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.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-C.xml
## Lenovo Group Limited

**Lenovo NeXtScale nx360 M5**  
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