Lenovo Group Limited

Lenovo ThinkServer TD350
(2.40 GHz, Intel Xeon E5-2680 v4)

<table>
<thead>
<tr>
<th>SPECint_rate2006 = 1300</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_rate_base2006 = 1250</td>
</tr>
</tbody>
</table>

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

Test date: Oct-2016
Hardware Availability: Mar-2016
Software Availability: Mar-2016

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
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<tbody>
<tr>
<td>perlbench</td>
<td>400</td>
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<tr>
<td>bzip2</td>
<td>401</td>
</tr>
<tr>
<td>gcc</td>
<td>403</td>
</tr>
<tr>
<td>mcf</td>
<td>429</td>
</tr>
<tr>
<td>gobmk</td>
<td>445</td>
</tr>
<tr>
<td>hammer</td>
<td>456</td>
</tr>
<tr>
<td>sjeng</td>
<td>458</td>
</tr>
<tr>
<td>libquantum</td>
<td>462</td>
</tr>
<tr>
<td>h264ref</td>
<td>464</td>
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<tr>
<td>omnetpp</td>
<td>471</td>
</tr>
<tr>
<td>astar</td>
<td>473</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>483</td>
</tr>
</tbody>
</table>

SPECint_rate2006 = 1300

| SPECint_rate_base2006 = 1250 |

Hardware

- CPU Name: Intel Xeon E5-2680 v4
- CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz
- CPU MHz: 2400
- FPU: Integrated
- CPU(s) enabled: 28 cores, 2 chips, 14 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: 35 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 16.0.2.181 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
Lenovo Group Limited
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CPU2006 Result

**SPECint_rate2006 = 1300**
**SPECint_rate_base2006 = 1250**

### Results Table

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<tr>
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<td></td>
</tr>
</tbody>
</table>

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"
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

### Platform Notes

BIOS Configuration:
Cluster On Die set to Enabled
Early Snoop set to Disabled
Performance Profile set to Custom
C1E Support set to Disabled
Core C3 set to Disabled
Core C6 set to Disabled
Thermal Profile set to Max Performance
Memory Power Savings set to Disabled
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 $ e3fbb8667b5a285932ceab81e28219e1
running on TD350-03 Mon Oct 10 09:56:06 2016

Continued on next page
Lenovo Group Limited
Lenovo ThinkServer TD350
(2.40 GHz, Intel Xeon E5-2680 v4)

SPEClnt_rate2006 = 1300
SPEClnt_rate_base2006 = 1250

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
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Platform Notes (Continued)

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 E5-2680 v4@ 2.40GHz
2 "physical id"s (chips)
56 "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 : 14
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
cache size : 17920 KB

From /proc/meminfo
MemTotal: 264555044 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:
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 10 09:53

SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 689G 8.1G 681G 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 Continued on next page
Lenovo Group Limited
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(2.40 GHz, Intel Xeon E5-2680 v4)

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**CPU2006 license:** 9017
**Test date:** Oct-2016
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**Hardware Availability:** Mar-2016
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**Software Availability:** Mar-2016

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**Platform Notes (Continued)**

determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

**BIOS LENOVO TB5TS362 03/24/2016**
**Memory:**
16x Hynix Semiconductor HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz

(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-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh
```

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB memory using RedHat EL 7.2 glibc 2.17
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
```

---

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
Lenovo Group Limited

Lenovo ThinkServer TD350
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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

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_OFFSETBITS=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_LP64
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64

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## Lenovo Group Limited

**Lenovo ThinkServer TD350**  
(2.40 GHz, Intel Xeon E5-2680 v4)  

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<td>Software Availability:</td>
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</tr>
</tbody>
</table>

### SPECint_rate2006 = 1300  
### SPECint_rate_base2006 = 1250

### Peak Portability Flags (Continued)

483.xalancbmk: `-D_FILE_OFFSET_BITS=64` `-DSPEC_CPU_LINUX`

### Peak Optimization Flags

**C benchmarks:**

400.perlbench:  
- `xCORE-AVX2`  
- `ipo`  
- `prof-gen:threadsafe`  
- `par-num-threads=1`  
- `no-prec-div`  
- `auto-ilp32`

401.bzip2:  
- `xCORE-AVX2`  
- `ipo`  
- `prof-gen:threadsafe`  
- `par-num-threads=1`  
- `opt-prefetch`  
- `auto-ilp32`  
- `ansi-alias`

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

429.mcf: basepeak = yes

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

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

458.sjeng:  
- `xCORE-AVX2`  
- `ipo`  
- `prof-gen:threadsafe`  
- `par-num-threads=1`  
- `unroll4`  
- `auto-ilp32`

462.libquantum: basepeak = yes

464.h264ref:  
- `xCORE-AVX2`  
- `ipo`  
- `prof-gen:threadsafe`  
- `par-num-threads=1`  
- `unroll12`  
- `ansi-alias`

### C++ benchmarks:

471.omnetpp:  
- `xCORE-AVX2`  
- `prof-gen:threadsafe`  
- `par-num-threads=1`  
- `ansi-alias`  
- `opt-ra-region-strategy=block`  
- `-L/sh -lsmartheap`  
- `-Wl,-z,muldefs`

473.astar: basepeak = yes

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Lenovo ThinkServer TD350
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Peak Optimization Flags (Continued)

483.xalancbmk: basepeak = yes

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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.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-Settings-V1.2-BDW-revC.xml

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For other inquiries, please contact webmaster@spec.org.

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