**Lenovo Group Limited**

**Lenovo System x3500 M5**

(Intel Xeon E5-2603 v3, 1.60 GHz)

---

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

**SPECint**

\[
\text{SPECint} = 271  
\text{SPECint_base} = 263
\]

**Test date:** Jun-2015  
**Hardware Availability:** Jan-2015  
**Software Availability:** Sep-2014

---

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECint_base</th>
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<th>CPU(s)</th>
<th>Memory Size</th>
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<td>400.perlbench</td>
<td>12</td>
<td>201</td>
<td>249</td>
<td>12 cores, 2 chips, 6 cores/chip</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)</td>
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<td>445.gobmk</td>
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<td>12 cores per chip per core</td>
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<tr>
<td>456.hmmer</td>
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<td>15 MB I+D on chip per core</td>
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<td>319</td>
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</tr>
</tbody>
</table>

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**Hardware**

- **CPU Name:** Intel Xeon E5-2603 v3  
- **CPU Characteristics:**
  - CPU MHz: 1600  
  - FPU: Integrated  
  - CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip  
  - Primary Cache: 32 KB I + 32 KB D on chip per core  
  - Secondary Cache: 256 KB I+D on chip per core  
  - L3 Cache: 15 MB I+D on chip per core  
  - Other Cache: None  
  - Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)  
- **Disk Subsystem:** 1 x 960 GB SATA SSD  
- **Other Hardware:** None

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**Software**

- **Operating System:** Red Hat Enterprise Linux Server release 7.0 (Maipo)  
  - 3.10.0-123.el7.x86_64  
- **Compiler:** C/C++: Version 15.0.0.090 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 V10.0
## Lenovo Group Limited

### Lenovo System x3500 M5
(Intel Xeon E5-2603 v3, 1.60 GHz)

<table>
<thead>
<tr>
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<td>319</td>
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</tr>
</tbody>
</table>

### Results 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"

### Platform Notes

BIOS setting:
Operating Mode set to "Efficiency-Favor Performance"
Sysinfo program /home/SPEC/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3500M5 Wed Jun 24 20:25:29 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 E5-2603 v3 @ 1.60GHz
  2 "physical id"s (chips)
  12 "processors"
  cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

Continued on next page
## Lenovo Group Limited

**Lenovo System x3500 M5**  
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| SPECint_rate2006 = | 271 |
| SPECint_rate_base2006 = | 263 |

### CPU2006 license: 9017

| Test date: | Jun-2015 |
| Hardware Availability: | Jan-2015 |
| Software Availability: | Sep-2014 |

| Test sponsor: | Lenovo Group Limited |
| Tested by: | Lenovo Group Limited |

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### Platform Notes (Continued)

```
cpu cores : 6
siblings : 6
physical 0: cores 0 1 2 3 4 5
physical 1: cores 0 1 2 3 4 5
cache size : 15360 KB
```

From `/proc/meminfo`

```
MemTotal: 263458148 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
```

```
Filesystem       Type Size  Used Avail Use% Mounted on  
/dev/mapper/rhel-root xfs 927G 138G 789G 15% /
```

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:
    16x Hynix HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz, configured at 1600 MHz
    8x NO DIMM Unknown
```

(End of data from sysinfo program)
Lenovo Group Limited
Lenovo System x3500 M5
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## General Notes

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

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0
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
```
runcspec command invoked through numactl i.e.:
```
numactl --interleave=all runspec <etc>
```

---

## Base Compiler Invocation

**C benchmarks**:
```
icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
```

**C++ benchmarks**:
```
icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
```

---

## Base Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_IA32
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX

---

## Base Optimization Flags

**C benchmarks**:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
```

**C++ benchmarks**:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -Wl,-z,muldefs -L/sh -lsmartheap
```

---

## Base Other Flags

**C benchmarks**:
```
403.gcc: -Dalloca=_alloca
```

---
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Peak Compiler Invocation

C benchmarks (except as noted below):
  icc -m32 -L/opt/intel/composer_xe_2015/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/composer_xe_2015/lib/ia32

Peak Portability Flags

  400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
  401.bzip2: -DSPEC_CPU_LP64
  456.hmmer: -DSPEC_CPU_LP64
  458.sjeng: -DSPEC_CPU_LP64
  462.libquantum: -DSPEC_CPU_LINUX
  483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

  400.perlbench: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
  -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
  -auto-ilp32

  401.bzip2: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
  -O3(pass 2) -no-prec-div(pass 2) -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(pass 1) -prof-use(pass 2)
  -ansi-alias

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

  458.sjeng: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
  -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
  -unroll4 -auto-ilp32

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Peak Optimization Flags (Continued)

462.libquantum: basepeak = yes
464.h264ref: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-unroll2 -ansi-alias

C++ benchmarks:
471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.xml

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.html

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