Lenovo Group Limited

Lenovo System x3550 M5
(Intel Xeon E5-2620 v3, 2.40 GHz)

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

Test date: Feb-2015
Hardware Availability: Oct-2014
Software Availability: Sep-2014

CPU Name: Intel Xeon E5-2620 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz
CPU MHz: 2400
FPU: Integrated
CPU(s) enabled: 12 cores, 2 chips, 6 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: 15 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 300 GB SAS
Other Hardware: None

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

SPECint_rate2006 = 529
SPECint_rate_base2006 = 508

Software
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>401.bzip2</td>
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<td>942</td>
<td>246</td>
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<td>473.astar</td>
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<td>483.xalancbmk</td>
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<td>286</td>
<td>579</td>
<td>24</td>
<td>286</td>
<td>580</td>
<td>286</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"

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 x3550m5 Sat Feb 14 03:30:17 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 E5-2620 v3 @ 2.40GHz
    2 "physical id"s (chips)
    24 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
Lenovo Group Limited

Lenovo System x3550 M5
(Intel Xeon E5-2620 v3, 2.40 GHz)

**SPEC CINT2006 Result**

<table>
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<tr>
<th>Metric</th>
<th>Value</th>
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**CPU2006 license:** 9017
**Test date:** Feb-2015
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**Software Availability:** Sep-2014

Platform Notes (Continued)

- **CPU Cores:** 6
- **siblings:** 12
- **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: 263633996 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release* /etc/*version*`
- 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)

uname -a:
```
Linux x3550m5 3.10.0-123.e17.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 | 275G | 11G | 265G | 4% | /

**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** -[TBE103AUS-1.01]- 10/23/2014

**Memory**:
- 14x Hynix 484D4134324752374D4652344E2D54462020 16 GB 2 rank 2133 MHz, configured at 1867 MHz
- 2x Hynix 484D4134324752374D4652344E2D54465431 16 GB 2 rank 2133 MHz, configured at 1867 MHz
- 8x NO DIMM Unknown

(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:

```
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.:
```
umactl --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
```
# Lenovo Group Limited

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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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Continued on next page
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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)
              -O3(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)
              -O3(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

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.20141230.html

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.20141230.xml

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