Lenovo Group Limited

Lenovo System x3950 X6 (Intel Xeon E7-8891 v3, 2.80 GHz)

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

Lenovo Group Limited (Intel Xeon E7-8891 v3, 2.80 GHz)

SPECint\_rate2006 = 3960
SPECint\_rate\_base2006 = 3790

Test date: Jan-2016
Hardware Availability: Jul-2015
Software Availability: Oct-2014

CPU Name: Intel Xeon E7-8891 v3
CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz: 2800
FPU: Integrated
CPU(s) enabled: 80 cores, 8 chips, 10 cores/chip, 2 threads/core
CPU(s) orderable: 4, 6, 8 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: 45 MB I+D on chip per chip
Other Cache: None
Memory: 2 TB (128 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)
Disk Subsystem: 1 x 400 GB SSD
Other Hardware: None

Operating System: SUSE Linux Enterprise Server 12 (x86_64) 3.12.28-4-default
Compiler: CIC++: Version 15.0.0.0.90 of Intel C++ StudioXE 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
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Results Table

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<tr>
<th>Benchmark</th>
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<td>563</td>
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<td>403.gcc</td>
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<td>160</td>
<td>259</td>
<td>4260</td>
<td>259</td>
<td>4260</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
Operating Mode set to Custom in BIOS
Cstates disabled in B10
Sysinfo program /cpu2006.1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-lea3 Tue Oct 13 11:23:35 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 E7-8891 v3 @ 2.80GHz
  8 "physical id"s (chips)
  160 "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
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Platform Notes (Continued)

    cpu cores : 10
    siblings : 20
    physical 0: cores 0 1 2 4 6 8 17 19 20 23
    physical 1: cores 0 1 2 4 6 8 17 19 20 23
    physical 2: cores 0 1 2 4 6 8 17 19 20 23
    physical 3: cores 0 1 2 4 6 8 17 19 20 23
    physical 4: cores 0 1 2 4 6 8 17 19 20 23
    physical 5: cores 0 1 2 4 6 8 17 19 20 23
    physical 6: cores 0 1 2 4 6 8 17 19 20 23
    physical 7: cores 0 1 2 4 6 8 17 19 20 23
    cache size : 46080 KB

From /proc/meminfo
    MemTotal: 2117742048 kB
    HugePages_Total: 0
    Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12

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

uname -a:
    Linux linux-lea3 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
        (9879bd4) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 13 11:22 last=5

SPEC is set to: /cpu2006.1.2
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda3 xfs 371G 8.0G 363G 3% /

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.

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**Platform Notes (Continued)**  

BIOS IBM -[A9E125JUS-2.00]- 06/18/2015  
Memory:  
126x Hynix HMA42GR7MF4N-TF 16 GB 2 rank 2133 MHz, configured at 1600 MHz  
2x Hynix HMA42GR7MF4N-TFTD 16 GB 2 rank 2133 MHz, configured at 1600 MHz  
64x NO DIMM Unknown  

(End of data from sysinfo program)  

**General Notes**  

Environment variables set by runspec before the start of the run:  
LD_LIBRARY_PATH = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64:/cpu2006.1.2/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  
runcpec 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  
-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: -Daloca=_alloca

### 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`

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Peak Optimization Flags (Continued)

429.mcf: basepeak = yes
445.gobmk: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -prof-use(pass 2)
        -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(pass 1) -ipo(pass 2)
        -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
        -unroll14 -auto-ilp32
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-CC.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-CC.xml
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