Lenovo Group Limited

Lenovo ThinkServer TS440 (Intel Xeon E3-1286 v3, 3.70 GHz)

**SPECfp®2006 = 80.8**

**SPECfp_base2006 = 78.9**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Operating System: Red Hat Enterprise Linux Server release 7.0 (Maipo) 3.10.0-123.el7.x86_64</td>
</tr>
<tr>
<td><strong>CPU Characteristics:</strong></td>
<td>Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux</td>
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<tr>
<td><strong>CPU MHz:</strong></td>
<td>Auto Parallel: Yes</td>
</tr>
<tr>
<td><strong>FPU:</strong></td>
<td>File System: xfs</td>
</tr>
<tr>
<td><strong>CPU(s) enabled:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>CPU(s) orderable:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Primary Cache:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary Cache:</strong></td>
<td></td>
</tr>
</tbody>
</table>

**CPU2006 license:** 9017

Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Mar-2015

Hardware Availability: Jun-2014

Software Availability: Sep-2014

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Continued on next page

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**Lenovo Group Limited**

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**SPECfp2006 =** 80.8

**SPECfp_base2006 =** 78.9

**CPU2006 license:** 9017

**Tested by:** Lenovo Group Limited

**Test sponsor:** Lenovo Group Limited

**Test date:** Mar-2015

**Hardware Availability:** Jun-2014

**Software Availability:** Sep-2014

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** 32/64-bit

**Other Software:** None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>117</td>
<td>116</td>
<td>118</td>
<td>116</td>
<td>117</td>
<td>116</td>
</tr>
<tr>
<td>416.gamess</td>
<td>430</td>
<td>45.5</td>
<td>429</td>
<td>45.7</td>
<td>429</td>
<td>45.7</td>
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<tr>
<td>433.milc</td>
<td>104</td>
<td>88.5</td>
<td>104</td>
<td>88.5</td>
<td>104</td>
<td>88.4</td>
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<tr>
<td>434.zeusmp</td>
<td>62.2</td>
<td>146</td>
<td>62.1</td>
<td>146</td>
<td>62.3</td>
<td>146</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>137</td>
<td>52.1</td>
<td>137</td>
<td>52.2</td>
<td>137</td>
<td>52.1</td>
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<tr>
<td>436.cactusADM</td>
<td>48.3</td>
<td>247</td>
<td>48.5</td>
<td>246</td>
<td>49.0</td>
<td>244</td>
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<tr>
<td>437.leslie3d</td>
<td>112</td>
<td>83.6</td>
<td>113</td>
<td>83.3</td>
<td>113</td>
<td>83.3</td>
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<tr>
<td>444.namd</td>
<td>231</td>
<td>34.7</td>
<td>231</td>
<td>34.7</td>
<td>232</td>
<td>34.6</td>
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<tr>
<td>447.dealII</td>
<td>170</td>
<td>67.3</td>
<td>169</td>
<td>67.6</td>
<td>169</td>
<td>67.7</td>
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<tr>
<td>450.soplex</td>
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<td>46.3</td>
<td>176</td>
<td>47.3</td>
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<td>47.5</td>
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<tr>
<td>453.povray</td>
<td>84.4</td>
<td>63.0</td>
<td>86.5</td>
<td>61.5</td>
<td>83.9</td>
<td>63.4</td>
</tr>
<tr>
<td>454.calculix</td>
<td>132</td>
<td>62.6</td>
<td>132</td>
<td>62.5</td>
<td>132</td>
<td>62.4</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>150</td>
<td>70.7</td>
<td>150</td>
<td>70.7</td>
<td>150</td>
<td>70.7</td>
</tr>
<tr>
<td>465.tonto</td>
<td>176</td>
<td>55.9</td>
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<td>55.7</td>
<td>177</td>
<td>55.7</td>
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<tr>
<td>470.lbm</td>
<td>95.4</td>
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<td>95.2</td>
<td>144</td>
<td>95.8</td>
<td>143</td>
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<tr>
<td>481.wrf</td>
<td>104</td>
<td>107</td>
<td>105</td>
<td>107</td>
<td>105</td>
<td>107</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>210</td>
<td>92.7</td>
<td>212</td>
<td>92.0</td>
<td>215</td>
<td>90.4</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"

**Platform Notes**

BIOS configuration
ICE Performance Modes set to Full Speed
Intel(R) Hyper-Threading-Technology set to Disabled
C1E Support set to Disabled
Sysinfo program /usr/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 $e3fbb8667b5a285932ceab81e28219e1
running on TS440 Tue Mar 10 01:35:00 2015

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
Continued on next page

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CPU2006 license: 9017
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Tested by: Lenovo Group Limited

SPECfp2006 = 80.8
SPECfp_base2006 = 78.9

Test date: Mar-2015
Hardware Availability: Jun-2014
Software Availability: Sep-2014

Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E3-1286 v3 @ 3.70GHz
  1 "physical id"s (chips)
  4 "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 : 4
siblings : 4
physical 0: cores 0 1 2 3
cache size : 8192 KB

From /proc/meminfo
MemTotal: 16155112 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 TS440 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

run-level 3 Mar 9 21:07

SPEC is set to: /usr/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 741G 14G 728G 2% /

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 FBKT99AUS 09/19/2014
Memory:
2x Samsung M391B1G73BH0-YK0 8 GB 2 rank 1600 MHz
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Lenovo Group Limited

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Platform Notes (Continued)

2x [Empty] [Empty]

(End of data from sysinfo program)
TS440 support 2 channels and 2 DIMMs per channel, total 4 DIMMs. 2DIMM slots installed with 8 GB DIMM for this run.

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/usr/cpu2006/libs/32:/usr/cpu2006/libs/64:/usr/cpu2006/sh"
OMP_NUM_THREADS = "4"

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

Base Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main

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Software Availability: Sep-2014

**Base Portability Flags (Continued)**

459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

**Base Optimization Flags**

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias

**Peak Compiler Invocation**

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
icc -m64 ifort -m64

**Peak Portability Flags**

Same as Base Portability Flags
Lenovo Group Limited
Lenovo ThinkServer TS440 (Intel Xeon E3-1286 v3, 3.70 GHz)  

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Test sponsor: Lenovo Group Limited  
Test date: Mar-2015  
Hardware Availability: Jun-2014  
Tested by: Lenovo Group Limited  
Software Availability: Sep-2014

Peak Optimization Flags

C benchmarks:

433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-auto-ilp32 -ansi-alias

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -03 -no-prec-div -unroll2 -ansi-alias  
-parallel

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4  
-ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
Lenovo Group Limited

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| SPECfp_base2006 | 78.9 |

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Software Availability: Sep-2014

Peak Optimization Flags (Continued)

436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
481.wrf: basepeak = yes

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-Settings-V1.2-TS440-revA.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-Settings-V1.2-TS440-revA.xml

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

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