SPEC® CINT2006 Result
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Lenovo Group Limited

Lenovo ThinkServer RD540 (Intel Xeon E5-2609 v2, 2.50 GHz)

$SPECint^®2006 =$ 39.1

$SPECint\_base2006 =$ 37.8

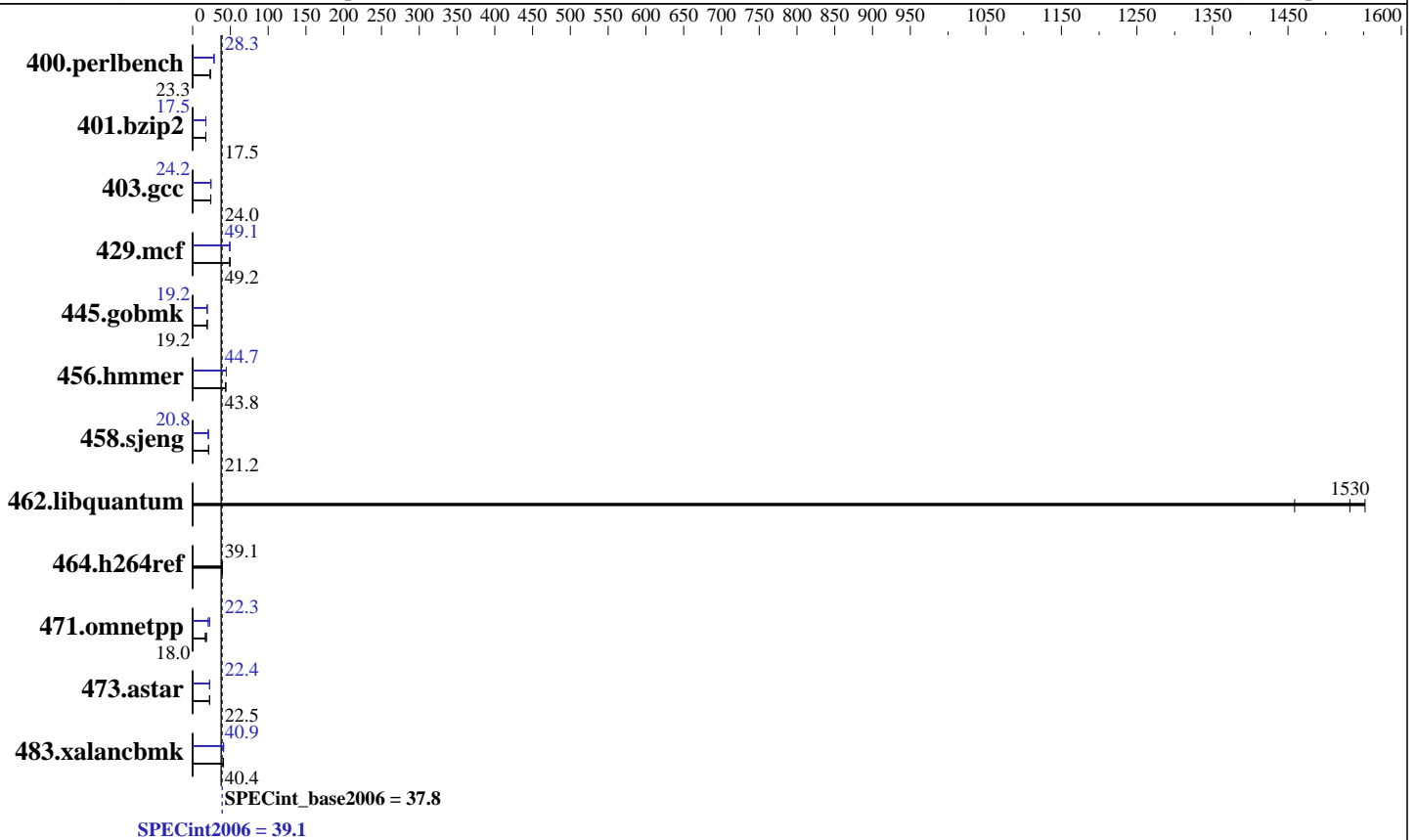|			
CPU2006 license: 9017		**Test date:**	Jan-2015
Test sponsor: Lenovo Group Limited		**Hardware Availability:**	Jan-2013
Tested by: Lenovo Group Limited		**Software Availability:**	Sep-2014

400.perlbench 28.3 / 23.3
401.bzip2 17.5 / 17.5
403.gcc 24.2 / 24.0
429.mcf 49.1 / 49.2
445.gobmk 19.2 / 19.2
456.hmmer 44.7 / 43.8
458.sjeng 20.8 / 21.2
462.libquantum 1530
464.h264ref 39.1
471.omnetpp 22.3 / 18.0
473.astar 22.4 / 22.5
483.xalancbmk 40.9 / 40.4

SPECint_base2006 = 37.8
SPECint2006 = 39.1

Hardware

CPU Name:	Intel Xeon E5-2609 v2
CPU Characteristics:	
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
CPU(s) orderable:	1,2 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:	10 MB I+D on chip per chip
Other Cache:	None
Memory:	256 GB (16 x 16 GB 2Rx4 PC3L-12800R-11, ECC, running at 1333 MHz)
Disk Subsystem:	1 x 240 SATA SSD
Other Hardware:	None

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:	Yes
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit
Other Software:	Microquill SmartHeap V10.0

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	418	23.4	**420**	**23.3**	420	23.3	**345**	**28.3**	345	28.3	345	28.3
401.bzip2	**552**	**17.5**	552	17.5	551	17.5	**551**	**17.5**	552	17.5	551	17.5
403.gcc	335	24.1	336	24.0	**335**	**24.0**	337	23.9	**332**	**24.2**	332	24.3
429.mcf	186	49.1	**185**	**49.2**	184	49.5	**186**	**49.1**	185	49.3	186	49.0
445.gobmk	**546**	**19.2**	548	19.1	546	19.2	546	19.2	546	19.2	**546**	**19.2**
456.hmmer	**213**	**43.8**	213	43.7	213	43.8	209	44.7	209	44.5	**209**	**44.7**
458.sjeng	572	21.2	**572**	**21.2**	572	21.2	583	20.7	583	20.8	**583**	**20.8**
462.libquantum	14.2	1460	13.4	1550	**13.5**	**1530**	14.2	1460	13.4	1550	**13.5**	**1530**
464.h264ref	566	39.1	**567**	**39.1**	567	39.0	566	39.1	**567**	**39.1**	567	39.0
471.omnetpp	377	16.6	**348**	**18.0**	343	18.2	280	22.3	**281**	**22.3**	306	20.4
473.astar	**312**	**22.5**	313	22.4	310	22.6	310	22.6	**313**	**22.4**	313	22.4
483.xalancbmk	172	40.2	169	40.9	**171**	**40.4**	168	41.1	169	40.8	**169**	**40.9**

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

Submit Notes

The config file option 'submit' was used.

Operating System Notes

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

Platform Notes

```
    BIOS configuration
    CPU C3 report set to Enabled
     Sysinfo program /usr/cpu2006/config/sysinfo.rev6914
     $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
     running on RD540 Fri Jan 23 00:15:08 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 E5-2609 v2 @ 2.50GHz
           2 "physical id"s (chips)
           8 "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
```

Continued on next page

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Platform Notes (Continued)

```
      physical 0: cores 0 1 2 3
      physical 1: cores 0 1 2 3
    cache size : 10240 KB

  From /proc/meminfo
    MemTotal:       263944616 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 RD540 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 Jan 23 00:12

  SPEC is set to: /usr/cpu2006
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   219G   34G  185G  16% /
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 A1TS8AA 10/15/2014
  Memory:
  1x DimmA3_Manufacturer DimmA3_PartNumA3
  1x DimmB3_Manufacturer DimmB3_PartNumB3
  1x DimmC3_Manufacturer DimmC3_PartNumC3
  1x DimmD3_Manufacturer DimmD3_PartNumD3
  16x Samsung M393B2G70BH0-YK0 16 GB 2 rank 1333 MHz

 (End of data from sysinfo program)
RD540 support 4 channels and 12 DIMMs for processor0, 4 channels and 8 DIMMs for processor1,
total 8 channels and 20 DIMMs. 16 DIMM slots installed with 16 GB DIMM for this run.
```

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General Notes

```
Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/usr/cpu2006/libs/32:/usr/cpu2006/libs/64:/usr/cpu2006/sh"
OMP_NUM_THREADS = "8"

 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

Base Portability Flags

```
 400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
    401.bzip2: -DSPEC_CPU_LP64
      403.gcc: -DSPEC_CPU_LP64
      429.mcf: -DSPEC_CPU_LP64
    445.gobmk: -DSPEC_CPU_LP64
    456.hmmer: -DSPEC_CPU_LP64
    458.sjeng: -DSPEC_CPU_LP64
 462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
   464.h264ref: -DSPEC_CPU_LP64
   471.omnetpp: -DSPEC_CPU_LP64
     473.astar: -DSPEC_CPU_LP64
 483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
    -xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32

C++ benchmarks:
    -xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -Wl,-z,muldefs
    -L/sh -lsmartheap64

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Base Other Flags

C benchmarks:

>   403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):
>   icc -m64

>   400.perlbench: icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

>   445.gobmk: icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

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

>   473.astar: icpc -m64

Peak Portability Flags

>   400.perlbench: -DSPEC_CPU_LINUX_IA32
>   401.bzip2: -DSPEC_CPU_LP64
>   403.gcc: -DSPEC_CPU_LP64
>   429.mcf: -DSPEC_CPU_LP64
>   456.hmmer: -DSPEC_CPU_LP64
>   458.sjeng: -DSPEC_CPU_LP64
>   462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
>   464.h264ref: -DSPEC_CPU_LP64
>   473.astar: -DSPEC_CPU_LP64
>   483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

>   400.perlbench: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
>   -no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch
>   -ansi-alias

>   401.bzip2: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
>   -no-prec-div -prof-use(pass 2) -auto-ilp32 -opt-prefetch
>   -ansi-alias

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Peak Optimization Flags (Continued)

403.gcc: -xAVX -ipo -O3 -no-prec-div -inline-calloc
-opt-malloc-options=3 -auto-ilp32

429.mcf: -xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch
-auto-p32

445.gobmk: -xAVX(pass 2) -prof-gen(pass 1) -prof-use(pass 2)
-ansi-alias

456.hmmer: -xAVX -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
-ansi-alias

458.sjeng: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2)
-opt-ra-region-strategy=block   -ansi-alias
-Wl,-z,muldefs -L/sh -lsmartheap

473.astar: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -lsmartheap64

483.xalancbmk: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
-Wl,-z,muldefs -L/sh -lsmartheap

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-Settings-V1.2-RD540-revC.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-RD540-revC.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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